REQUEST FOR PROPOSALS
SYRACUSE REGIONAL AIRPORT AUTHORITY

CENTRALIZED DEICING FACILITY CONSTRUCT

RFP# 2026-09

Issued:	May 04, 2026
Submission Deadline:	**June 24, 2026 no later than 1:00 pm eastern time.**
Submission Format:	Email PDF to bids@syrairport.org. Bids are only accepted electronically. Please print the word RFP Reference #2026-09 on the cover page of the bid and on the email subject line.

IMPORTANT NOTICE: A restricted period under the Procurement Lobbying Law is currently in effect for this Procurement and it will remain in effect until the Authority executes the contract. Bidders are prohibited from contact related to this procurement with any Syracuse Regional Airport Authority member, officer, staff or employee other than the designated contact person (if any) and/or the designated email address for contact. Please refer to Sections 2.2 and 2.3 below.

All contacts/inquiries shall be made by email **only** to the following address: bids@syrairport.org

1. GENERAL INFORMATION

1.1. Background

The Syracuse Regional Airport Authority (the "Authority") was created by the New York State Legislature on August 17, 2011 by Chapter 463 of the Laws of 2011. The Authority is the operator of the Syracuse Hancock International Airport in Syracuse, New York. The Authority is a New York State public benefit corporation established for the purpose of (i) stimulating economic growth, (ii) increasing trade and tourism, (iii) promoting safe and secure air travel in the region, (iv) providing citizens with efficient and economical air transportation options, and (v) to protect and enhance the natural resources and quality of the environment.

1.2. Intent and Purpose of this RFP

This Request for Proposals (RFP) solicits bids to expand and reconstruct the existing south deicing pad at Syracuse Hancock International Airport for the new Centralized Deicing Facility. The pavement reconstruction area is approximately 350,000 sf with an additional 425,000 sf of new asphalt pavement which is expected to accommodate seven narrow or two wide body aircraft. A comprehensive description of the Project can be found at **Exhibit A** to this RFP.

1.3 Key Dates in the RFP Schedule

It is anticipated that a Project award will be made in connection with this Request for Proposals (RFP) based on the following schedule:

May 04, 2026 – Issuance of Request for Proposals
May 27, 2026 at 1PM– Non-Mandatory Pre-Bid Conference
June 10, 2026 at 1PM – Question/Clarification Submission Deadline
June 24, 2026 at 1PM – Bid Submission Deadline
June 24, 2026 at 2PM – Bid Opening via Microsoft Teams

Please note: *The Authority reserves the right to change any of the dates stated in this RFP. If such change occurs, the Authority will notify all entities who received the RFP directly from the Authority and post the change(s) on the Syracuse Regional Airport Authority's website, which is part of the Syracuse Hancock International Airport website (http://www.syrsraa.com/bids-RFP-rfq/).*

Interested parties that receive this RFP or access it from a source other than the Authority should contact the Authority at bids@syrairport.org to advise the Authority of their interest and to confirm that their correct contact information, including email address, is placed on file with the Authority.

1.4 Pre-Bid Conference

A non-mandatory pre-bid conference will be held at 1:00 pm on May 27, 2026 in John Walsh Conference Room, Syracuse Hancock Airport, 1000 Col Eileen Collins Blvd, Syracuse NY. This will be the only time available for prospective Bidders to visit the site. Persons with disabilities who require assistance or special arrangements to participate in this pre-bid conference or the bid opening are encouraged to contact the Airport at (315) 454-3263 at least 72 hours in advance so that proper arrangements can be made.

1.5 Amendment or Termination of RFP

RFP Amendment, Cancellation/Postponement: The Syracuse Regional Airport Authority reserves the right to amend, cancel or postpone this RFP at any time without penalty. The Syracuse Regional Airport Authority reserves the right to terminate or cancel any contract awarded pursuant to this RFP, either pre or post execution, or any part of said contract, immediately upon notice mailed or delivered by the Authority to the selected Bidder.

1.6 Unbalanced Bids

The Syracuse Regional Airport Authority reserves the right to reject any and all bids at any time not deemed in the best interest of the Authority and to reject as informal such bids, as in the Authority's opinion, are incomplete, conditional, obscure, or which contain irregularities of any kind.

1.7 Questions or Requests for Proposals or Clarification

Any questions, requests for information or clarification regarding this RFP should be submitted via email, citing the relevant RFP page(s) and section(s), no later than the date listed in Section 1.3 Key Dates to bids@syrairport.org.

Questions will not be accepted other than by email, and any question received after the deadline may not be answered. The list of questions/requests for information or clarification and the official responses will

be emailed to all Bidders who obtained this material directly from the Authority and posted on the Syracuse Regional Airport Authority's website, http://www.syrsraa.com/bids-RFP-rfq/.

Bidders that receive this RFP or access it from a source other than the Authority should contact the Authority at bids@syrairport.org to confirm that and/or add their correct contact information, including email address, is on file with the Authority for purposes of this RFP. This will ensure that the Bidder receives the list of questions/requests for information, amendments or clarifications and the official responses. The Authority is not responsible for a Bidder's failure to receive the list of questions/requests for information, amendments or clarifications and the official responses, due to the Bidder's failure to provide the Authority its contact information, including email address, and no allowance will be made for a Bidder that submitted a bid that is not in compliance with the RFP requirements due to the Bidder's aforementioned failure to receive the list of questions/requests for information or clarification/amendments and addenda, and the official responses to such inquires and/or changes.

By submitting a bid to the Authority in response to this RFP, each Bidder agrees and represents and warrants that the Bidder: a) has all information necessary for the Bidder to complete and submit a fully responsive bid to the Authority; b) that if awarded the contract, that the Bidder has all the necessary skills and resources to complete the contract for the amount stated in the bid; and c) that the Bidder is waiving any and all claims against the Authority and its members, officers, staff and employees relating to the submission of the Bidder's bid to the Authority. Bidder will bear any, and all travel and other costs and expenses related to its attendance at the pre-submittal meeting and facility tour (if any). Verbal responses provided by Authority representatives at such meeting/tour are informal and are not binding on the Authority.

1.8 Amendments and Addenda

In the event that it becomes necessary to revise this RFP, such revision will be by an addendum to this RFP. Any addendum to this RFP will become part of this RFP and part of any contract awarded as a result of this RFP. Further, if a Bidder discovers any conflict, discrepancy, omission or other error in this RFP, the Bidder shall immediately notify the Authority at bids@syrairport.org, of such error and request modification to the document to address such alleged error. The Authority shall make any RFP modifications necessary by addenda, provided that any such modifications would not materially benefit or disadvantage any one Bidder over another. If a Bidder fails, prior to the submission deadline, to notify the Authority of a known error or an error that reasonably should have been known or discovered by Bidder, the Bidder shall assume the risk of such failure to notify. If awarded the contract, the Bidder shall not be entitled to additional compensation, change order or time allowance by reason of the error or its late correction. All RFP addenda will be communicated via email to the recipients of the original RFP.

The Authority is not responsible for a Bidder's failure to receive amendments or addenda pertaining to this RFP. It is incumbent on Bidders to routinely check for amendments and addenda at *http://www.syrsraa.com/bids-RFP-rfq/* and no allowance will be made for a Bidder's failure to receive addenda. As of the date of issuance, there are no designated dates for release of addenda. However, Bidders should check the Authority's website frequently beginning at the time of RFP issuance through the deadline for submission of bids. It is the sole responsibility of the Bidder to be knowledgeable of all amendments, addenda, questions and answers related to this RFP.

1.9 Submission Requirements

Bidder's bid, including all required forms attached at Exhibits to this RFP, shall be submitted via email to bids@syrairport.org in response to this RFP. The submission shall be clearly labeled with the name of the

Bidder, date and must contain the required information for the Bidder. Failure to do so may result in disqualification. Do not include the RFP in the submission. Bids should be submitted in the following format:

Description of Company	1 page
Experience on similar scope & size projects (not SRAA)	4 pages
Approach for construction & coordination	6 pages
Proposed project schedule	2 pages
Project Management & Supervisory staffing & experience	2 pages
Required Attachments, Questionnaire and Fee Schedule	

Bidders should also be willing and able to provide additional information that may be required. In addition, interviews may be requested at the discretion of any RFP review or ad hoc Committee appointed by the Authority.

All information and materials submitted to the Authority in response to this RFP will become the property of the Authority. Bidders shall not submit proprietary or confidential business information unless they believe such information is critical to their submittals or presentations. If any such information is included, it shall be clearly identified as such. The Authority shall endeavor to protect the identified information only to the extent allowed under applicable law.

By submitting a bid to the Authority in response to this RFP, each Bidder agrees and represents and warrants that the Bidder: a) has all information necessary for the Bidder to complete and submit a fully responsive bid to the Authority; b) that if awarded the contract, that the Bidder has all the necessary skills and resources to complete the contract for the amount stated in the bid; and c) that the Bidder is waiving any and all claims against the Authority and its members, officers, staff and employees relating to the submission of the Bidders bid to the Authority. Bidder will bear any, and all travel and other costs and expenses related to its attendance at the pre-submittal meeting and facility tour (if any). Verbal responses provided by Authority representatives at such meeting/tour are informal and are not binding on the Authority.

2.0 Bids and Qualifications Review

Upon receipt of bids, the Authority's shall internally review each bid and make a recommendation to the Board of the Authority. Bids will be reviewed on the basis of competency, experience and ability to perform the services required. Bidders should be willing and able to provide additional information that may be required by the Authority. The Syracuse Regional Airport Authority reserves the right to waive any formalities and to reject or negotiate any and all bids for any reason.

2.1 Award

The Syracuse Regional Airport Authority may award the project(s), following the required approvals, if it determines such project(s) is/are in the best interest of the Syracuse Regional Airport Authority.

2.2 Restriction of Communications

Bidders are prohibited from contact related to this RFP with any Authority Board member, officer, staff, employee or representative other than designated personnel from the date this RFP is issued until the contract(s) have been executed by the Authority. Violation of this provision is grounds for immediate disqualification. All inquiries concerning this RFP must be done via email at: bids@syrairport.org. Please indicate RFP Reference # **2026-09** in the subject line of the email.

2.3 New York State Finance Law Sections 139-j and 139-k

Pursuant to State Finance Law §§ 139-j and 139-k (collectively, the "Statute"), certain restrictions are placed on contact with State agencies, including public entities such as the Authority, during the procurement process. The term "contact" is defined in the Statute as "any oral, written or electronic communication with a governmental entity under circumstances where a reasonable person would infer that the communication was intended to influence the governmental entities conduct or decision regarding the governmental procurement." Upon receiving any contact, the Authority must inquire and record whether the person or organization that made the contact was the offeror (defined below), or was retained, employed or designated on behalf of the offeror to appear before or contact the Authority. The term "offeror" is defined in the Statute as "the individual or entity, or any employee, agent or consultant or person acting on behalf of such individual or entity, that contacts a governmental entity about a governmental procurement during the restricted period of such governmental procurement whether or not the caller has a financial interest in the outcome of the procurement; provided, however, that a governmental agency or its employees that communicates with the procuring agency regarding a governmental procurement in the exercise of its oversight duties shall not be considered an offeror." The "restricted period" is defined in the Statute as "the period of time commencing with the earliest written notice, advertisement or solicitation of a request for proposals, invitation for bids, or solicitation of bids, or any other method for soliciting a response from offerors intending to result in a procurement contract with a governmental entity and ending with the final contract award and approval by the governmental entity and, where applicable, the state comptroller." Authority members, officers, staff and employees are also required to obtain certain information when contacted during the restricted period and make a determination of the responsibility of the offeror pursuant to the Statute. Certain findings of non-responsibility can result in rejection for contract award and, in the event of two findings within a four-year period; the offeror is debarred from submitting a bid on or being awarded any procurement contract for a period of four years from the date of the second final determination. Any Bidder responding to this RFP must complete the Non-Collusive bid Certification attached hereto at **Exhibit B** and submit it to the Authority with its bid. Questions regarding this form may be directed to the Designated Contact email for this solicitation and/or visit the following website for information: https://online.ogs.ny.gov/legal/lobbyinglawfaq/.

VIOLATIONS OF THE FOREGOING SECTIONS 2.2 and 2.3 SHALL BE STRICTLY ENFORCED AND MAY RESULT IN DISQUALIFICATION OF THE BID TO WHICH IT PERTAINS.

2.4 Exceptions

Any and all exceptions to this RFP must be clearly and completely indicated in bids submitted. Please be advised that any exceptions to the requirements in this RFP may be cause for a Bidder's bid to be disqualified.

2.5 Bid Costs

The Bidders' costs for the Bidders' entire submittal effort shall be borne by the Bidder. The Authority will not reimburse any Bidder or other firm for any costs associated with its submittal effort.

2.6 Whistleblower Policy and Procedures

The selected Bidder will be required to comply with and perform its services under the contract in accordance with any and all Whistleblower Policy and Procedures adopted by the Authority and available on its website at: https://syrairport.org/sraa/.

2.7 DBE Program

This project is funded by a Federal Aviation Administration grant, and requires the proposer and successful bidder to comply with Disadvantaged Business Enterprise compliance goals. By submitting a proposal, the Proposer represents that it has reviewed and familiarized itself with the Federal Disadvantaged Business Enterprise compliance program. Any conflicts between this solicitation and those regulations shall be resolved in favor of the regulations. Each proposer shall, in accordance with the regulations, make good faith efforts and, in a manner that can be established in documentary form, solicit active participation by certified DBE's in connection with any contract resulting from this RFP. These regulations, and any contract to be entered into between the Authority and the successful proposer, will impose reporting obligations on the awarded contractor to periodically report DBE information to the Authority. Failure to do so will result in a finding of non-responsiveness and rejection of that proposal. For purposes of this solicitation, the Authority has established an overall goal of (6%) for Disadvantaged Business Enterprise (DBE) participation for the project*.

**Pursuant to U.S. Department of Transportation Interim Final Rule (IFR), effective October 3, 2025, the NYS Unified Certification Program (UCP) must complete the reevaluation process provided in 49 CFR § 26.111 for all DBE certifications, and until such time the UCP may not include DBE contract goals or count any participation toward overall DBE goals. NYS UCP has therefore, as of the date hereof, paused goal setting and awards that include DBE goals (see NYSUCP DBE Directory and Application Portal). In the event NYS UCP has completed said evaluation process and certified DBEs in accordance with the IFR and new federal eligibility standards prior to execution of the Project Agreement between Authority and the selected Bidder, the selected Bidder shall comply with the Authority's established DBE goal. Nothing in this RFP or resultant Project Agreement with the selected Bidder shall require the termination, rescission, amendment, breach or otherwise interfere with any executed contracts between the selected Bidder and any contractors/subcontractors concerning the Project in the event of NYS UCP completes its reevaluation and certification of DBEs after execution of the Project Agreement between Authority and the selected Bidder.*

2.8 Required Federal Solicitation/Contract Clauses (Current as of March 17, 2026)

The Authority is the recipient of U.S. Department of Transportation grant monies and as such is required to include specific solicitation provisions in all solicitations for the following types of grant funded projects:

1. Construction Development,
2. Equipment Acquisitions, and
3. Professional Services (A/E) Contracting.

This project will be funded, at least in part, with Federal monies. In addition, the contract awarded to the winning Bidder will include a number of mandatory Federal contract clauses that will bind the contractor and its subcontractors to those clauses (Exhibit C hereto).

Required Solicitation Clauses

FAA BUY AMERICAN PREFERENCE

The Contractor certifies that its bid/offer is in compliance with 49 USC § 50101, BABA and other related Made in America Laws,[1] U.S. statutes, guidance, and FAA policies, which provide that Federal funds may not be obligated unless all iron, steel and manufactured goods used in AIP funded projects are produced in the United States, unless the Federal Aviation Administration has issued a waiver for the product; the product is listed as an Excepted Article, Material Or Supply in Federal Acquisition Regulation subpart 25.108; or is included in the FAA Nationwide Buy American Waivers Issued list.

The Bidder or offeror must complete and submit the certification of compliance with FAA's Buy American Preference, BABA and Made in America laws included herein with their bid or offer. The Airport Sponsor/Owner will reject as nonresponsive any bid or offer that does not include a completed certification of compliance with FAA's Buy American Preference and BABA.

The Bidder or offeror certifies that all constructions materials, defined to mean an article, material, or supply other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives that are or consist primarily of: non-ferrous metals; plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables); glass (including optic glass); lumber; or drywall used in the project are manufactured in the U.S.

The Bidder or offeror certifies procurement of certain rolling stock using FAA grant funds will prohibit airports from using Federal financial assistance to procure buses or rail car vehicle rolling stock from covered entities.

GENERAL CIVIL RIGHTS PROVISIONS

In all its activities within the scope of its airport program, the Contractor agrees to comply with pertinent statutes, Executive Orders, and such rules as identified in Title VI List of Pertinent Nondiscrimination Acts and Authorities to ensure that no person shall, on the grounds of race, color, national origin, creed, sex, age, or disability be excluded from participating in any activity conducted with or benefiting from Federal assistance.

This provision is in addition to that required by Title VI of the Civil Rights Act of 1964.

The above provision binds the Contractor and subcontractors from the bid solicitation period through the completion of the contract.

CIVIL RIGHTS – TITLE VI ASSURANCE

Title VI of the Civil Rights Act of 1964, as amended, (Title VI) prohibits discrimination on the grounds of race, color, or national origin under any program or activity receiving Federal financial assistance.

[1] Per Executive Order 14005 "Made in America Laws" means all statutes, regulations, rules, and Executive Orders relating to federal financial assistance awards or federal procurement, including those that refer to "Buy America" or "Buy American," that require, or provide a preference for, the purchase or acquisition of goods, products, or materials produced in the United States, including iron, steel, and manufactured products offered in the United States.

Sponsors must include appropriate clauses from the Standard DOT Title VI Assurances in all contracts and solicitations.

Title VI Solicitation Notice:

The Sponsor, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S.C. §§ 2000d to 2000d-4), 28 CFR § 50.3, and 49 CFR Part 21, hereby notifies all bidders that it will affirmatively ensure that any contract entered into pursuant to this advertisement, all contractors will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of the owner's race, color, national origin, sex, creed, age, or disability in consideration for an award.

DAVIS-BACON REQUIREMENTS

The Davis-Bacon Act (40 USC §§ 3141-3144, 3146, and 3147) ensures that laborers and mechanics employed under the contract receive pay no less than the locally prevailing wages and fringe benefits as determined by the Department of Labor.

CERTIFICATION OF OFFEROR/BIDDER REGARDING DEBARMENT

By submitting a bid under this solicitation, the Bidder or offeror certifies that neither it nor its principals are presently debarred or suspended by any Federal department or agency from participation in this transaction.

CERTIFICATION OF LOWER TIER CONTRACTORS REGARDING DEBARMENT

The successful Bidder, by administering each lower tier subcontract that exceeds $25,000 as a "covered transaction", must confirm each lower tier participant of a "covered transaction" under the project is not presently debarred or otherwise disqualified from participation in this federally-assisted project. The successful Bidder will accomplish this by:

1. Checking the System for Award Management at website: http://www.sam.gov.
2. Collecting a certification statement similar to the Certification of Offeror /Bidder Regarding Debarment, above.
3. Inserting a clause or condition in the covered transaction with the lower tier contract.

If the Federal Aviation Administration later determines that a lower tier participant failed to disclose to a higher tier participant that it was excluded or disqualified at the time it entered the covered transaction, the FAA may pursue any available remedies, including suspension and debarment of the non-compliant participant.

DISADVANTAGED BUSINESS ENTERPRISE

The requirements of 49 CFR Part 26 including any amendments thereto apply to this contract. It is the policy of the Owner to practice nondiscrimination based on race, color, sex, or national origin in the award or performance of this contract. The Owner encourages participation by all firms qualifying under this solicitation regardless of business size or ownership.

Bid Information Submitted as a matter of **responsiveness**:

The Owner's award of this contract is conditioned upon Bidder or Offeror satisfying the good faith effort requirements of 49 CFR § 26.53.

As a condition of responsiveness, the Bidder or Offeror must submit the following information with its proposal on the forms provided herein:

1) The names and addresses of Disadvantaged Business Enterprise (DBE) firms that will participate in the contract;
2) A description of the work that each DBE firm will perform;
3) The dollar amount of the participation of each DBE firm listed under (1);
4) Written statement from Bidder or Offeror that attests their commitment to use the DBE firm(s) listed under (1) to meet the Owner's project goal;
5) Written confirmation from each listed DBE firm that it is participating in the contract in the kind and amount of work provided in the prime contractor's commitment; and
6) If Bidder or Offeror cannot meet the advertised project DBE goal, evidence of good faith efforts undertaken by the Bidder or Offeror as described in appendix A to 49 CFR part 26 including any amendments thereto. The documentation of good faith efforts must include copies of each DBE and non-DBE subcontractor quote submitted to the bidder when a non-DBE subcontractor was selected over a DBE for work on the contract.

FEDERAL FAIR LABOR STANDARDS ACT (FEDERAL MINIMUM WAGE)

All contracts and subcontracts that result from this solicitation incorporate by reference the provisions of 29 CFR part 201, et seq, the Federal Fair Labor Standards Act (FLSA), with the same force and effect as if given in full text. The FLSA sets minimum wage, overtime pay, recordkeeping, and child labor standards for full and part-time workers.

The Contractor has full responsibility to monitor compliance to the referenced statute or regulation. The Contractor must address any claims or disputes that arise from this requirement directly with the U.S. Department of Labor – Wage and Hour Division.

PROHIBITION OF COVERED UNMANNED AIRCRAFT SYSTEMS (UAS)

The Bidder or Offeror certifies that they are aware of and comply with relevant Federal statutes and regulations, including those from the Federal Aviation Administration (FAA), for operating unmanned aircraft systems (UAS) in accordance, and in compliance with all related requirements in the FAA Reauthorization Act of 2024 (Public Law 118-63), section 936 (49 U.S.C. § 44801 note).

Contractor warrants that all UAS operations will be conducted in full compliance with all applicable Federal Aviation Administration (FAA) regulations, including but not limited to 14 CFR Part 107, and any other applicable local, state, or Federal laws and regulations.

Sponsors and subgrant recipients cannot use AIP grant funds to enter into, extend, or renew a contract related to covered unmanned aircraft systems (UAS). This includes both procurement and operational contracts, as well as contracts with entities that operate such systems.

PROCUREMENT OF RECOVERED MATERIALS

Contractor and subcontractor agree to comply with Section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act, and the regulatory provisions of 40 CFR Part 247. In the performance of this contract and to the extent practicable, the Contractor and subcontractors

are to use products containing the highest percentage of recovered materials for items designated by the Environmental Protection Agency (EPA) under 40 CFR Part 247 whenever:

1) The contract requires procurement of $10,000 or more of a designated item during the fiscal year; or

2) The contractor has procured $10,000 or more of a designated item using Federal funding during the previous fiscal year.

The list of EPA-designated items is available at www.epa.gov/smm/comprehensive-procurement-guidelines-construction-products.

Section 6002(c) establishes exceptions to the preference for recovery of EPA-designated products if the contractor can demonstrate the item is:

a) Not reasonably available within a timeframe providing for compliance with the contract performance schedule;
b) Fails to meet reasonable contract performance requirements; or
c) Is only available at an unreasonable price.

2.9 Conditions, Terms and Limitations

This RFP is subject to the specific conditions, terms and limitations stated below:

1. The services to be performed shall conform to and be subject to the provisions of the New York Public Authorities Law, Generally Accepted Auditing Standards, Generally Accepted Accounting Principles, and Standards promulgated by the NYS Comptroller and Authorities Budget Office and all other applicable laws and regulations of all Federal and State agencies having jurisdiction.

2. Valid licenses and registrations as required by the Authority and any State, and Federal agencies shall be obtained by the successful Bidder prior to commencing work.

3. Final designation of a Bidder will depend on satisfaction of all additional RFP documentation and review requirements of the Authority and will be subject to the subsequent approval by the Authority.

4. No transaction will be consummated if any selected Bidder or principal of a selected Bidder or any member of the Bidder's development team is in arrears or in default upon any debt, lease, contract or obligation regarding the Authority or Syracuse Hancock International Airport. The Authority reserves the right to reject any response to this RFP by any such Bidder.

5. The Authority reserves the right to:

    a. Negotiate with one or more Bidders, and/or negotiate on terms other than those set forth herein.

    b. At any time, waive compliance with, or change any of the terms and conditions of this RFP, to entertain modifications or additions to selected bids.

6. This RFP does not represent any obligation or agreement whatsoever on the part of the Authority. Any such obligation or agreement may only be incurred or entered into by written agreement authorized by the Board of the Authority, approved as to form by the Authority's counsel and executed by the Executive Director of the Authority.

7. Mere selection of a Bidder will not create any rights on the Bidder's part, including, without limitation, rights of enforcement, equity or reimbursement, until after all required government approvals are received and the insurance, agreement and all related documents are fully approved and executed.

8. This RFP and any agreement or other documents resulting therefrom is subject to Federal, State, or local law or regulation having jurisdiction over the subject matter thereof, as the same may be amended from time to time.

9. In the event of any conflict between the Request for Proposals and the Technical Specifications, the Request for Proposals shall govern.

2.10 EVALUATION PROCESS

2.10.1 General Information

Upon receipt of bids, the Authority and/or any Ad Hoc Committee it shall appoint for reviewing bids ("Committee") will review each bid and may recommend a Bidder(s) to the Board of the Authority to be awarded a contract to provide the required services at the Airport.

Bidders should be willing and able to provide additional information that may be required by the Authority or its Committee. Also, interviews and office visits may be requested at the discretion of the Authority/Committee.

Upon review of bids submitted by Bidders, the Authority/Committee may, at its discretion, submit to Bidders written questions and requests for clarification relating to their bids. Bidders will be provided the period of time in which the written responses to the Authority's requests for clarification must be completed.

Other than to provide clarifying information as may be requested by the Authority, including the Committee, no Bidder will be allowed to alter its bid or add information.

2.10.2 Submission Review

The Authority/Committee will examine all bids that are received in a proper and timely manner to determine if they meet the bid submission requirements, as described in this RFP. Bids that are materially deficient in meeting the submission requirements or have omitted material documents, in the sole opinion of the Committee, may be rejected. Bids failing to pass the Submission Review will be considered non-responsive and will not be evaluated any further.

2.10.3 Bid Review Criteria

Bids will be reviewed based on a variety of criteria, including but not limited to:

1. The education, experience and/or expertise of the Bidder and it's principals and key employees.
2. The Bidder's specific experience, stability and history of performance providing the requested services similar to those under consideration.
3. The availability of adequate personnel to provide the requested services safely and efficiently.
4. The Bidder's approach to the planning, organization, supervision, and management of the requested services at the Airport, including communications procedures, problem-solving approaches, costing and other level-of-service factors.
5. The Bidder's proposed fee for the services requested herein with a breakdown of those fee's as they relate to discrete tasks or phases of the work to be performed.
6. Commitment to consistently maintain the highest standards of performance and the expeditious resolution of problems and complaints.
7. The financial stability of Bidder's organization.
8. The recommendations and opinions of each Bidder's previous customers or clients.
9. Information provided in response to specific questions and requirements contained in the RFP and all attachments/exhibits.
10. The Bidder's past experience at the Syracuse Hancock International Airport.
11. Information provided at interview (if required).

As stated above, the selection criteria include the fee the Bidder will charge the Authority for the services described in this RFP. The Bidder must certify in the bid that its fee covers all services proposed and meets the requirements of this RFP. The total estimated contract value for the services provided will be derived from the successful Bidder's proposed fee.

The Committee will evaluate each bid based on a "Best Value" concept. This means that the bid(s) that optimize(s) quality, cost, and efficiency among responsive and responsible Bidders shall be selected for award.

The Authority and its review committee will determine which bid(s) best satisfies its requirements. The Authority reserves all rights with respect to the award. All bids deemed to be responsive to the requirements of this procurement will be evaluated. Bids failing to meet the requirements of this RFP may be eliminated from consideration. Qualified staff/individuals will evaluate all submitted bids. The Authority may request clarification of a bid.

2.10.4 Reservation of Rights

The Authority reserves the right to:

(i) withdraw or cancel the RFP at any time and at its sole discretion;

(ii) reject any or all bids received in response to this RFP;

(iii) accept a bid and any subsequent bid for the contract from someone other than the lowest cost Bidder consistent with the criteria for the evaluation of bids;

(iv) make an award under the RFP in whole or in part;

(v) disqualify any Bidder whose conduct and/or bid fails to conform to the requirements of the RFP;

(vi) seek clarifications and revisions of bids;

(vii) use bid information obtained through site visits, management interviews and the Authority's investigation of a Bidder's qualifications, experience, ability or financial standing, and any material or information submitted by the Bidder in response to the agency's request for clarifying information in the course of evaluation and/or selection under the RFP;

(viii) prior to the bid opening, amend the RFP specifications to correct errors or oversights, or to supply additional information, as it becomes available;

(ix) prior to the bid opening, direct Bidders to submit bid modifications addressing subsequent RFP amendments;

(x) change any of the scheduled dates;

(xi) eliminate any mandatory, non-material specifications that cannot be complied with by all of the prospective Bidders;

(xii) waive any requirements that are not material;

(xiii) negotiate with the successful Bidder within the scope of the RFP in the best interests of the Authority;

(xiv) conduct contract negotiations with the next responsible Bidder, should the Authority be unsuccessful in negotiating with the selected Bidder;

(xv) utilize any and all ideas submitted in the bids received;

(xvi) unless otherwise specified in the solicitation, every submission is a firm offer and not revocable for a period of 60 days from the bid opening;

(xvii) require clarification at any time during the procurement process and/or require correction of arithmetic or other apparent errors for the purpose of assuring a full and complete understanding of an offerer's bid and/or to determine an offerer's compliance with the requirements of the solicitation;

(xviii) waive or modify minor deviations in the bids received after prior notification to the Bidders;

(xix) request best and final offers; and

(xx) Should the Authority be unsuccessful in negotiating a contract with a selected Bidder, the Authority may begin contract negotiations with the next highest-rated qualified Bidder. In addition, if it is subsequently determined by the Authority that the selected Bidder is non-responsible, the Authority may then invite the next highest rated, qualified Bidder(s) to enter negotiations for purposes of executing a contract. The Authority may do all of the foregoing without the need to recommence the RFP process.

The foregoing is a non-exhaustive list of the Authority's rights and remedies, all of which are hereby expressly reserved whether or not specifically listed.

2.10.5 CONFLICTS OF INTEREST

Members, officers, staff, and employees of the Syracuse Regional Airport Authority may respond to this RFP only in accordance with the Authority's Code of Ethics.

2.10.6 INSURANCE REQUIREMENTS

Prior to providing any labor or materials, the Contractor shall, at its sole cost and expense, 1) obtain the following insurance coverage with one or more insurers licensed to do business in the State of New York, naming as additional insureds the Syracuse Regional Airport Authority, the City of Syracuse and any other person or entity whom the Bidder is required to defend, indemnify and hold harmless and/or for whom the Contractor is performing work, their tenants, mortgagees, officers, directors, agents, employees and partners; 2) provide to the Authority an insurance certificate and a copy of the policy or other satisfactory evidence of such coverage from the carrier, which coverage shall be maintained until completion and final acceptance of the work; and 3) require that all of its own subcontractors and lower tier contractors obtain and provide same coverage:

D.1 Insurance covering claims under workmen's compensation, disability benefit, and other similar employee benefit acts. Insurance also covering claims for damages because of bodily injury, occupational disease or sickness, or death of his employees with the following limits:

Worker's Compensation Employer's Liability:	Statutory
Bodily Injury by Accident (per Accident):	$ 1,000,000
Bodily Injury by Disease (per Employee):	$ 1,000,000
Bodily Injury by Disease (Policy Limit):	$ 1,000,000

D.2 Commercial General Liability Insurance, which shall include a blanket contractual liability insuring the indemnification obligations of this Agreement, broad form property damage liability, and personal injury liability coverage extensions. Such policy shall not exclude X, C, U exposures. Commercial General Liability Policy shall include Products and Completed Operations Liability. Further, Products and Completed Operations Liability shall be maintained in full force and effect for a period of three (3) years following final completion of the Work. All coverage required under Commercial General Liability should be provided on an occurrence form with the following minimum limits: (Per Project Aggregate)

Bodily Injury and Property Damage (per occurrence) Combined Single Limit.	$2,000,000
Products / Completed Operations Aggregate	$4,000,000
General Aggregate	$4,000,000

The required limits may be satisfied by a combination of a primary policy and an excess or umbrella policy.

D.3 Umbrella form Excess liability coverage with limits of not less than total proposed bid price per occurrence, covering all work performed by the Subcontractor under this Contract.

D.4 Automobile Liability (Bodily Injury and Property Damage Liability) with limits of not less than $1,000,000 per occurrence that includes coverage for all owned, non-owned, and hired automobiles.

D.5 Contractors' Equipment Coverage on an "All Risk" basis, covering physical damage to all tools and equipment, including motorized equipment used by the Contractor or subcontractors with limits at least high enough to provide for replacement of items critical to project efforts.

D.6 Such other kinds of insurance as may be required by the Authority or by the general contract documents, each such policy to be in the amount stipulated in the general contract documents unless a different amount is hereinafter designated or is otherwise prescribed in writing by the Authority.

D.7 If any operations performed within the scope of this project require the use of any aircraft or watercraft (owned or unowned), the Contractor shall maintain liability insurance satisfactory to the Authority.

D.8 If any operations performed within the scope of this project include design work, the Contractor shall maintain Professional Liability Insurance with a limit of not less than $1,000,000. Such insurance shall be satisfactory to the Authority.

D.9 If any operations performed within the scope of this project include work with hazardous materials, Bidder shall maintain Environmental Impairment Liability Insurance with a limit of not less than $1,000,000. Such insurance shall be satisfactory to the Authority.

D.10 The Authority and City of Syracuse shall be named "additional insured" on the General Liability, Automobile, Excess Liability policies, and, if applicable, any liability policies carried on watercraft. General Liability Additional Insured status shall be specifically provided by Additional Insured Form CG2010(1185) or a combination of CG2010(Ed date) and CG2037(Ed Date), or CG2038(Ed Date) and CG2037(Ed Date), or equivalent manuscript wording, and shall apply on a primary and non-contributing basis before any other Insurance or self-Insurance, including any deductible, maintained by, or provided to, the aforementioned additional insureds, and shall remain in effect for the duration of the contract, including the Completed Operations Period. All policies shall be endorsed for Primary and Non-Contributory, Waive all Rights of Subrogation in favor of the Authority. Policies shall not be canceled, materially changed or non-renewed without thirty (30) days advance notice to the Authority.

2.10.7 CONTRACT PREPARATION/NEGOTIATION

After a Bidder(s) is recommended by the Authority's review committee, and if necessary approved by the Authority's Board, an agreement incorporating the agreed upon compensation and scope of services and other relevant terms will be drafted by the Authority's counsel and submitted to the successful Bidder.

As both a recipient of Federal Grant monies, and the fact that the Authority is a New York State Public Benefit Corporation, it is required to include certain clauses in all of its contracts. A list of those clauses is annexed hereto at Exhibit "C". These clauses will be required to be incorporated into the final contract with the successful Bidder.

Exhibit A

SCOPE OF WORK

Base Scope: This project aims to centralize aircraft deicing efforts into the existing south deicing pad through the expansion and reconstruction of the south de-icing pad. The full-depth pavement reconstruction area is approx. 350,000 sf with an additional 425,000 sf of new asphalt pavement which is expected to accommodate 7 narrow and 2 wide body aircraft. Incidental project components include site demolition, glycol collection diversion and pumping system, abandoned ARFF building demolition, airfield light and guidance sign fixtures with foundations, airfield cable and conduit, apron area flood lighting, electrical power and control equipment, surface and subsurface drainage improvements, stormwater collection structures and piping, stormwater management, turf grading, municipal utility service modifications, pavement markings and saw cut grooving.

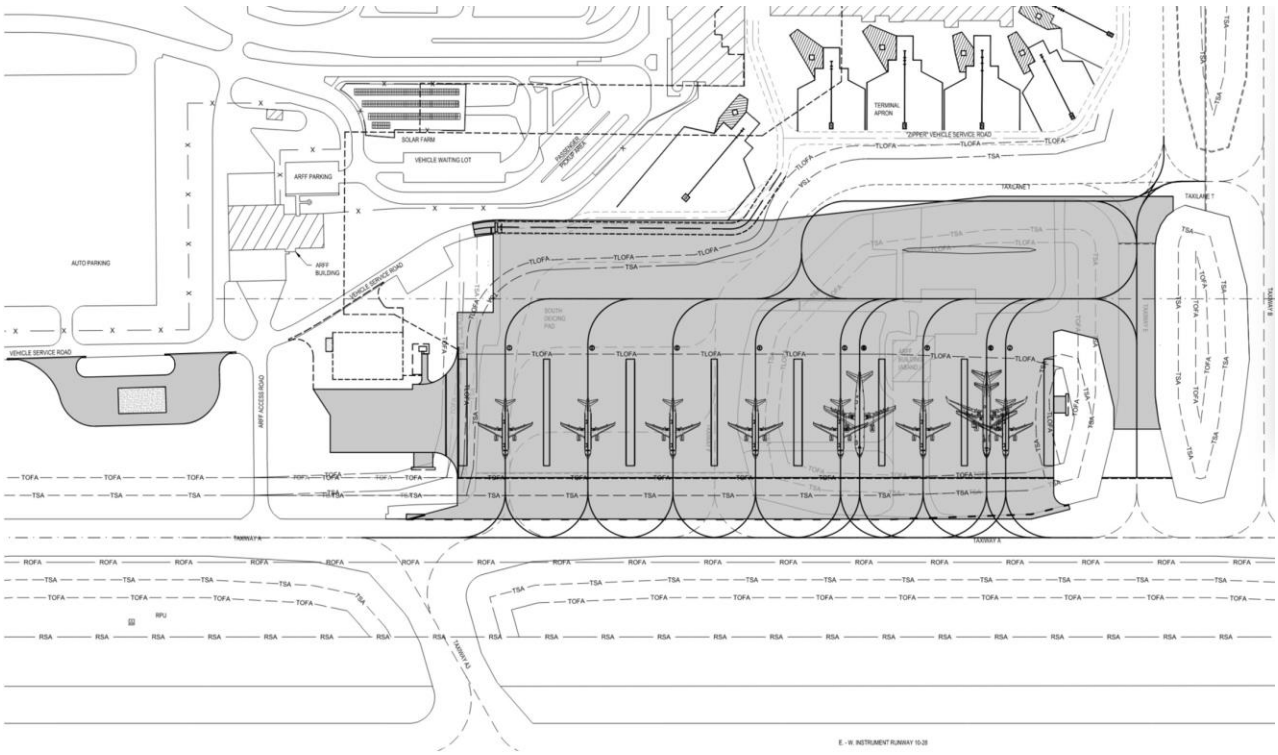


Figure 1: Scope of Work

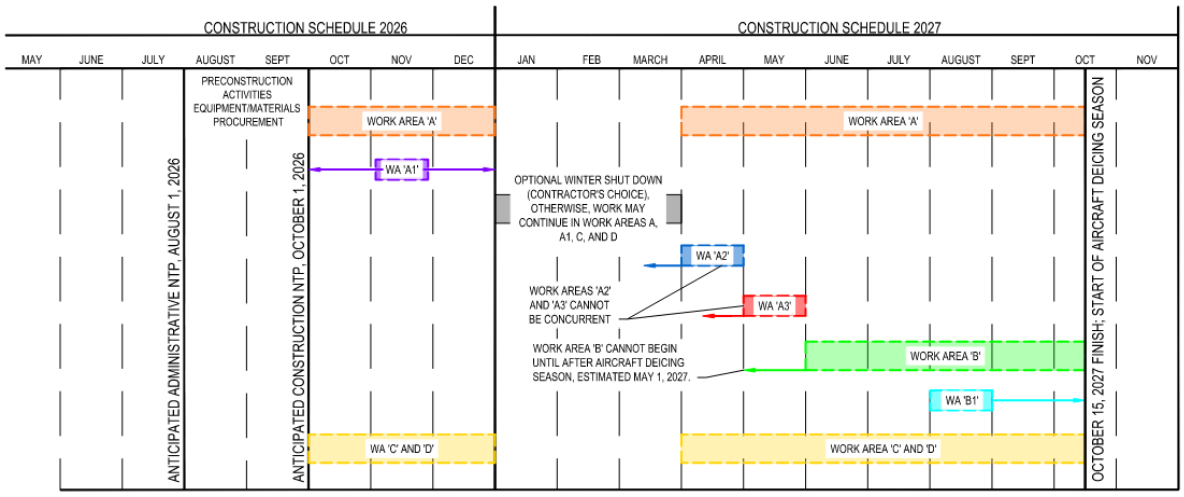
A. One general prime contractor, base bid with add-on #1 (Bulk glycol tank storage facility).
A 0% DBE goal applies to this project. SRAA and FAA AIP grant funding.

B. Unique project items:

- Cement treated subgrade
- Preformed thermoplastic pavement markings
- Building demolition, hazardous material abatement
- (4) large underground stormwater management systems, total 1.3 acres
- (2) pump stations and multiple valve structures

- Pavements disposed of off-site, soils and aggregates will remain on airport property
- Spoil area material full encapsulation liner system, 4 acres
- Semi-flush deicing bay status lights, controlled with ALCMS
- Shop fabricated fiberglass equipment shelter (10' x 16', skid mounted, FAA style)
- Glycol bulk storage tank facility with control systems, add on #1 bid. Liquid Automation Systems (LAS) equipment procured separately by SRAA, contractor installed.
- Primarily FAA technical specifications, supplemented with special CSI based specs.

D. General Construction Timeframe:



E. Construction work phasing, working on an airport

- Simplified work areas, concurrent to streamline constructability, minimize mobilizations.
- Airport security badging, gate access protocols

F. All CAD files, Revit models, and as-built drawings produced as part of this project shall be delivered to the Syracuse Regional Airport Authority upon completion of the work. Deliverables shall include all native and editable electronic files, fully coordinated and reflective of the final constructed conditions.

Time of Completion: The Authority will issue a written "Notice-to-Proceed" which will specify an effective date for the Contractor to commence work. The Bidder must agree to commence work on a date to be specified in the written Notice-to- Proceed of the Authority and to substantially complete the project by Winter 2027. Any changes to the proposed timeline must be reviewed and approved by the Authority.

Performance Bond: Each Bidder shall submit a performance bond duly executed by the Bidder as principal and having as surety thereon a surety company approved by the Authority, in the amount of not less than eighty percent (80%) of the proposed bid. The performance bond shall be submitted to the Authority upon execution of a contract.

Bid Bond: Each bid shall be accompanied by a bid bond in the amount of five percent (5%) of the total

bid price, payable to the Owner. The bid bond shall be issued by a surety company authorized to do business in the project location. The bid bond is submitted as a guarantee that the bidder, if awarded the contract, will enter into the contract and furnish the required performance and payment bonds within the time specified.

Contract: The individual, firm, partnership, or corporation to whom or to which the Contract has been awarded shall sign the necessary agreements entering into a Contract with the Authority and return them to the Office of the Authority (with the required contract bonds and insurance certificates) within ten (10) business days from the date the contract is mailed to the successful Bidder. Any questions or concerns regarding language in the agreement must be addressed within the time period specified.

The Contract does not become binding until both the successful Bidder and the Authority sign it. At that time, and at that time only, does the Contract become binding on all parties. At this point, the Contract is considered fully executed.

Failure to Execute Contract: Failure of a Bidder to comply with any of the requirements of the Proposal, failure to execute the Contract within ten (10) calendar days from the date mailed, as specified, or failure to furnish Contract bonds as required shall be just cause for the annulment of the award. In the event of such annulment of the award, the amount of Proposal or bid security shall become the property of the Owner, not as a penalty but as fixed and agreed liquidated damages. Award may then be made to the next best qualified Bidder, or the work re- advertised, or otherwise handled as the Owner may elect.

Proposal Requests/Change Orders:

A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
B. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
    1. Within time specified in Proposal Request or 20 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
    2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    4. Include costs of labor and supervision directly attributable to the change.
    5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
    6. Quotation Form: Use forms acceptable to Architect or form provided as part of web-based Project management software.
C. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.
    1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
    2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.

3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Proposal Request Form: Use form acceptable to Architect or form provided as part of web-based Project management software

Change Orders: Change orders must be reviewed and approved prior to work performed. All change orders must be signed by the Authority's project manager and CFO. If change order is considered substantial by the CFO, the change order may be forwarded to the Executive Director for review. The Authority will not be liable for any costs associated with work performed without authorization.

Bidders Qualifications: Bidders must have experience performing as a prime contractor on similar size and scope projects. Any individual, partnership, or corporation which has been disqualified by the State of New York from acting as prime contractor or subcontractor on State projects shall likewise be disqualified from acting as the prime contractor or subcontractor on this project.

Bidders Staffing: Bidders must provide the names of staff that will be assigned to the project for approval by the Authority. Staff in management and supervisory roles should have extensive experience on projects of similar size and scope. The Authority reserves the right to interview proposed staff prior to approval. Once assigned to the project, no changes may be made to staff without the consent of the Authority.

Subcontracts: The Bidder is specifically advised that any person, firm, or other party to whom it proposes to award a subcontract under this Contract:

- Must be acceptable to the Authority. Previous performance and actions of the proposed subcontractor may be considered by the Authority, and
- To extent possible, provide a list of proposed subcontractors in the proposal and
- Must submit Equal Employment Opportunity form. Approval of the proposed subcontract award cannot be given by the Owner unless and until the Authority approves the proposed subcontractor and proposed subcontractor has submitted the Certification and/or the evidence showing that it has fully complied with any reporting requirements to which it is or was subject. Although the bidder is not required to attach such Certification by proposed subcontractors to his bid, the bidder is hereby advised of this requirement so that appropriate action can be taken to prevent subsequent delay in subcontract awards.

Airport Operations Coordination: The Contractor is hereby advised that the construction limits of the project are within the secure areas of the Airport and are subject to all rules and regulations for TSA and FAA.

- Construction activities must be coordinated with Airport Operations weekly to ensure no conflicts with Airline activity.
- Crane activities must be scheduled with the appropriate 7460 form filed with the FAA.
- Weekly production and status meetings will be held with appropriate Authority staff to facilitate communications and coordination.
- Contractor is responsible for badging all staff to meet TSA standards as escorting by the Authority is not available. All badges must be returned to the Authority at the end of the project. Any badges not returned will be subject to the lost badge fees.
- Contractor is responsible for maintaining covered dumpsters and ensuring all debris (FOD) is removed from pavement at the end of each day.
- The Authority will provide a Construction Safety and Phasing Plan to assist with operational and safety coordination.

Obligations of the Bidder: At the time of the bid submission, each Bidder will be expected to have inspected the site(s) and to have read and to be thoroughly familiar with the plans and contract documents (including all addenda). The failure or omission of any Bidder to examine any form, instrument or document shall in no way relieve any Bidder from any obligation in respect to the Proposal.

All Bidders are specifically instructed to visit the site(s) of the work, to ascertain personally the extent and character of the work to be performed and to familiarize themselves with conditions at the site(s).

Payment for the Work: Partial payments will be made at least once per month based on work performed to date. Bidder agrees to submit monthly payment applications by the 10th day following end of the calendar month for work performed during the calendar month. Payment applications will include all supporting documentation for work performed. Payment applications must be on a SRAA approved application and certification document an AIA G702 form. Retainage will be withheld at a rate of 10% of total payment application.

FAA Facilities and Cable Runs: The Bidder is hereby advised that the construction limits of the project include existing facilities and buried cable runs that are owned, operated and maintained by the FAA. The Contractor, during the execution of the project work, shall comply with the following:

A. The Bidder shall permit FAA maintenance personnel the right of access to the project work site for purposes of inspecting and maintaining all existing FAA owned facilities.
B. The Bidder shall notify the above named FAA Airway Facilities Point-of-Contact seven (7) calendar days prior to commencement of construction activities in order to permit sufficient time to locate and mark existing buried cables and to schedule any required facility outages.
C. If execution of the project work requires a facility outage, the Bidder shall contact the FAA Point-of-Contact a minimum of 48 hours prior to the time of the required outage. No work should be done until documented FAA approval is received.
D. If execution of the project work results in damages to existing FAA equipment or cables, notification shall be made to the FAA Point of Contact and the Authority immediately to obtain guidance on how to proceed. Should the Bidder be directed to repair the damaged item in conformance with FAA standards, work is required to meet the satisfaction of the FAA Point-of-Contact.
E. If the project work requires the cutting or splicing of FAA owned cables, the FAA Point-of-Contact shall be contacted a minimum of 48 hours prior to the time the cable work commences. The FAA reserves the right to have a FAA Airway Facilities representative on site to observe the splicing of the cables as a condition of acceptance. All cable splices are to be accomplished in accordance with FAA Airway Facilities' specifications and require approval by the FAA Point-of-Contact as a condition of acceptance by the Owner. The Bidder is hereby advised that FAA Airway Facilities restricts the location of where splices may be installed. If a cable splice is required in a location that is not permitted by FAA Airway Facilities, the Bidder shall furnish and install a sufficient length of new cable that eliminates the need for any splice.

Permitting: All permits are through the City of Syracuse. The Authority will pay for permits directly. The Bidder will be responsible for picking up the permits after presenting their credentials from City of Syracuse Central Permit Office.

Dig Safe: Prior to commencing any excavation, the Bidder shall notify any and all utility companies which might have an underground utility installation in the vicinity of the work area. Such notice shall be given at least 48 hours prior to the time of anticipated excavation.

Such notice may be conducted by notifying the following to ascertain the potential location of any underground utility in the area:

- UDig NY (800) 962-7962

Bidders are responsible for verification of site conditions in field where indicated on design documents.

Disqualification of Bidders: A Bidder shall be considered disqualified for any of the following:

A. Submitting more than one Proposal from the same partnership, firm, or corporation under the same or different name.
B. Evidence of collusion among bidders. Bidders participating in such collusion shall be disqualified as bidders for any future work of the Owner until such participating Bidder has been reinstated by the Owner as a qualified bidder.
C. Failure to comply with any pre-qualification regulations of the Owner, if such regulations are cited, or otherwise included, in the Proposal as a requirement for bidding.
D. Failure to pay, or satisfactorily settle, all bills due for labor and materials on former contracts in force (with the Owner) at the time the Owner issues the Proposal to a prospective bidder.
E. Contractor default under previous contracts with the Owner.
F. Unsatisfactory work on previous contracts with the Owner.
G. Unbalanced Proposals in which the prices for some items are out of proportion to the prices for other items.
H. Failure to submit a unit price for each item of work for which a bid price is required by the Proposal.
I. Lack of competency as revealed by the financial statement, experience, or plant and equipment statements submitted.
J. Lack of responsibility as shown by past work judged from the standpoint of workmanship and progress.

Uncompleted work which, in judgment of the Owner, might hinder or prevent the prompt completion of additional work if awarded.

Contractor Qualifications: Contractor confirms they have not been disqualified by the State of New York or the FAA from acting as prime contractor or subcontractor on State/Federal projects shall likewise have not been disqualified from acting as the prime contractor or subcontractor on this project.

Sales Tax Exemption: The Authority is exempt from the State of New York sales tax. Also, sales made to contractors, subcontractors or repairmen of materials, supplies or services which are to be incorporated into the completed work as part of this project are exempt from the sales tax. It shall be the contractor's responsibility to comply with all State regulations in regard to this exemption.

Contractors Use of Site and Premise:

A. Restricted Use of Site: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.
B. Limits on Use of Site: Limit use of Project site to Work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
    a. Driveways, Walkways and Entrances: Keep driveways and entrances serving premises clear and available to the Authority, Authority's employees, and emergency vehicles at all times. Do not use these areas for parking or for storage of materials.

Field Office: Office space for the purposes of construction personnel office activities, and project meetings will be provided by the Authority. Contractor will maintain space in the same condition as received, clean and orderly during use.

Work Restrictions:

A. Comply with restrictions on construction operations.
    1. Comply with limitations on use of public streets, work on public streets, rights of way, and other requirements of authorities having jurisdiction.
B. On-Site Work Hours: Shall be reviewed during to weekly project meeting to ensure compliance with Airport/Airline operation schedules.
C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Authority or others unless permitted under the following conditions and then only after arranging for
D. Temporary utility services according to requirements indicated:
    1. Notify Authority not less than two days in advance of proposed utility interruptions.

Substitutions:

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents.
    1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
    2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required to meet other Project requirements but may offer advantage to Contractor or Authority.
B. Substitution Requests: Submit documentation identifying product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
    1. Substitution Request Form: Use form that is part of web-based Project management software, CSI Form 13.1A, or comparable form as acceptable to the Architect.
    2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
        i. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
        ii. Product data including drawings and descriptions of products and fabrication and installation procedures.
        iii. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
        iv. Impact on Contractors construction schedule
        v. Cost information, including proposal of change, if any.

Materials Ownership:

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Authority that may be uncovered during demolition remain the property of the Authority.
    1. Carefully salvage in a manner to prevent damage and promptly return to the Authority.

Request for Information

A. Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
B. Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
C. Coordinate and submit RFIs in a prompt manner to avoid delays in Contractor's work or work of subcontractors.
D. Include a detailed, legible description of item needing information or interpretation.
E. Architect will review each RFI, determine action required, and respond. Allow seven days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
F. The following Contractor-generated RFIs will be returned without action:
    a. Requests for approval of submittals.
    b. Requests for approval of substitutions.
    c. Requests for approval of Contractor's means and methods.
    d. Requests for coordination information already indicated in the Contract Documents.
    e. Requests for adjustments in the Contract Time or the Contract Sum.
    f. Requests for interpretation of Architect's actions on submittals.
    g. Incomplete RFIs or inaccurately prepared RFIs.
G. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by Architect of additional information.
H. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 012600 "Contract Modification Procedures."
I. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 5 days of receipt of the RFI response.

Exhibit B

SYRACUSE REGIONAL AIRPORT AUTHORITY
NON-COLLUSIVE BID CERTIFICATION

By submission of this bid, each Respondent and each person signing on behalf of any Respondent certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of knowledge and belief:

1. The prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other Respondent, or with any competitor;

2. Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the Respondent and will not knowingly be disclosed by the Respondent prior to opening, directly or indirectly, to any other respondent or to any competitor; and

3. No attempt has been made or will be made by the Respondent to induce any other person, partnership or corporation to submit or not to submit a bid for purpose of restricting competition.

I hereby affirm under the penalties of perjury that the foregoing statement is true.

I also acknowledge notice that a false statement made in the foregoing is punishable under Article 20 of the Penal Law.

SIGN HERE _____. _____
Signature of Respondent's Authorized Person Date

_____.
Name of Respondent

_____.
Name of Respondent's Authorized Person

_____.
Title of Respondent's Authorized Person

Exhibit C

FEDERAL AND NEW YORK STATE GOVERNMENT CONTRACT CLAUSE REQUIREMENTS

Federally Required Contract Clauses (Current as of March 17, 2026)

The Authority is the recipient of U.S. Department of Transportation grant monies and as such is required to include specific contract provisions in all such grant funded projects and to further require that all contractors engaged by the Authority for such projects include specific contract provisions in all of such contractor's contracts with any sub-recipients or subcontractors. Contractor hereby specifically acknowledges such contract language requirements and specifically agrees on its behalf and for any sub recipient or subcontractor engaged by contractor as follows:

ACCESS TO RECORDS AND REPORTS

The Contractor must maintain an acceptable cost accounting system. The Contractor agrees to provide the Owner, the Federal Aviation Administration and the Comptroller General of the United States or any of their duly authorized representatives access to any books, documents, papers and records of the Contractor which are directly pertinent to the specific contract for the purpose of making audit, examination, excerpts and transcriptions. The Contractor agrees to maintain all books, records and reports required under this contract for a period of not less than three (3) years after final payment is made and all pending matters are closed.

BREACH OF CONTRACT TERMS

Any violation or breach of terms of this contract on the part of the Contractor or its subcontractors may result in the suspension or termination of this contract or such other action that may be necessary to enforce the rights of the parties of this agreement.

Owner will provide Contractor written notice that describes the nature of the breach and corrective actions the Contractor must undertake in order to avoid termination of the contract. Owner reserves the right to withhold payments to Contractor until such time the Contractor corrects the breach or the Owner elects to terminate the contract. The Owner's notice will identify a specific date by which the Contractor must correct the breach. Owner may proceed with termination of the contract if the Contractor fails to correct the breach by the deadline indicated in the Owner's notice.

The duties and obligations imposed by the Contract Documents and the rights and remedies available thereunder are in addition to, and not a limitation of, any duties, obligations, rights and remedies otherwise imposed or available by law.

BUY AMERICAN PREFERENCES

The Contractor certifies that its bid/offer is in compliance with 49 USC § 50101, BABA and other related Made in America Laws,[2] U.S. statutes, guidance, and FAA policies, which provide that Federal

[2] Per Executive Order 14005 "Made in America Laws" means all statutes, regulations, rules, and Executive Orders relating to federal financial assistance awards or federal procurement, including those that refer to "Buy America" or "Buy American," that require, or provide a preference for, the purchase or acquisition of goods, products, or materials produced in the United States, including iron, steel, and manufactured products offered in the United States.

funds may not be obligated unless all iron, steel and manufactured goods used in AIP funded projects are produced in the United States, unless the Federal Aviation Administration has issued a waiver for the product; the product is listed as an Excepted Article, Material Or Supply in Federal Acquisition Regulation subpart 25.108; or is included in the FAA Nationwide Buy American Waivers Issued list.

The bidder or offeror must complete and submit the certification of compliance with FAA's Buy American Preference, BABA and Made in America laws included herein with their bid or offer. The Airport Sponsor/Owner will reject as nonresponsive any bid or offer that does not include a completed certification of compliance with FAA's Buy American Preference and BABA.

The bidder or offeror certifies that all constructions materials, defined to mean an article, material, or supply other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives that are or consist primarily of: non-ferrous metals; plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables); glass (including optic glass); lumber; or drywall used in the project are manufactured in the U.S.

The bidder or offeror certifies procurement of certain rolling stock using FAA grant funds will prohibit airports from using Federal financial assistance to procure buses or rail car vehicle rolling stock from covered entities.

GENERAL CIVIL RIGHTS PROVISIONS

In all its activities within the scope of its airport program, the Contractor agrees to comply with pertinent statutes, Executive Orders, and such rules as identified in Title VI List of Pertinent Nondiscrimination Acts and Authorities to ensure that no person shall, on the grounds of race, color, national origin, creed, sex, age, or disability be excluded from participating in any activity conducted with or benefiting from Federal assistance.

This provision is in addition to that required by Title VI of the Civil Rights Act of 1964.

The above provision binds the Contractor and subcontractors from the bid solicitation period through the completion of the contract.

TITLE VI COMPLIANCE

Title VI Solicitation Notice:

The Sponsor, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S.C. §§ 2000d to 2000d-4), 28 CFR § 50.3, and 49 CFR Part 21, hereby notifies all bidders that it will affirmatively ensure that any contract entered into pursuant to this advertisement, all contractors will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of the owner's race, color, national origin, sex, creed, age, or disability in consideration for an award.

Compliance with Nondiscrimination Requirements:

During the performance of this contract, the Contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "Contractor"), agrees as follows:

1. **Compliance with Regulations:** The Contractor (hereinafter includes consultants) will comply with the Title VI List of Pertinent Nondiscrimination Acts and Authorities, as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.
2. **Nondiscrimination:** The Contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, national origin, creed, sex, age, or disability in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The Contractor will not participate directly or indirectly in the discrimination prohibited by the Nondiscrimination Acts and Authorities, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR part 21 including amendments thereto.
3. **Solicitations for Subcontracts, including Procurements of Materials and Equipment**: In all solicitations, either by competitive bidding or negotiation made by the Contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the Contractor of the contractor's obligations under this contract and the Nondiscrimination Acts and Authorities on the grounds of race, color, or national origin.
4. **Information and Reports:** The Contractor will provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Sponsor or the Federal Aviation Administration to be pertinent to ascertain compliance with such Nondiscrimination Acts and Authorities and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, the Contractor will so certify to the Sponsor or the Federal Aviation Administration, as appropriate, and will set forth what efforts it has made to obtain the information.
5. **Sanctions for Noncompliance:** In the event of a Contractor's noncompliance with the non-discrimination provisions of this contract, the Sponsor will impose such contract sanctions as it or the Federal Aviation Administration may determine to be appropriate, including, but not limited to:

    a. Withholding payments to the Contractor under the contract until the Contractor complies; and/or
    b. Cancelling, terminating, or suspending a contract, in whole or in part.

6. **Incorporation of Provisions:** The Contractor will include the provisions of paragraphs one through six in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations, and directives issued pursuant thereto. The Contractor will take action with respect to any subcontract or procurement as the Sponsor or the Federal Aviation Administration may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the Contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the Contractor may request the Sponsor to enter into any litigation to protect the interests of the Sponsor. In addition, the Contractor may request the United States to enter into the litigation to protect the interests of the United States.

Title VI List of Pertinent Nondiscrimination Acts and Authorities

During the performance of this contract, the Contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "Contractor") agrees to comply with the following non-discrimination statutes and authorities; including but not limited to:

• Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d et seq., 78 stat. 252) (prohibits discrimination on the basis of race, color, national origin);
• 49 CFR Part 21 (Non-discrimination in Federally-Assisted programs of the Department of Transportation—Effectuation of Title VI of the Civil Rights Act of 1964) including amendments thereto;
• The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601) (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);
• Section 504 of the Rehabilitation Act of 1973 (29 U.S.C. § 794 et seq.), as amended (prohibits discrimination on the basis of disability); and 49 CFR part 27 (Nondiscrimination on the Basis of Disability in Programs or Activities Receiving Federal Financial Assistance);
• The Age Discrimination Act of 1975, as amended (42 .U.S.C. § 6101 et seq.) (prohibits discrimination on the basis of age);
• Airport and Airway Improvement Act of 1982 (49 U.S.C. § 47123), as amended (prohibits discrimination based on race, creed, color, national origin, or sex);
• The Civil Rights Restoration Act of 1987 (P.L. 100-259) (broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, the Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms "programs or activities" to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);
• Titles II and III of the Americans with Disabilities Act of 1990 (42 U.S.C. § 12101, et seq) (prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities) as implemented by U.S. Department of Transportation regulations at 49 CFR Parts 37 and 38;
• Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. § 1681, et seq).

CLEAN AIR AND WATER POLLUTION CONTROL

Contractor agrees to comply with all applicable standards, orders, and regulations issued pursuant to the Clean Air Act (42 USC § 740-7671q) and the Federal Water Pollution Control Act as amended (33 USC § 1251-1387). The Contractor agrees to report any violation to the Owner immediately upon discovery. The Owner assumes responsibility for notifying the Environmental Protection Agency (EPA) and the Federal Aviation Administration.

Contractor must include this requirement in all subcontracts that exceed $150,000.

CONTRACT WORKHOURS AND SAFETY STANDARDS ACT REQUIREMENTS

1. Overtime Requirements.

No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic, including watchmen and guards, in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

2. Violation; Liability for Unpaid Wages; Liquidated Damages.

In the event of any violation of the clause set forth in paragraph (1) of this clause, the Contractor and any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1) of this clause, in the sum of $33 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1) of this clause.

3. Withholding for Unpaid Wages and Liquidated Damages.

The Federal Aviation Administration (FAA) or the Owner shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2) of this clause.

4. Subcontractors.

The Contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraphs (1) through (4) and also a clause requiring the subcontractor to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1) through (4) of this clause.

COPELAND 'ANTI-KICKBACK' ACT

Contractor must comply with the requirements of the Copeland "Anti-Kickback" Act (18 USC 874 and 40 USC 3145), as supplemented by Department of Labor regulation 29 CFR part 3. Contractor and subcontractors are prohibited from inducing, by any means, any person employed on the project to give up any part of the compensation to which the employee is entitled. The Contractor and each Subcontractor must submit to the Owner, a weekly statement on the wages paid to each employee performing on covered work during the prior week. Owner must report any violations of the Act to the Federal Aviation Administration.

DAVIS-BACON REQUIREMENTS

1.Minimum Wages.

(i) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by the Secretary of Labor under regulations implementing the Copeland Act (29 CFR Part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalent thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR § 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under (1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the Contractor and its subcontractors at the site of the work in a prominent and accessible place where it can easily be seen by the workers.

(ii)(A) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(1) The work to be performed by the classification requested is not performed by a classification in the wage determination;

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship tothe wage rates contained in the wage determination.

(B) If the Contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(C) In the event the Contractor, the laborers, or mechanics to be employed in the classification, or their representatives, and the contracting officer do not agree on the proposed classification and wage rate(including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D)The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (1)(ii) (B) or (C) of this paragraph, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the Contractor does not make payments to a trustee or other third person, the Contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, that the Secretary of Labor has found, upon the written request of the Contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. Withholding. The Federal Aviation Administration or the Sponsor shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the Contractor under this contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the Contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the Federal Aviation Administration may, after written notice to the Contractor, Sponsor, Applicant, or Owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. Payrolls and Basic Records.

(i) Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker; his or her correct classification; hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in 1(b)(2)(B) of the Davis-Bacon Act); daily and weekly number of hours worked; deductions made; and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the Contractor shall maintain records that show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual costs incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii)(A) The Contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the Federal Aviation Administration if the agency is a party to the contract, but if the agency is not such a party, the Contractor will submit the payrolls to the applicant, Sponsor, or Owner, as the case may be, for transmission to the Federal Aviation Administration. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR § 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead, the payrolls shall only need to include an individually identifying number for each

employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH–347 is available for this purpose from the Wage and Hour Division Web site at https://www.dol.gov/agencies/whd/government-contracts/construction/payroll-certification or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker and shall provide them upon request to the Federal Aviation Administration if the agency is a party to the contract, but if the agency is not such a party, the Contractor will submit them to the applicant, Sponsor, or Owner, as the case may be, for transmission to the Federal Aviation Administration, the Contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the sponsoring government agency (or the applicant, Sponsor, or Owner).

(B) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the Contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be provided under 29 CFR § 5.5(a)(3)(ii), the appropriate information is being maintained under 29 CFR § 5.5 (a)(3)(i), and that such information is correct and complete;

(2) That each laborer and mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR Part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (3)(ii)(B) of this section.(D)The falsification of any of the above certifications may subject the Contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.

(iii) The Contractor or subcontractor shall make the records required under paragraph (3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the Sponsor, the Federal Aviation Administration, or the Department of Labor and shall permit such representatives to interview employees during working hours on the job. If the Contractor or subcontractor fails to submit the required records or to make them available, the Federal agency may, after written notice to the Contractor, Sponsor, applicant, or Owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR § 5.12.

4. Apprentices and Trainees.

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide

apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the Contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the Contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR § 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at no less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination that provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate that is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the Contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

5. Compliance with Copeland Act Requirements.

The Contractor shall comply with the requirements of 29 CFR Part 3, which are incorporated by reference in this contract.

6. Subcontracts.

The Contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR §§5.5(a)(1) through (10) and such other clauses as the Federal Aviation Administration may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR § 5.5.

7. Contract Termination: Debarment.

A breach of the contract clauses in paragraph 1 through 10 of this section may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR § 5.12.

8. Compliance with Davis-Bacon and Related Act Requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract.

9. Disputes Concerning Labor Standards.

Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the Contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10.Certification of Eligibility.

(i) By entering into this contract, the Contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the Contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR § 5.12(a)(1).

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR § 5.12(a)(1).

(iii)The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 USC § 1001.

CERTIFICATION OF OFFEROR/BIDDER REGARDING DEBARMENT

Contractor certifies that neither it nor its principals are presently debarred or suspended by any Federal department or agency from participation in this transaction.

CERTIFICATION OF LOWER TIER CONTRACTORS REGARDING DEBARMENT

The Contractor, by administering each lower tier subcontract that exceeds $25,000 as a "covered transaction", must confirm each lower tier participant of a "covered transaction" under the project is not presently debarred or otherwise disqualified from participation in this federally-assisted project.

DISADVANTAGED BUSINESS ENTERPRISES (Prime Contracts for Projects Covered by a DBE Program)

Contract Assurance (49 CFR § 26.13) –

The Contractor, subrecipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The Contractor shall carry out applicable requirements of 49 CFR part 26, including any amendments thereto, in the award and administration of Department of Transportation-assisted contracts. Failure by the Contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the Owner deems appropriate, which may include, but is not limited to:

1) Withholding monthly progress payments;
2) Assessing sanctions;
3) Liquidated damages; and/or
4) Disqualifying the Contractor from future bidding as non-responsible.

Prompt Payment (49 CFR §26.29) –

The prime contractor agrees to pay each subcontractor under this prime contract for satisfactory performance of its contract no later than seven (7) days from the receipt of each payment the prime contractor receives from Owner. The prime contractor agrees further to return retainage payments to each subcontractor within seven (7) days after the subcontractor's work is satisfactorily completed. Any delay or postponement of payment from the above referenced time frame may occur only for good cause following written approval of the Owner. This clause applies to both DBE and non-DBE subcontractors.

Termination of DBE Subcontracts (49 CFR § 26.53(f)) –

The prime contractor must not terminate a DBE subcontractor listed in response to the RFP (or an approved substitute DBE firm) without prior written consent of Owner. This includes, but is not limited to, instances in which the prime contractor seeks to perform work originally designated for a DBE subcontractor with its own forces or those of an affiliate, a non-DBE firm, or with another DBE firm.

The prime contractor shall utilize the specific DBEs listed to perform the work and supply the materials for which each is listed unless the contractor obtains written consent Owner. Unless Owner's consent is provided, the prime contractor shall not be entitled to any payment for work or material unless it is performed or supplied by the listed DBE.

Owner may provide such written consent only if Owner agrees, for reasons stated in the concurrence document, that the prime contractor has good cause to terminate the DBE firm. For purposes of this paragraph, good cause includes the circumstances listed in 49 CFR § 26.53.

Before transmitting to Owner its request to terminate and/or substitute a DBE subcontractor, the prime contractor must give notice in writing to the DBE subcontractor, with a copy to Owner, of its intent to request to terminate and/or substitute, and the reason for the request.

The prime contractor must give the DBE five days to respond to the prime contractor's notice and advise Owner and the contractor of the reasons, if any, why it objects to the proposed termination of its subcontract and why Owner should not approve the prime contractor's action. If required in a particular case as a matter of public necessity (e.g., safety), Owner may provide a response period shorter than five days.

In addition to post-award terminations, the provisions of this section apply to pre-award deletions of or substitutions for DBE firms put forward by offerors in negotiated procurements.

TEXTING WHEN DRIVING

In accordance with Executive Order 13513, "Federal Leadership on Reducing Text Messaging While Driving", (10/1/2009) and DOT Order 3902.10, "Text Messaging While Driving", (12/30/2009), the Federal Aviation Administration encourages recipients of Federal grant funds to adopt and enforce safety policies that decrease crashes by distracted drivers, including policies to ban text messaging while driving when performing work related to a grant or subgrant.

In support of this initiative, the Owner encourages the Contractor to promote policies and initiatives for its employees and other work personnel that decrease crashes by distracted drivers, including policies that ban text messaging while driving motor vehicles while performing work activities associated with the project. The Contractor must include the substance of this clause in all sub-tier contracts exceeding $15,000 that involve driving a motor vehicle in performance of work activities associated with the project.

CERTIFICATION REGARDING DOMESTIC PREFERENCES FOR PROCUREMENTS

The Contractor certifies by signing this Agreement, to the greatest extent practicable, the Contractor has provided a preference for the purchase, acquisition, or use of goods, products, or materials produced in the United States (including, but not limited to, iron, aluminum, steel, cement, and other manufactured products) in compliance with 2 CFR § 200.322.

FEDERAL FAIR LABOR STANDARDS ACT (FEDERAL MINIMUM WAGE)

This Agreement and all subcontracts that result from this Agreement incorporate by reference the provisions of 29 CFR Part 201, et seq, the Federal Fair Labor Standards Act (FLSA), with the same force and effect as if given in full text. The FLSA sets minimum wage, overtime pay, recordkeeping, and child labor standards for full and part-time workers.

The Contractor has full responsibility to monitor compliance to the referenced statute or regulation. The Contractor must address any claims or disputes that arise from this requirement directly with the U.S. Department of Labor – Wage and Hour Division.

OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970

This Agreement and all subcontracts that result from this Agreement incorporate by reference the requirements of 29 CFR Part 1910 with the same force and effect as if given in full text. The employer must provide a work environment that is free from recognized hazards that may cause death or serious physical harm to the employee. The employer retains full responsibility to monitor its compliance and their subcontractor's compliance with the applicable requirements of the Occupational Safety and Health Act of 1970 (29 CFR Part 1910). The employer must address any claims or disputes that pertain to a referenced requirement directly with the U.S. Department of Labor – Occupational Safety and Health Administration.

PROHIBITION ON CERTAIN TELECOMMUNICATIONS AND VIDEO SURVEILLANCE SERVICES OR EQUIPMENT

Contractor and Subcontractor agree to comply with mandatory standards and policies relating to use and procurement of certain telecommunications and video surveillance services or equipment in compliance with the National Defense Authorization Act P.L. 115-232, § 889(f)(1)).

PROHIBITION OF COVERED UNMANNED AIRCRAFT SYSTEMS (UAS)

The Contractor certifies that it is aware of and comply with relevant Federal statutes and regulations, including those from the Federal Aviation Administration (FAA), for operating unmanned aircraft systems (UAS) in accordance, and in compliance with all related requirements in the FAA Reauthorization Act of 2024 (Public Law 118-63), section 936 (49 U.S.C. § 44801 note).

Contractor warrants that all UAS operations will be conducted in full compliance with all applicable Federal Aviation Administration (FAA) regulations, including but not limited to 14 CFR Part 107, and any other applicable local, state, or Federal laws and regulations.

Sponsors and subgrant recipients cannot use AIP grant funds to enter into, extend, or renew a contract related to covered unmanned aircraft systems (UAS). This includes both procurement and operational contracts, as well as contracts with entities that operate such systems.

PROCUREMENT OF RECOVERED MATERIALS

Contractor and subcontractor agree to comply with Section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act, and the regulatory provisions of 40 CFR Part 247. In the performance of this contract and to the extent practicable, the Contractor and subcontractors are to use products containing the highest percentage of recovered materials for items designated by the Environmental Protection Agency (EPA) under 40 CFR Part 247 whenever:

1) The contract requires procurement of $10,000 or more of a designated item during the fiscal year; or
2) The contractor has procured $10,000 or more of a designated item using Federal funding during the previous fiscal year.

The list of EPA-designated items is available at www.epa.gov/smm/comprehensive-procurement-guidelines-construction-products.

Section 6002(c) establishes exceptions to the preference for recovery of EPA-designated products if the contractor can demonstrate the item is:

a) Not reasonably available within a timeframe providing for compliance with the contract performance schedule;
b) Fails to meet reasonable contract performance requirements; or
c) Is only available at an unreasonable price.

SEISMIC SAFETY

The Contractor agrees to ensure that all work performed under this contract, including work performed by subcontractors, conforms to a building code standard that provides a level of seismic safety substantially equivalent to standards established by the National Earthquake Hazards Reduction Program (NEHRP). Local building codes that model their code after the current version of the International Building Code (IBC) meet the NEHRP equivalency level for seismic safety.

TERMINATION FOR CONVENIENCE

The Owner may terminate this contract in whole or in part at any time by providing written notice to the Contractor. Such action may be without cause and without prejudice to any other right or remedy of Owner. Upon receipt of a written notice of termination, except as explicitly directed by the Owner, the Contractor shall immediately proceed with the following obligations regardless of any delay in determining or adjusting amounts due under this clause:

1. Contractor must immediately discontinue work as specified in the written notice.
2. Terminate all subcontracts to the extent they relate to the work terminated under the notice.
3. Discontinue orders for materials and services except as directed by the written notice.
4. Deliver to the Owner all fabricated and partially fabricated parts, completed and partially completed work, supplies, equipment and materials acquired prior to termination of the work, and as directed in the written notice.
5. Complete performance of the work not terminated by the notice.
6. Take action as directed by the Owner to protect and preserve property and work related to this contract that Owner will take possession.

Owner agrees to pay Contractor for:

1. Completed and acceptable work executed in accordance with the contract documents prior to the effective date of termination;
2. Documented expenses sustained prior to the effective date of termination in performing work and furnishing labor, materials, or equipment as required by the contract documents in connection with uncompleted work;
3. Reasonable and substantiated claims, costs, and damages incurred in settlement of terminated contracts with Subcontractors and Suppliers; and
4. Reasonable and substantiated expenses to the Contractor directly attributable to Owner's termination action.

Owner will not pay Contractor for loss of anticipated profits or revenue or other economic loss arising out of or resulting from the Owner's termination action.

The rights and remedies this clause provides are in addition to any other rights and remedies provided by law or under this contract.

TERMINATION FOR CAUSE

The Contractor shall be considered in default of his or her contract and such default will be considered as cause for the Owner to terminate the contract for any of the following reasons, if the Contractor:

a. Fails to begin the work under the contract within the time specified in the Notice to Proceed, or

b. Fails to perform the work or fails to provide sufficient workers, equipment and/or materials to assure completion of work in accordance with the terms of the contract, or

c. Performs the work unsuitably or neglects or refuses to remove materials or to perform anew such work as may be rejected as unacceptable and unsuitable, or

d. Discontinues the execution of the work, or

e. Fails to resume work which has been discontinued within a reasonable time after notice to do so, or

f. Becomes insolvent or is declared bankrupt, or commits any act of bankruptcy or insolvency, or

g. Allows any final judgment to stand against the Contractor unsatisfied for a period of 10 days, or

h. Makes an assignment for the benefit of creditors, or

i. For any other cause whatsoever, fails to carry on the work in an acceptable manner.

Should the Engineer consider the Contractor in default of the contract for any reason above, the Engineer shall immediately give written notice to the Contractor and the Contractor's surety as to the reasons for considering the Contractor in default and the Owner's intentions to terminate the contract.

If the Contractor or surety, within a period of 10 days after such notice, does not proceed in accordance therewith, then the Owner will, upon written notification from the Engineer of the facts of such delay, neglect, or default and the Contractor's failure to comply with such notice, have full power and authority without violating the contract, to take the execution of the work out of the hands of the Contractor. The Owner may appropriate or use any or all materials and equipment that have been mobilized for use in the work and are acceptable and may enter into an agreement for the completion of said contract according to the terms and provisions thereof, or use such other methods as in the opinion of the Engineer will be required for the completion of said contract in an acceptable manner.

All costs and charges incurred by the Owner, together with the cost of completing the work under contract, will be deducted from any monies due or which may become due the Contractor. If such expense exceeds the sum which would have been payable under the contract, then the Contractor and the surety shall be liable and shall pay to the Owner the amount of such excess.

VETERAN'S PREFERENCE

In the employment of labor (excluding executive, administrative, and supervisory positions), the Contractor and all sub-tier contractors must give preference to covered veterans as defined within 49 U.S.C. § 47112. Covered veterans include Vietnam-era veterans, Persian Gulf veterans, Afghanistan-Iraq war veterans, disabled veterans, and small business concerns (as defined by 15 U.S.C. § 632) owned and controlled by disabled veterans. This preference only applies when there are covered veterans readily available and qualified to perform the work to which the employment relates.

New York State Required Contract Clauses (Standard Clauses for NYS Contracts-2023)

The Authority is a New York State public benefit corporation and as such is required to include specific contract provisions in all such project contracts and to further require that all contractors engaged by the Authority for such projects include specific contract provisions in all of such contractor's contracts with any sub-recipients or subcontractors. Contractor hereby specifically acknowledges such contract language requirements and specifically agrees on its behalf and for any sub recipient or subcontractor engaged by Contractor as follows:

The parties to the attached contract, license, lease, amendment or other agreement of any kind (hereinafter, "the contract" or "this contract") agree to be bound by the following clauses which are hereby made a part of the contract (the word "Contractor" herein refers to any party other than the State, whether a contractor, licenser, licensee, lessor, lessee or any other party):

1. EXECUTORY CLAUSE. In accordance with Section 41 of the State Finance Law, the State shall have no liability under this contract to the Contractor or to anyone else beyond funds appropriated and available for this contract.

2. NON-ASSIGNMENT CLAUSE. In accordance with Section 138 of the State Finance Law, this contract may not be assigned by the Contractor or its right, title or interest therein assigned, transferred, conveyed, sublet or otherwise disposed of without the State's previous written consent, and attempts to do so are null and void. Notwithstanding the foregoing, such prior written consent of an assignment of a contract let pursuant to Article XI of the State Finance Law may be waived at the discretion of the contracting agency and with the concurrence of the State Comptroller where the original contract was subject to the State Comptroller's approval, where the assignment is due to a reorganization, merger or consolidation of the Contractor's business entity or enterprise. The State retains its right to approve an assignment and to require that any Contractor demonstrate its responsibility to do business with the State. The Contractor may, however, assign its right to receive payments without the State's prior written consent unless this contract concerns Certificates of Participation pursuant to Article 5-A of the State Finance Law.

3. COMPTROLLER'S APPROVAL. In accordance with Section 112 of the State Finance Law (or, if this contract is with the State University or City University of New York, Section 355 or Section 6218 of the Education Law), if this contract exceeds $50,000 (or the minimum thresholds agreed to by the Office of the State Comptroller for certain S.U.N.Y. and C.U.N.Y. contracts), or if this is an amendment for any amount to a contract which, as so amended, exceeds said statutory amount, or if, by this contract, the State agrees to give something other than money when the value or reasonably estimated value of such consideration exceeds $25,000, it shall not be valid, effective or binding upon the State until it has been approved by the State Comptroller and filed in his office. Comptroller's approval of contracts let by the Office of General Services is required when such contracts exceed $85,000 (State Finance Law § 163.6-a). However, such pre-approval shall not be required for any contract established as a centralized contract through the Office of General Services or for a purchase order or other transaction issued under such centralized contract.

4. WORKERS' COMPENSATION BENEFITS. In accordance with Section 142 of the State Finance Law, this contract shall be void and of no force and effect unless the Contractor shall provide and maintain coverage during the life of this contract for the benefit of such employees as are required to be covered by the provisions of the Workers' Compensation Law.

5. NON-DISCRIMINATION REQUIREMENTS. To the extent required by Article 15 of the Executive Law (also known as the Human Rights Law) and all other State and Federal statutory and constitutional non-discrimination provisions, the Contractor will not discriminate against any employee or applicant for employment, nor subject any individual to harassment, because of age, race, creed, color, national origin, sexual orientation, gender identity or expression, military status, sex, disability, predisposing genetic characteristics, familial status, marital status, or domestic violence victim status or because the individual has opposed any practices forbidden under the Human Rights Law or has filed a complaint, testified, or assisted in any proceeding under the Human Rights Law. Furthermore, in accordance with Section 220-e of the Labor Law, if this is a contract for the construction, alteration or repair of any public building or public work or for the manufacture, sale or distribution of materials, equipment or supplies, and to the extent that this contract shall be performed within the State of New York, Contractor agrees that neither it nor its subcontractors shall, by reason of race, creed, color, disability, sex, or national origin: (a) discriminate in hiring against any New York State citizen who is qualified and available to perform the work; or (b) discriminate against or intimidate any employee hired for the performance of work under this contract. If this is a building service contract as defined in Section 230 of the Labor Law, then, in accordance with Section 239 thereof, Contractor agrees that neither it nor

its subcontractors shall by reason of race, creed, color, national origin, age, sex or disability: (a) discriminate in hiring against any New York State citizen who is qualified and available to perform the work; or (b) discriminate against or intimidate any employee hired for the performance of work under this contract. Contractor is subject to fines of $50.00 per person per day for any violation of Section 220-e or Section 239 as well as possible termination of this contract and forfeiture of all moneys due hereunder for a second or subsequent violation.

6. **WAGE AND HOURS PROVISIONS.** If this is a public work contract covered by Article 8 of the Labor Law or a building service contract covered by Article 9 thereof, neither Contractor's employees nor the employees of its subcontractors may be required or permitted to work more than the number of hours or days stated in said statutes, except as otherwise provided in the Labor Law and as set forth in prevailing wage and supplement schedules issued by the State Labor Department. Furthermore, Contractor and its subcontractors must pay at least the prevailing wage rate and pay or provide the prevailing supplements, including the premium rates for overtime pay, as determined by the State Labor Department in accordance with the Labor Law. Additionally, effective April 28, 2008, if this is a public work contract covered by Article 8 of the Labor Law, the Contractor understands and agrees that the filing of payrolls in a manner consistent with Subdivision 3-a of Section 220 of the Labor Law shall be a condition precedent to payment by the State of any State approved sums due and owing for work done upon the project.

7. NON-COLLUSIVE BIDDING CERTIFICATION. In accordance with Section 139-d of the State Finance Law, if this contract was awarded based upon the submission of bids, Contractor affirms, under penalty of perjury, that its bid was arrived at independently and without collusion aimed at restricting competition. Contractor further affirms that, at the time Contractor submitted its bid, an authorized and responsible person executed and delivered to the State a non-collusive bidding certification on Contractor's behalf.

8. INTERNATIONAL BOYCOTT PROHIBITION. In accordance with Section 220-f of the Labor Law and Section 139-h of the State Finance Law, if this contract exceeds $5,000, the Contractor agrees, as a material condition of the contract, that neither the Contractor nor any substantially owned or affiliated person, firm, partnership or corporation has participated, is participating, or shall participate in an international boycott in violation of the federal Export Administration Act of 1979 (50 USC App. Sections 2401 et seq.) or regulations thereunder. If such Contractor, or any of the aforesaid affiliates of Contractor, is convicted or is otherwise found to have violated said laws or regulations upon the final determination of the United States Commerce Department or any other appropriate agency of the United States subsequent to the contract's execution, such contract, amendment or modification thereto shall be rendered forfeit and void. The Contractor shall so notify the State Comptroller within five (5) business days of such conviction, determination or disposition of appeal (2 NYCRR § 105.4).

9. SET-OFF RIGHTS. The State shall have all of its common law, equitable and statutory rights of set-off. These rights shall include, but not be limited to, the State's option to withhold for the purposes of set-off any moneys due to the Contractor under this contract up to any amounts due and owing to the State with regard to this contract, any other contract with any State department or agency, including any contract for a term commencing prior to the term of this contract, plus any amounts due and owing to the State for any other reason including, without limitation, tax delinquencies, fee delinquencies or monetary penalties relative thereto. The State shall exercise its set-off rights in accordance with normal State practices including, in cases of set-off pursuant to an audit, the finalization of such audit by the State agency, its representatives, or the State Comptroller.

10. RECORDS. The Contractor shall establish and maintain complete and accurate books, records, documents, accounts and other evidence directly pertinent to performance under this contract (hereinafter,

collectively, the "Records"). The Records must be kept for the balance of the calendar year in which they were made and for six (6) additional years thereafter. The State Comptroller, the Attorney General and any other person or entity authorized to conduct an examination, as well as the agency or agencies involved in this contract, shall have access to the Records during normal business hours at an office of the Contractor within the State of New York or, if no such office is available, at a mutually agreeable and reasonable venue within the State, for the term specified above for the purposes of inspection, auditing and copying. The State shall take reasonable steps to protect from public disclosure any of the Records which are exempt from disclosure under Section 87 of the Public Officers Law (the "Statute") provided that: (i) the Contractor shall timely inform an appropriate State official, in writing, that said records should not be disclosed; and (ii) said records shall be sufficiently identified; and (iii) designation of said records as exempt under the Statute is reasonable. Nothing contained herein shall diminish, or in any way adversely affect, the State's right to discovery in any pending or future litigation.

11. IDENTIFYING INFORMATION AND PRIVACY NOTIFICATION. (a) Identification Number(s). Every invoice or New York State Claim for Payment submitted to a New York State agency by a payee, for payment for the sale of goods or services or for transactions (e.g., leases, easements, licenses, etc.) related to real or personal property must include the payee's identification number. The number is any or all of the following: (i) the payee's Federal employer identification number, (ii) the payee's Federal social security number, and/or (iii) the payee's Vendor Identification Number assigned by the Statewide Financial System. Failure to include such number or numbers may delay payment. Where the payee does not have such number or numbers, the payee, on its invoice or Claim for Payment, must give the reason or reasons why the payee does not have such number or numbers. (b) Privacy Notification. (1) The authority to request the above personal information from a seller of goods or services or a lessor of real or personal property, and the authority to maintain such information, is found in Section 5 of the State Tax Law. Disclosure of this information by the seller or lessor to the State is mandatory. The principal purpose for which the information is collected is to enable the State to identify individuals, businesses and others who have been delinquent in filing tax returns or may have understated their tax liabilities and to generally identify persons affected by the taxes administered by the Commissioner of Taxation and Finance. The information will be used for tax administration purposes and for any other purpose authorized by law. (2) The personal information is requested by the purchasing unit of the agency contracting to purchase the goods or services or lease the real or personal property covered by this contract or lease. The information is maintained in the Statewide Financial System by the Vendor Management Unit within the Bureau of State Expenditures, Office of the State Comptroller, 110 State Street, Albany, New York 12236.

12. EQUAL EMPLOYMENT OPPORTUNITIES FOR MINORITIES AND WOMEN. In accordance with Section 312 of the Executive Law and 5 NYCRR Part 143, if this contract is: (i) a written agreement or purchase order instrument, providing for a total expenditure in excess of $25,000.00, whereby a contracting agency is committed to expend or does expend funds in return for labor, services, supplies, equipment, materials or any combination of the foregoing, to be performed for, or rendered or furnished to the contracting agency; or (ii) a written agreement in excess of $100,000.00 whereby a contracting agency is committed to expend or does expend funds for the acquisition, construction, demolition, replacement, major repair or renovation of real property and improvements thereon; or (iii) a written agreement in excess of $100,000.00 whereby the owner of a State assisted housing project is committed to expend or does expend funds for the acquisition, construction, demolition, replacement, major repair or renovation of real property and improvements thereon for such project, then the following shall apply and by signing this agreement the Contractor certifies and affirms that it is Contractor's equal employment opportunity policy that:

(a) The Contractor will not discriminate against employees or applicants for employment because of race, creed, color, national origin, sex, age, disability or marital status, shall make and document its

conscientious and active efforts to employ and utilize minority group members and women in its work force on State contracts and will undertake or continue existing programs of affirmative action to ensure that minority group members and women are afforded equal employment opportunities without discrimination. Affirmative action shall mean recruitment, employment, job assignment, promotion, upgradings, demotion, transfer, layoff, or termination and rates of pay or other forms of compensation;

(b) at the request of the contracting agency, the Contractor shall request each employment agency, labor union, or authorized representative of workers with which it has a collective bargaining or other agreement or understanding, to furnish a written statement that such employment agency, labor union or representative will not discriminate on the basis of race, creed, color, national origin, sex, age, disability or marital status and that such union or representative will affirmatively cooperate in the implementation of the Contractor's obligations herein; and

(c) the Contractor shall state, in all solicitations or advertisements for employees, that, in the performance of the State contract, all qualified applicants will be afforded equal employment opportunities without discrimination because of race, creed, color, national origin, sex, age, disability or marital status. Contractor will include the provisions of "a," "b," and "c" above, in every subcontract over $25,000.00 for the construction, demolition, replacement, major repair, renovation, planning or design of real property and improvements thereon (the "Work") except where the Work is for the beneficial use of the Contractor. Section 312 does not apply to: (i) work, goods or services unrelated to this contract; or (ii) employment outside New York State. The State shall consider compliance by a contractor or subcontractor with the requirements of any federal law concerning equal employment opportunity which effectuates the purpose of this clause. The contracting agency shall determine whether the imposition of the requirements of the provisions hereof duplicate or conflict with any such federal law and if such duplication or conflict exists, the contracting agency shall waive the applicability of Section 312 to the extent of such duplication or conflict. Contractor will comply with all duly promulgated and lawful rules and regulations of the Department of Economic Development’s Division of Minority and Women's Business Development pertaining hereto.

13. CONFLICTING TERMS. In the event of a conflict between the terms of the contract (including any and all attachments thereto and amendments thereof) and the terms of this Appendix A, the terms of this Appendix A shall control.

14. GOVERNING LAW. This contract shall be governed by the laws of the State of New York except where the Federal supremacy clause requires otherwise.

15. LATE PAYMENT. Timeliness of payment and any interest to be paid to Contractor for late payment shall be governed by Article 11-A of the State Finance Law to the extent required by law.

16. NO ARBITRATION. Disputes involving this contract, including the breach or alleged breach thereof, may not be submitted to binding arbitration (except where statutorily authorized), but must, instead, be heard in a court of competent jurisdiction of the State of New York.

17. SERVICE OF PROCESS. In addition to the methods of service allowed by the State Civil Practice Law & Rules ("CPLR"), Contractor hereby consents to service of process upon it by registered or certified mail, return receipt requested. Service hereunder shall be complete upon Contractor's actual receipt of process or upon the State's receipt of the return thereof by the United States Postal Service as refused or undeliverable. Contractor must promptly notify the State, in writing, of each and every change of address to which service of process can be made. Service by the State to the last known address shall be sufficient. Contractor will have thirty (30) calendar days after service hereunder is complete in which to respond.

18. PROHIBITION ON PURCHASE OF TROPICAL HARDWOODS. The Contractor certifies and warrants that all wood products to be used under this contract award will be in accordance with, but not limited to, the specifications and provisions of Section 165 of the State Finance Law, (Use of Tropical Hardwoods) which prohibits purchase and use of tropical hardwoods, unless specifically exempted, by the State or any governmental agency or political subdivision or public benefit corporation. Qualification for an exemption under this law will be the responsibility of the contractor to establish to meet with the approval of the State. In addition, when any portion of this contract involving the use of woods, whether supply or installation, is to be performed by any subcontractor, the prime Contractor will indicate and certify in the submitted bid that the subcontractor has been informed and is in compliance with specifications and provisions regarding use of tropical hardwoods as detailed in § 165 State Finance Law. Any such use must meet with the approval of the State; otherwise, the bid may not be considered responsive. Under Bidder certifications, proof of qualification for exemption will be the responsibility of the Contractor to meet with the approval of the State.

19. MACBRIDE FAIR EMPLOYMENT PRINCIPLES. In accordance with the MacBride Fair Employment Principles (Chapter 807 of the Laws of 1992), the Contractor hereby stipulates that the Contractor either (a) has no business operations in Northern Ireland, or (b) shall take lawful steps in good faith to conduct any business operations in Northern Ireland in accordance with the MacBride Fair Employment Principles (as described in Section 165 of the New York State Finance Law), and shall permit independent monitoring of compliance with such principles.

20. OMNIBUS PROCUREMENT ACT OF 1992. It is the policy of New York State to maximize opportunities for the participation of New York State business enterprises, including minority- and women-owned business enterprises as Bidders, subcontractors and suppliers on its procurement contracts. Information on the availability of New York State subcontractors and suppliers is available from:

NYS Department of Economic Development Division for Small Business
Albany, New York 12245 Telephone: 518-292-5100
Fax: 518-292-5884
email: opa@esd.ny.gov

A directory of certified minority- and women-owned business enterprises is available from:

NYS Department of Economic Development
Division of Minority and Women's Business Development 633 Third Avenue
New York, NY 10017 212-803-2414
email: mwbecertification@esd.ny.gov https://ny.newnycontracts.com/FrontEnd/VendorSearchPublic.asp

The Omnibus Procurement Act of 1992 (Chapter 844 of the Laws of 1992, codified in State Finance Law § 139-i and Public Authorities Law § 2879(3)(n)–(p)) requires that by signing this bid or contract, as applicable, Contractors certify that whenever the total bid amount is greater than $1 million:

(a) The Contractor has made reasonable efforts to encourage the participation of New York State Business Enterprises as suppliers and subcontractors, including certified minority- and women-owned business enterprises, on this project, and has retained the documentation of these efforts to be provided upon request to the State;

(b) The Contractor has complied with the Federal Equal Opportunity Act of 1972 (P.L. 92-261), as amended;

(c) The Contractor agrees to make reasonable efforts to provide notification to New York State residents of employment opportunities on this project through listing any such positions with the Job Service Division of the New York State Department of Labor or providing such notification in such manner as is consistent with existing collective bargaining contracts or agreements. The Contractor agrees to document these efforts and to provide said documentation to the State upon request; and

(d) The Contractor acknowledges notice that the State may seek to obtain offset credits from foreign countries as a result of this contract and agrees to cooperate with the State in these efforts.

21. RECIPROCITY AND SANCTIONS PROVISIONS. Bidders are hereby notified that if their principal place of business is located in a country, nation, province, state or political subdivision that penalizes New York State vendors, and if the goods or services they offer will be substantially produced or performed outside New York State, the Omnibus Procurement Act 1994 and 2000 amendments (Chapter 684 and Chapter 383, respectively, codified in State Finance Law § 165(6) and Public Authorities Law § 2879(5))) require that they be denied contracts which they would otherwise obtain. NOTE: As of October 2019, the list of discriminatory jurisdictions subject to this provision includes the states of South Carolina, Alaska, West Virginia, Wyoming, Louisiana and Hawaii.

22. COMPLIANCE WITH BREACH NOTIFICATION AND DATA SECURITY LAWS. Contractor shall comply with the provisions of the New York State Information Security Breach and Notification Act (General Business Law § 899-aa and State Technology Law § 208) and commencing March 21, 2020 shall also comply with General Business Law § 899-bb.

23. COMPLIANCE WITH CONSULTANT DISCLOSURE LAW. If this is a contract for consulting services, defined for purposes of this requirement to include analysis, evaluation, research, training, data processing, computer programming, engineering, environmental, health, and mental health services, accounting, auditing, paralegal, legal or similar services, then, in accordance with Section 163 (4)(g) of the State Finance Law (as amended by Chapter 10 of the Laws of 2006), the Contractor shall timely, accurately and properly comply with the requirement to submit an annual employment report for the contract to the agency that awarded the contract, the Department of Civil Service and the State Comptroller.

24. PROCUREMENT LOBBYING. To the extent this agreement is a "procurement contract" as defined by State Finance Law §§ 139-j and 139-k, by signing this agreement the contractor certifies and affirms that all disclosures made in accordance with State Finance Law §§ 139-j and 139-k are complete, true and accurate. In the event such certification is found to be intentionally false or intentionally incomplete, the State may terminate the agreement by providing written notification to the Contractor in accordance with the terms of the agreement.

25. CERTIFICATION OF REGISTRATION TO COLLECT SALES AND COMPENSATING USE TAX BY CERTAIN STATE CONTRACTORS, AFFILIATES AND SUBCONTRACTORS. To the extent this agreement is a contract as defined by Tax Law § 5-a, if the contractor fails to make the certification required by Tax Law § 5-a or if during the term of the contract, the Department of Taxation and Finance or the covered agency, as defined by Tax Law § 5-a, discovers that the certification, made under penalty of perjury, is false, then such failure to file or false certification shall be a material breach of this contract and this contract may be terminated, by providing written notification to the Contractor in accordance with the terms of the agreement, if the covered agency determines that such action is in the best interest of the State.

26. IRAN DIVESTMENT ACT. By entering into this Agreement, Contractor certifies in accordance with State Finance Law § 165-a that it is not on the “Entities Determined to be Non-

Responsive Bidders/Offerers pursuant to the New York State Iran Divestment Act of 2012" ("Prohibited Entities List") posted at: https://ogs.ny.gov/list- entities-determined-benon-responsive-Biddersofferers-pursuant-nys-iran-divestmentact-2012.

Contractor further certifies that it will not utilize on this Contract any subcontractor that is identified on the Prohibited Entities List. Contractor agrees that should it seek to renew or extend this Contract, it must provide the same certification at the time the Contract is renewed or extended. Contractor also agrees that any proposed Assignee of this Contract will be required to certify that it is not on the Prohibited Entities List before the contract assignment will be approved by the State. During the term of the Contract, should the state agency receive information that a person (as defined in State Finance Law § 165-a) is in violation of the above-referenced certifications, the state agency will review such information and offer the person an opportunity to respond. If the person fails to demonstrate that it has ceased its engagement in the investment activity which is in violation of the Act within 90 days after the determination of such violation, then the state agency shall take such action as may be appropriate and provided for by law, rule, or contract, including, but not limited to, imposing sanctions, seeking compliance, recovering damages, or declaring the Contractor in default.

27. ADMISSIBILITY OF REPRODUCTION OF CONTRACT. Notwithstanding the best evidence rule or any other legal principle or rule of evidence to the contrary, the Contractor acknowledges and agrees that it waives any and all objections to the admissibility into evidence at any court proceeding or to the use at any examination before trial of an electronic reproduction of this contract, in the form approved by the State Comptroller, if such approval was required, regardless of whether the original of said contract is in existence.

BUY AMERICAN CERTIFICATION

Certification of Compliance with FAA Buy American Preference – Construction Projects

As a matter of bid responsiveness, the bidder or offeror must complete, sign, date, and submit this certification statement with its proposal. The bidder or offeror must indicate how it intends to comply with 49 U.S.C. § 50101, BABA and other related Made in America Laws, U.S. statutes, guidance, and FAA policies, by selecting one of the following certification statements. These statements are mutually exclusive. Bidder must select one or the other (i.e., not both) by inserting a checkmark (✓) or the letter "X".

☐ Bidder or offeror hereby certifies that it will comply with 49 U.S.C. § 50101, BABA and other related U.S. statutes, guidance, and policies of the FAA by:

a) Only installing iron, steel and manufactured products produced in the United States;
b) Only installing construction materials defined as: an article, material, or supply – other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives that are or consist primarily of non-ferrous metals; plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables); glass (including optic glass); lumber or drywall that have been manufactured in the United States.
c) Installing manufactured products for which the Federal Aviation Administration (FAA) has issued a waiver as indicated by inclusion on the current FAA Nationwide Buy American Waivers Issued listing; or
d) Installing products listed as an Excepted Article, Material or Supply in Federal Acquisition Regulation Subpart 25.108.

By selecting this certification statement, the bidder or offeror agrees:

a) To provide to the Airport Sponsor or the FAA evidence that documents the source and origin of the iron, steel, and/or manufactured product.
b) To faithfully comply with providing U.S. domestic products.
c) To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.
d) Certify that all construction materials used in the project are manufactured in the U.S.

☐ The bidder or offeror hereby certifies it cannot comply with the 100 percent Buy American Preferences of 49 U.S.C. § 50101(a) but may qualify for a Type 3 or Type 4 waiver under 49 USC § 50101(b). By selecting this certification statement, the apparent bidder or offeror with the apparent low bid agrees:

a) To the submit to the Airport Sponsor or FAA within 15 calendar days of being selected as the responsive bidder, a formal waiver request and required documentation that supports the type of waiver being requested.
b) That failure to submit the required documentation within the specified timeframe is cause for a non-responsive determination that may result in rejection of the proposal.
c) To faithfully comply with providing U.S. domestic products at or above the approved U.S. domestic content percentage as approved by the FAA.
d) To furnish U.S. domestic product for any waiver request that the FAA rejects.

e) To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.

Required Documentation

Type 2 Waiver (Nonavailability) - The iron, steel, manufactured goods or construction materials or manufactured goods are not available in sufficient quantity or quality in the United States. The required documentation for the Nonavailability waiver is

a) Completed Content Percentage Worksheet and Final Assembly Questionnaire
b) Record of thorough market research, consideration where appropriate of qualifying alternate items, products, or materials including;
c) A description of the market research activities and methods used to identify domestically manufactured items capable of satisfying the requirement, including the timing of the research and conclusions reached on the availability of sources.

Type 3 Waiver – The cost of components and subcomponents produced in the United States is more than 60 percent of the cost of all components and subcomponents of the "facility/project." The required documentation for a Type 3 waiver is:

a) Completed Content Percentage Worksheet and Final Assembly Questionnaire including;
b) Listing of all manufactured products that are not comprised of 100 percent U.S. domestic content (excludes products listed on the FAA Nationwide Buy American Waivers Issued listing and products excluded by Federal Acquisition Regulation Subpart 25.108; products of unknown origin must be considered as non-domestic products in their entirety).
c) Cost of non-domestic components and subcomponents, excluding labor costs associated with final assembly and installation at project location.
d) Percentage of non-domestic component and subcomponent cost as compared to total "facility" component and subcomponent costs, excluding labor costs associated with final assembly and installation at project location.

Type 4 Waiver (Unreasonable Costs) - Applying this provision for iron, steel, manufactured goods or construction materials would increase the cost of the overall project by more than 25 percent. The required documentation for this waiver is:

a) A completed Content Percentage Worksheet and Final Assembly Questionnaire from
b) At minimum two comparable equal bids and/or offers;
c) Receipt or record that demonstrates that supplier scouting called for in Executive Order 14005, indicates that no domestic source exists for the project and/or component;
d) Completed waiver applications for each comparable bid and/or offer.

False Statements: Per 49 USC § 47126, this certification concerns a matter within the jurisdiction of the Federal Aviation Administration and the making of a false, fictitious, or fraudulent certification may render the maker subject to prosecution under Title 18, United States Code.

Date	Signature
Company Name	Title

(Buy American form(s) must be completed and submitted with the Proposal.)

STATEMENT OF SURETY'S INTENT

TO: Syracuse Regional Airport Authority

We have reviewed the bid of _____
(Contractor)

of _____
(Address)

for the **CENTRALIZED DEICING FACILITY CONSTRUCT**,

project for which bids will be received on: _____
(Bid Opening Date)

and wish to advise that should this Bid of the Contractor be accepted and the Contract awarded to him, it is our present intention to become surety on the performance bond and labor and material bond required by the Contract.

Any arrangement for the bonds required by the Contract is a matter between the Contractor and ourselves and we assure no liability to you or third parties if for any reason we do not execute the requisite bonds.

We are duly authorized to do business in the State of New York.

ATTEST: _____ _____

_____
Surety's Authorized Signature(s)

Corporate seal, if any. If no seal, write "No Seal" across this place and sign.)

ATTACH PROPOSAL GUARANTEE
ATTACH POWER OF ATTORNEY

(This form must be complete and submitted with the Proposal.
Copies of this form may be filled out and attached to this page.)

CONTRACTOR'S STORM WATER POLLUTION PREVENTION PLAN CERTIFICATION

Airport Name/Location: Syracuse Hancock International Airport

Syracuse Regional Airport Authority, 1000 Col. Eileen Collins Blvd., Syracuse, New York 13212

Project Name: **CENTRALIZED DEICING FACILITY CONSTRUCT**
Contractor's Official Name: _____
Address: _____
Telephone Number: _____

Certification Statement:

"I certify under penalty of law that I understand and agree to comply with the terms and conditions of the Storm Water Pollution Prevention Plan for this project presented in the technical specifications of these Contract Documents in Item P-156, "Soil Erosion and Sediment Control". I understand and agree to comply with the terms and conditions of the New York State Pollutant Discharge Elimination System (SPDES) general permit for storm water discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. I understand that the Owner must file a "Notice of Intent for Stormwater Discharges Associated with Construction Activity Under SPDES General Permit #GP-0-15-002 (Permit)". I agree that I will not engage in activity that will cause stormwater to discharge from the construction site until such time that the Owner has received acknowledgment from the New York State Department of Environmental Conservation that construction activity associated with this project is covered under the Permit."

_____	_____
Printed Name of Signer	Signature
_____	_____
Title	Date

(This form must be completed and submitted with the Proposal.)

SAFETY PLAN COMPLIANCE DOCUMENT (SPCD) CERTIFICATION

Project Location: Syracuse Hancock International Airport

Project Name: **CENTRALIZED DEICING FACILITY CONSTRUCT**

Contractor's Official Name: _____
Contact Person: _____ Telephone: _____
Street Address: _____
City: _____ State: _____ Zip: _____

Certification Statement:

I certify that I have read the Construction Safety and Phasing Plan (CSPP) included in the Contract Documents and if awarded this Contract, I will abide by its requirements as written.

I certify that I have read the Safety Plan Compliance Document (SPCD) included in the Contract Documents and if awarded this Contract, I will abide by its requirements as written;

I certify that I will provide the information required in the SPCD prior to the start of construction work, if awarded this Contract, and that I will provide any additional information requested by the Owner.

_____	_____
Printed Name of Signer	Signature
_____	_____
Title	Date

PROCUREMENT LOBBYING FORM

1. Bidder/Offerer certifies that it understands and agrees to comply with the procedures of the Syracuse Regional Airport Authority relative to permissible contacts as required by State Finance Law Section 139-j (3) and Section 139-j (6) (b).

Contractor DISCLOSURE OF PRIOR NON-RESPONSIBILITY DETERMINATIONS Pursuant to Procurement Lobbying Law (SFL §139-j)

2. Has any governmental entity made a finding of non-responsibility regarding the individual or entity seeking to enter into this procurement contract in the previous four years?

___Yes _____No

If "Yes" to the above question, please answer the following question: (Make Notations Clear)

(a) Was the basis for the finding of non-responsibility due to a violation of State Finance Law §139-j?

___Yes _____No

(b) If "Yes", was the basis for the finding of non-responsibility due to the intentional provision of false or incomplete information to a governmental entity?

___Yes _____No

If "Yes" to any of the above questions, please provide details regarding the finding of non-responsibility:

Governmental Entity:_____

Date of Finding of Non-Responsibility:_____

Basis of Finding of Non-Responsibility (attach additional sheets as necessary)

_____

_____

3. Has any governmental entity terminated or withheld a procurement contract with the above-named individual or entity due to the intentional provision of false or incomplete information?

____Yes _____No

If "Yes" to the above question, provide details:
Governmental Entity:_____
Date of Termination or Withholding of Contract:_____
Basis of Termination or Withholding: (add additional pages if necessary)

_____

4. Bidder/Offerer certifies that all information provided to the Syracuse Regional Airport Authority with respect to State Finance Law Section 139-k is complete, true and accurate.

Name of Bidder/Offerer:

_____

Bidder's/Offerer's Business Address:

_____

Bidder's/Offerer's Signature: **Date:**

_____ _____

I understand that my signature represents that I am signing and responding to all certifications/questions listed above

Print Name:

_____

Title of Person signing this form: _____

(This form must be completed and submitted with the Proposal.)

RESOLUTION FOR CORPORATE BIDDERS

RESOLVED, that _____ be authorized

(Name of Officer)

to sign and submit the bid or proposal of this corporation for the following project:

CENTRALIZED DEICING FACILITY CONSTRUCT

and to include in such bid or proposal the certificate as to non-collusion required by section one hundred three-d of the General Municipal Law as the act and deed of such corporation, and for any inaccuracies or misstatements in such certificate this corporate bidder shall be liable under penalties of perjury.

The foregoing is a true and correct copy of the resolution adopted by

_____

_____ Corporation at a meeting of its Board of Directors held on the____day of _____, 20___.

_____

(Secretary)

(Seal)

(This form must be completed and submitted with the Proposal.)

CERTIFICATIONS

BIDDER'S NAME: _____

ADDRESS: _____

TELEPHONE NO.: _____ **FAX NO.** _____

IRS EMPLOYER IDENTIFICATION NUMBER: _____

NOTICE OF NONSEGREGATED FACILITIES REQUIREMENT

Notice to Prospective Federally Assisted Construction Contractors

1. A Certification of Non-segregated Facilities shall be submitted prior to the award of a federally- assisted construction contract exceeding $10,000 which is not exempt from the provisions of the Equal Opportunity Clause.
2. Contractors receiving federally assisted construction contract awards exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity Clause will be required to provide for the forwarding of the following notice to prospective subcontractors for supplies and construction contracts where the subcontracts exceed $10,000 and are not exempt from the provisions of the Equal Opportunity Clause.
3. The penalty for making false statements in offers is prescribed in 18 U.S.C. § 1001.

Notice to Prospective Subcontractors of Requirements for Certification of Non-Segregated Facilities

1. A Certification of Non-segregated Facilities shall be submitted prior to the award of a subcontract exceeding $10,000, which is not exempt from the provisions of the Equal Opportunity Clause.
2. Contractors receiving subcontract awards exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity Clause will be required to provide for the forwarding of this notice to prospective subcontractors for supplies and construction contracts where the subcontracts exceed $10,000 and are not exempt from the provisions of the Equal Opportunity Clause.
3. The penalty for making false statements in offers is prescribed in 18 U.S.C. § 1001.

* * * * *

CERTIFICATION OF NON-SEGREGATED FACILITIES

The federally-assisted construction contractor certifies that she or he does not maintain or provide, for his employees, any segregated facilities at any of his establishments and that she or he does not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The federally assisted construction contractor certifies that she or he will not maintain or provide, for his employees, segregated facilities at any of his establishments and that she or he will not permit his employees to perform their services at any location under his control where segregated facilities are maintained. The federally assisted construction contractor agrees that a breach of this certification is a violation of the Equal Opportunity Clause in this contract.

As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms, and washrooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directives or are, in fact, segregated on the basis of race, color, religion, or national origin because of habit, local custom, or any other reason. The federally-assisted construction contractor agrees that (except where she or he has obtained identical certifications from proposed subcontractors for specific time periods) she or he will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity Clause and that she or he will retain such certifications in his files.

* * * * *

CERTIFICATION OF OFFEROR/BIDDER REGARDING DEBARMENT

By submitting a bid/proposal under this solicitation, the bidder or offeror certifies that neither it nor its principals are presently debarred or suspended by any Federal department or agency from participation in this transaction.

CERTIFICATION OF LOWER TIER CONTRACTORS REGARDING DEBARMENT

The successful bidder, by administering each lower tier subcontract that exceeds $25,000 as a “covered transaction”, must verify each lower tier participant of a “covered transaction” under the project is not presently debarred or otherwise disqualified from participation in this federally assisted project. The successful bidder will accomplish this by:

1. Checking the System for Award Management at website: http://www.sam.gov

2. Collecting a certification statement similar to the Certificate Regarding Debarment and Suspension (Bidder or Offeror), above.

3. Inserting a clause or condition in the covered transaction with the lower tier contract

If the FAA later determines that a lower tier participant failed to disclose to a higher tier participant that it was excluded or disqualified at the time it entered the covered transaction, the FAA may pursue any available remedies, including suspension and debarment of the non-compliant participant.

* * * * *

CERTIFICATION REGARDING LOBBYING

The bidder or offeror certifies by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the Bidder or Offeror, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all sub-awards at all tiers (including subcontracts, sub-grants, and contracts under grants, loans, and cooperative agreements) and that all sub-recipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

* * * * *

CERTIFICATION OF OFFERER/BIDDER REGARDING TAX DELINQUENCY AND FELONY CONVICTIONS

The Contractor must complete the following two certification statements. The Contractor must indicate its current status as it relates to tax delinquency and felony conviction by inserting a checkmark or "X" in the space following the applicable response. The Contractor agrees that, if awarded a contract resulting from this solicitation, it will incorporate this provision for certification in all lower tier subcontracts.

Certifications:

1) The Contractor represents that it is (___) is not (___) a corporation that has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.

2) The Contractor represents that it is (___) is not (___) a corporation that was convicted of a criminal violation under any Federal law within the preceding 24 months.

Note:
If a Contractor responds in the affirmative to either of the above representations, the Contractor is ineligible to receive an award unless the sponsor has received notification from the agency suspension and debarment official (SDO) that the SDO has considered suspension or debarment and determined that further action is not required to protect the Government's interests. The Contractor therefore must provide information to the owner about its tax liability or conviction to the Owner, who will then notify the FAA Airports District Office, which will then notify the agency's SDO to facilitate completion of the required considerations before award decisions are made.

Term Definitions

Felony conviction: Felony conviction means a conviction within the preceding twenty four (24) months of a felony criminal violation under any Federal law and includes conviction of an offense defined in a section of the U.S. code that specifically classifies the offense as a felony and conviction of an offense that is classified as a felony under 18 U.S.C. § 3559.

Tax Delinquency: A tax delinquency is any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.

* * * * *

TRADE RESTRICTION CERTIFICATION

By submission of an offer, the Offeror certifies that with respect to this solicitation and any resultant contract, the Offeror –

1) is not owned or controlled by one or more citizens of a foreign country included in the list of countries that discriminate against U.S. firms as published by the Office of the United States Trade Representative (USTR);

2) has not knowingly entered into any contract or subcontract for this project with a person that is a citizen or national of a foreign country included on the list of countries that discriminate against U.S. firms as published by the USTR; and

3) has not entered into any subcontract for any product to be used on the Federal project that is produced in a foreign country included on the list of countries that discriminate against U.S. firms published by the USTR.

This certification concerns a matter within the jurisdiction of an agency of the United States of America and the making of a false, fictitious, or fraudulent certification may render the maker subject to prosecution under Title 18 USC § 1001.

The Offeror/Contractor must provide immediate written notice to the Owner if the Offeror/Contractor learns that its certification or that of a subcontractor was erroneous when submitted or has become erroneous by reason of changed circumstances. The Contractor must require subcontractors provide immediate written notice to the Contractor if at any time it learns that its certification was erroneous by reason of changed circumstances.

Unless the restrictions of this clause are waived by the Secretary of Transportation in accordance with 49 CFR § 30.17, no contract shall be awarded to an Offeror or subcontractor:

1) who is owned or controlled by one or more citizens or nationals of a foreign country included on the list of countries that discriminate against U.S. firms published by the USTR; or
2) whose subcontractors are owned or controlled by one or more citizens or nationals of a foreign country on such USTR list; or
3) who incorporates in the public works project any product of a foreign country on such USTR list.

Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by this provision. The knowledge and information of a contractor is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

The Offeror agrees that, if awarded a contract resulting from this solicitation, it will incorporate this provision for certification without modification in all lower tier subcontracts. The Contractor may rely on the certification of a prospective subcontractor that it is not a firm from a foreign country included on the list of countries that discriminate against U.S. firms as published by USTR, unless the Offeror has knowledge that the certification is erroneous.

This certification is a material representation of fact upon which reliance was placed when making an award. If it is later determined that the Contractor or subcontractor knowingly rendered an erroneous certification, the Federal Aviation Administration (FAA) may direct through the Owner cancellation of the contract or subcontract for default at no cost to the Owner or the FAA.

Printed Name & Title:
Signature:
Date:

(These certifications must be completed and submitted with the Proposal.)

BIDDER'S STATEMENT OF PREVIOUS CONTRACTS SUBJECT TO EEO CLAUSE AS DESCRIBED IN SPECIAL PROVISIONS TO THE GENERAL PROVISIONS, SECTION SP 70-23, SUBSECTION A-16

The Bidder shall complete the following statement by checking the appropriate boxes.

The Bidder has _____has not ____participated in a previous contract subject to the Equal Opportunity Clause prescribed by Executive Order 11246, as amended, of September 24, 1965.

The Bidder has _____has not ____submitted all compliance reports in connection with any such contract due under the applicable filing requirements; and that representations indicating submission of required compliance reports signed by proposed subcontractors will be obtained prior to award of subcontracts.

If the Bidder has participated in a previous contract subject to the Equal Opportunity Clause and has not submitted compliance reports due under applicable filing requirements, the Bidder shall submit a compliance report on Standard Form 100, "Employee Information Report EEO-1", attached to this proposal.

CERTIFICATION FOR RECEIPT OF ADDENDA

Receipt of the following Addenda is acknowledged:

ADDENDUM NO.: _____ DATED: _____
ADDENDUM NO.: _____ DATED: _____
ADDENDUM NO.: _____ DATED: _____
ADDENDUM NO.: _____ DATED: _____
ADDENDUM NO.: _____ DATED: _____
ADDENDUM NO.: _____ DATED: _____

_____
(Firm or Corporation Making Bid)

_____
(Signature of Authorized Person)

P.O. Address: _____

Dated: _____

(This form must be completed and submitted with the Proposal.)

SYR
SYRACUSE
HANCOCK
INTERNATIONAL AIRPORT

SRAA
Syracuse Regional Airport Authority

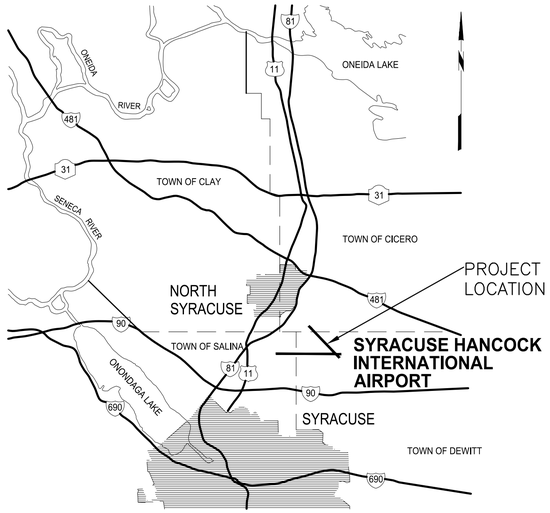
C&S COMPANIES

CONTRACT DRAWINGS
FOR THE CONSTRUCTION OF

CENTRALIZED DEICING FACILITY (CDF)

SYRACUSE HANCOCK INTERNATIONAL AIRPORT

SYRACUSE REGIONAL AIRPORT AUTHORITY
SYRACUSE, NEW YORK



LOCATION MAP

FAA AIP PROJECT: 3-36-0114-XXX-XX
NYSDOT PROJECT: XXXXXX
C&S PROJECT: O68.069.001
SRAA NO. 2024-13

APRIL 29, 2026

BID DOCUMENTS
NOT FOR CONSTRUCTION

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209
SUBDIVISION 2 OF THE NEW YORK STATE EDUCATION LAW

GI001

Copyright ©

Apr 29, 2026 - 3:29pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_GI Series.dwg

GENERAL CONSTRUCTION NOTES

1. THE CONTRACTOR'S ATTENTION IS DIRECTED TO SECTION 70-08, ATTACHMENT A - CONSTRUCTION SAFETY AND PHASING PLAN (CSPP) OF THE GENERAL PROVISIONS.
2. THESE DRAWINGS HAVE BEEN PREPARED, IN PART, BASED UPON RECORD DRAWINGS AND/OR CAD FILES FURNISHED BY OTHERS. WHILE THIS INFORMATION IS BELIEVED TO BE RELIABLE, THOSE UTILIZING THE INFORMATION ON THESE DRAWINGS ARE ADVISED TO OBTAIN INDEPENDENT VERIFICATION OF ITS ACCURACY BEFORE USING IT FOR ANY PURPOSE.
3. EXISTING UTILITIES WERE TAKEN FROM PLANS OF RECORD. THEY HAVE BEEN SHOWN TO THE EXTENT KNOWN AND ARE OFFERED IN GOOD FAITH SOLELY FOR INFORMATIONAL PURPOSES. THEY MAY NOT REFLECT ACTUAL LOCATIONS AND MAY NOT BE INCLUSIVE. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
4. ONE WEEK PRIOR TO EXCAVATING IN ANY AREA, THE CONTRACTOR SHALL HIRE AN APPROVED UTILITY LOCATING SERVICE AND MARK OUT ALL UTILITIES. THE CONTRACTOR SHALL MEET WITH AIRPORT OPERATIONS AND THE RPR TO DETERMINE TAXIWAY AND APRON CLOSURE TIMES AND DURATIONS FOR THE LOCATING TASKS. CONTRACTOR SHALL PERFORM SITE INVESTIGATIONS TO VERIFY LOCATION AND DEPTH OF ALL UTILITIES AS NECESSARY. INVESTIGATION TECHNIQUES MAY INCLUDE RF TRACING, GROUND PENETRATING RADAR, VACUUM OR AIR PRESSURE POT-HOLING, OR BY OTHER MEANS APPROVED BY THE RPR CONTRACTOR SHALL ACCURATELY RECORD AND MARK THE LOCATION OF ALL UTILITIES. ALL MARKERS SHALL BE APPROVED BY AIRPORT OPERATIONS AND CANNOT PRESENT A HEIGHT OBSTRUCTION OR FOREIGN OBJECT DEBRIS (FOD) HAZARD TO AIRCRAFT (OBJECTS THAT CAN BE DISLODGED BY JET BLAST/WIND). THE COST OF THESE EFFORTS SHALL BE INCIDENTAL TO MAINTENANCE AND PROTECTION OF TRAFFIC.
5. THE ACTUAL LOCATION AND ELEVATION OF ALL UTILITIES SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION.
6. IN THE EVENT OF DAMAGE TO EXISTING UTILITIES OR CABLES, THE RPR AND OWNER SHALL BE NOTIFIED IMMEDIATELY.
7. THE CONTRACTOR SHALL REPAIR ALL DAMAGE TO UTILITIES OR CABLES, AS DIRECTED BY THE RPR, IMMEDIATELY AND AT THE CONTRACTOR'S EXPENSE.
8. ALL AREAS DISTURBED AS A RESULT OF THE CONTRACTOR'S STAGING AND CONSTRUCTION OPERATIONS SHALL BE RESTORED EQUAL TO OR BETTER THAN ORIGINAL CONDITION AT THE CONTRACTOR'S EXPENSE. PRECONSTRUCTION PHOTOS SHALL BE TAKEN BY THE RPR FOR USE IN DOCUMENTING EXISTING CONDITIONS.
9. DURING THE WORK OF THIS CONTRACT, THE CONTRACTOR SHALL FURNISH, ERECT AND MAINTAIN WHATEVER TEMPORARY LIGHTING MAY BE NECESSARY TO KEEP THE APRON AND TAXIWAYS IN OPERATING CONDITION WHEN OPEN FOR AIRCRAFT.
10. ALL DIRT, DUST, STONES AND LOOSE DEBRIS SHALL BE CONTINUOUSLY REMOVED FROM ALL PAVED SURFACES DURING THIS CONTRACT.
11. THE CONTRACTOR SHALL RECONSTRUCT AND MAINTAIN EXISTING ACCESS ROADS AS REQUIRED FOR ACCESS TO THE WORK AREAS.
12. THE CONTRACTOR SHALL CONSTRUCT AND MAINTAIN PROPOSED GRAVEL ACCESS ROADS AT THE APPROXIMATE LOCATION SHOWN.
13. PROPOSED ACCESS ROADS SHALL BE REMOVED UPON COMPLETION OF WORK AND THE AREA RESTORED TO ORIGINAL CONDITION.
14. ALL OF THE CONTRACTOR'S OPERATIONS SHALL REMAIN ON AIRPORT PROPERTY AT ALL TIMES. UNDER NO CIRCUMSTANCES WILL THE CONTRACTOR BE ALLOWED ON ADJACENT PROPERTY.
15. THIS CONTRACT DOES NOT ALLOW FOR PRICE INCREASES DUE TO ESCALATION IN COST OF UNIT BID ITEMS. THE CONTRACTOR SHALL TAKE THIS INTO CONSIDERATION WHEN PREPARING UNIT PRICES FOR BID.
16. THE CONTRACTOR IS RESPONSIBLE FOR ALL QUALITY CONTROL TESTING. QUALITY ASSURANCE TESTS WILL BE MADE BY AND AT THE EXPENSE OF THE OWNER, UNLESS OTHERWISE NOTED. THE COST OF ALL FAILING TESTS SHALL BE BORNE BY THE CONTRACTOR.
17. THE CONTRACTOR'S QUALIFIED REPRESENTATIVE SHALL BE ON SITE ALL TIMES DURING CONSTRUCTION WORK, INCLUDING WORK PERFORMED BY SUBCONTRACTORS. THE CONTRACTOR'S QUALIFIED REPRESENTATIVE SHALL BE AVAILABLE VIA TELEPHONE AT ALL TIMES IN CASE OF EMERGENCIES, SHALL ATTEND WEEKLY PROGRESS MEETINGS AT THE AIRPORT AND BE ABLE TO MAKE DECISIONS ON BEHALF OF THE CONTRACTOR.
18. THE RPR SHALL BE NOTIFIED IN WRITING (VIA RFI) OF ANY CONDITIONS THAT VARY FROM THOSE SHOWN ON THE PLANS. THE CONTRACTOR'S WORK SHALL NOT VARY FROM THE PLANS WITHOUT THE EXPRESSED APPROVAL OF THE RPR.

GRADING AND EXCAVATION NOTES

19. PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR SHALL STRIP, SCREEN AND STOCKPILE ALL MATERIAL SUITABLE FOR TOPSOILING.
20. SELECTIVE GRADING SHALL BE REQUIRED AS DIRECTED BY THE RPR.
21. THE EXACT LOCATIONS AND DIMENSIONS OF PAVEMENT TO BE RECONSTRUCTED SHALL BE DETERMINED BY THE RPR DURING CONSTRUCTION.
22. THE QUANTITY OF UNCLASSIFIED EXCAVATION, ITEM P-152, INCLUDES 1,000 CY FOR BASE BID AND 330 CY FOR ADD ON #1 OF UNDERCUT EXCAVATION WHICH WILL BE USED ONLY WHEN DIRECTED BY THE RPR.
23. THE QUANTITY OF CRUSHED STONE FOR UNDERCUT REPLACEMENT, ITEM P-160, WILL BE USED ONLY WHEN DIRECTED BY THE RPR.
24. ALL EXCAVATED MATERIAL EXCLUDING ASPHALT, SHALL BE DISPOSED OF AT THE ON-SITE SPOIL AREA, AS SHOWN ON THE GENERAL PLAN OR AS OTHERWISE SPECIFIED BY THE OWNER. EXCAVATED SOIL MATERIALS CAN NOT LEAVE THE AIRPORT PROPERTY. THIS INCLUDES SPOIL MATERIAL SUITABLE FOR EMBANKMENT, TOPSOIL, AND GRANULAR SUBBASES. MATERIALS SHALL BE BROKEN INTO MANAGEABLE PIECES TO ALLOW FOR USE IN EMBANKMENT/FILL AREAS. ALL OTHER MATERIALS SHALL BE DISPOSED OF OFF-SITE AT THE CONTRACTORS EXPENSE INCLUDING CONCRETE, ASPHALT, STRUCTURES, PIPE, CABLE, CONDUIT, ETC.
25. EMBANKMENTS SHALL BE CONSTRUCTED WITH SUITABLE ON-SITE MATERIAL OBTAINED FROM GENERAL EXCAVATION, UNLESS OTHERWISE DIRECTED BY THE RPR. NO SEPARATE PAYMENT SHALL BE MADE FOR EMBANKMENT.
26. THE LIMIT FOR TOPSOILING, SEEDING, AND MULCHING ARE THE LIMITS OF GRADING SHOWN ON THE GRADING PLANS. ALL AREAS OUTSIDE OF THE GRADING LIMITS WHICH ARE DISTURBED SHALL BE RESTORED BY THE CONTRACTOR AT HIS EXPENSE.
27. TEMPORARY AIR AND WATER POLLUTION, SOIL EROSION AND SILTATION CONTROL WORK PERFORMED FOR PROTECTION OF CONSTRUCTION AREAS OUTSIDE THE CONSTRUCTION LIMITS, SUCH AS BORROW AREAS WASTE AREAS, HAUL ROADS, EQUIPMENT AND MATERIAL STORAGE SITES, AND TEMPORARY PLANT SITES, WILL NOT BE MEASURED AND PAID FOR DIRECTLY BUT SHALL BE CONSIDERED AS A SUBSIDIARY OBLIGATION OF THE CONTRACTOR.
28. ALL SOIL EROSION AND SEDIMENT CONTROL DEVICES AND MATERIALS SHALL BE IN PLACE PRIOR TO BEGINNING EARTHWORK OPERATIONS AND SHALL BE MAINTAINED UNTIL THE NEW SLOPES ARE STABILIZED WITH SEEDING AND/OR SLOPE PROTECTION AS DETERMINED BY THE RPR.
29. FINE GRADING SHALL INCLUDE CREATING A SMOOTH STABLE UNIFORM SURFACE WITH TOPSOIL TO SUPPORT TURF GROWTH. ALL AREAS SHALL BE RAKED OR OTHERWISE CLEARED OF STONES AND OTHER MATERIAL LARGER THAN 1" IN ANY DIAMETER. SURFACES MUST MEET TSA/RSA STANDARDS AND SAFELY ACCOMMODATE THE AIRPORTS MOWING EQUIPMENT.

SURVEY NOTES

30. THE HORIZONTAL DATUM FOR THIS SURVEY IS BASED ON NYS CENTRAL ZONE NAD83(2011)(NORTH AMERICAN DATUM 1983/2011). THE VERTICAL DATUM FOR THIS SURVEY IS BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
31. THE TOPOGRAPHIC FEATURES SHOWN HEREON WERE COMPILED FROM FIELD SURVEY PERFORMED BY AUBERTINE AND CURRIER ARCHITECTS, ENGINEERS AND LAND SURVEYORS, PLLC. DATED MAY 10, 2024.

PAVING NOTES

32. ALL AREAS TO BE OVERLAID SHALL BE PREPARED IN ACCORDANCE WITH ITEM P-101, "PREPARATION/REMOVAL OF EXISTING PAVEMENTS".
33. EMULSIFIED ASPHALT TACK COAT, ITEM P-603, SHALL BE APPLIED PRIOR TO PLACING EACH LIFT OF PAVEMENT, UNLESS OTHERWISE DIRECTED BY THE RPR.
34. TRANSVERSE PAVING JOINTS IN ONE LAYER SHALL LINE UP WITH TRANSVERSE JOINTS IN THE PREVIOUS LAYERS UNLESS OTHERWISE APPROVED BY THE RPR.
35. TRANSVERSE PAVING JOINTS IN ADJACENT LANES SHALL LINE UP WITH EACH OTHER EXTENDING ACROSS THE FULL WIDTH OF PAVEMENT.
36. IN CASES OTHER THAN CENTERLINE JOINTS, LONGITUDINAL PAVING JOINTS IN ONE LAYER SHALL BE OFFSET FROM THAT IN THE PREVIOUS LAYER BY AT LEAST ONE FOOT. THE JOINT AT THE CENTERLINE OF THE PAVEMENT SHALL LINE UP WITH PREVIOUS LAYER CENTERLINE JOINTS.
37. COLD JOINTS SHALL BE SAWCUT BACK A MINIMUM OF 6 INCHES TO EXPOSE A CLEAN, SOUND, UNIFORM VERTICAL SURFACE FOR THE FULL DEPTH OF THE LIFT. THE SAWCUT SHALL NOT BE PERFORMED UNTIL THE PAVEMENT HAS REACHED AMBIENT TEMPERATURE.
38. CONTRACTOR SHALL CONSIDER LOCAL ROAD/HIGHWAY WEIGHT RESTRICTIONS AS PART OF HAULING/TRANSPORT OPERATIONS. DAMAGE TO LOCAL ROAD/HIGHWAY PAVEMENTS CAUSED BY HAULING/TRANSPORT OPERATIONS SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
39. 3D DESIGN SURFACE FILES (XML, DTM) CREATED IN MICROSTATION INROADS WILL BE PROVIDED TO THE CONTRACTOR PRIOR TO CONSTRUCTION.

MARKING NOTES

40. REMOVAL OF EXISTING MARKINGS SHALL BE IN ACCORDANCE WITH ITEM P-620.

A1 GENERAL NOTES
SCALE: NOT TO SCALE

Sheet Number	Sheet Title	Sheet Description
1	GI001	TITLE SHEET
2	GI002	GENERAL NOTES AND INDEX TO DRAWINGS
3	GI003	ABBREVIATIONS, AND LEGEND
4	GI004	QUANTITIES
5	GI101	GENERAL PLAN
6	GI102	OVERALL SITE AND KEY PLAN
7	GI601	GLYCOL COLLECTION SYSTEM PROCESS FLOW DIAGRAM
8	GC001	GENERAL WORK PHASING NOTES
9	GC101	OVERALL CONSTRUCTION SAFETY AND PHASING PLAN
10	GC102	CONSTRUCTION SAFETY AND PHASING PLAN - WORK AREA A
11	GC103	CONSTRUCTION SAFETY AND PHASING PLAN - WORK AREA A1
12	GC104	CONSTRUCTION SAFETY AND PHASING PLAN - WORK AREA A2
13	GC105	CONSTRUCTION SAFETY AND PHASING PLAN - WORK AREA A3
14	GC106	CONSTRUCTION SAFETY AND PHASING PLAN - WORK AREA B
15	GC107	CONSTRUCTION SAFETY AND PHASING PLAN - WORK AREA B1
16	GC108	CONSTRUCTION SAFETY AND PHASING PLAN - WORK AREA C
17	GC109	CONSTRUCTION SAFETY AND PHASING PLAN - WORK AREA D
18	GC501	CONSTRUCTION SAFETY AND PHASING DETAILS
19	GC502	CONSTRUCTION SAFETY AND PHASING DETAILS
20	VF100	EXISTING CONDITIONS PLAN
21	VF101	EXISTING CONDITIONS PLAN
22	VF102	EXISTING CONDITIONS PLAN
23	VF103	EXISTING CONDITIONS PLAN
24	CE100	SOIL EROSION AND SEDIMENT CONTROL PLAN
25	CE101	SOIL EROSION AND SEDIMENT CONTROL PLAN
26	CE102	SOIL EROSION AND SEDIMENT CONTROL PLAN
27	CE103	SOIL EROSION AND SEDIMENT CONTROL PLAN
28	CE104	SOIL EROSION AND SEDIMENT CONTROL PLAN
29	CE105	SOIL EROSION AND SEDIMENT CONTROL PLAN
30	CE501	SOIL EROSION AND SEDIMENT CONTROL DETAILS
31	CD100	DEMOLITION PLAN
32	CD101	DEMOLITION PLAN
33	CD102	DEMOLITION PLAN
34	CD103	DEMOLITION PLAN
35	CS100	GEOMETRY PLAN (ADD ON #1)
36	CS101	GEOMETRY PLAN
37	CS102	GEOMETRY PLAN
38	CS103	GEOMETRY PLAN
39	CG100	GRADING PLAN (ADD ON #1)
40	CG101	GRADING PLAN
41	CG102	GRADING PLAN
42	CG103	GRADING PLAN
43	CG104	SPOIL AREA PLAN
44	CG201	TAXILANE "F" CENTERLINE PROFILE
45	CG501	TYPICAL SECTIONS AND DETAILS
46	CG502	PAVEMENT AND GRADING DETAILS
47	CG503	ON-SITE SPOIL AREA DETAILS
48	CP101	JOINT SEALING AND PAVING PLAN
49	CP102	CONCRETE PAVEMENT JOINT PLAN (ADD ON #1)
50	CP501	CONCRETE PAD PAVEMENT DETAILS (ADD ON #1)
51	CP502	CONCRETE PAD PAVEMENT DETAILS (ADD ON #1)
52	CU100	DRAINAGE AND UTILITY PLAN
53	CU101	DRAINAGE AND UTILITY PLAN
54	CU102	DRAINAGE AND UTILITY PLAN
55	CU103	DRAINAGE AND UTILITY PLAN
56	CU104	DRAINAGE AND UTILITY PLAN
57	CU301	DRAINAGE AND UTILITY PROFILES
58	CU302	DRAINAGE AND UTILITY PROFILES
59	CU303	DRAINAGE AND UTILITY PROFILES
60	CU304	DRAINAGE AND UTILITY PROFILES
61	CU401	ENLARGED PUMP STATION PLANS
62	CU501	DRIANAGE DETAILS
63	CU502	DRAINAGE DETAILS
64	CU503	DRAINAGE BMP DETAILS
65	CU504	DRAINAGE BMP DETAILS
66	CU505	DRAINAGE BMP GENERAL NOTES
67	CU506	CHANNEL DRAIN DETAILS
68	CU507	CHANNEL DRAIN DETAILS
69	CU508	PUMP STATION DETAILS - SOUTHWEST
70	CU509	PUMP STATION DETAILS - SOUTHEAST
71	CU510	DRAINAGE DETAILS
72	CU511	WATER UTILITY DETAILS
73	CU512	UTILITY DETAILS
74	PQ101	DEICING TANKS PLAN (ADD ON #1)
75	PQ201	DEICING TANK LAYOUT DETAILS (ADD ON #1)
76	PQ202	DEICING TANK LAYOUT DETAILS (ADD ON #1)
77	PQ501	ADF AND AAF SYSTEM P&ID (ADD ON #1)
78	PQ502	POTASSIUM ACETATE SYSTEM P&ID (ADD ON #1)
79	PQ503	DEICING DETAILS (ADD ON #1)
80	XM101	MARKING PLAN
81	XM102	MARKING PLAN
82	XM103	MARKING PLAN
83	XM501	PAVEMENT MARKING DETAILS
84	XM502	AIRCRAFT DEICING PAD IDENTIFICATION PAVEMENT MARKING DETAILS
85	EI001	GENERAL ELECTRICAL NOTES
86	ED100	ELECTRICAL DEMOLITION PLAN
87	ED101	ELECTRICAL DEMOLITION PLAN
88	ED102	ELECTRICAL DEMOLITION PLAN
89	ED103	ELECTRICAL DEMOLITION PLAN
90	ES100	ELECTRICAL SITE PLAN (ADD ON #1)
91	ES101	ELECTRICAL SITE PLAN
92	ES102	ELECTRICAL SITE PLAN
93	ES103	ELECTRICAL SITE PLAN
94	ES104	ELECTRICAL HOMERUN PLAN
95	ES401	DEICING FACILITY EQUIPMENT SHELTER PLAN
96	ES402	DE-ICING FLUID TANK STORAGE FACILITY PLAN (ADD ON #1)
97	ES501	EQUIPMENT SHELTER LAYOUT DETAILS
98	ES502	EQUIPMENT SHELTER AND GROUNDING DETAILS
99	ES503	EQUIPMENT SHELTER FOUNDATION DETAILS
100	ES504	AREA FLOOD LIGHTING DETAILS
101	ES505	EQUIPMENT RACK DETAILS
102	ES506	ELECTRICAL EQUIPMENT DETAILS
103	ES507	TELECOM CABLING AND CONDUIT DETAILS
104	ES601	SCHEDULES AND ONE-LINE DIAGRAMS
105	ES602	PANEL SCHEDULE
106	ES603	PANEL SCHEDULE
107	EL501	AIRFIELD LIGHTING ELECTRICAL DETAILS
108	EL502	AIRFIELD LIGHTING ELECTRICAL DETAILS
109	EL503	AIRFIELD LIGHTING INPAVEMENT LIGHTING DETAILS
110	EL504	AIRFIELD SIGNAGE DETAILS
111	EL505	AIRFIELD LIGHTING ELECTRICAL PULLBOX DETAILS
112	EL506	DEICING FACILITY STATUS LIGHTS POWER AND CONTROL DIAGRAM
113	EL507	ALCMS TOUCHSCREEN CONTROL GRAPHIC DIAGRAM

A3 SHEET INDEX
SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · NO. 083424 · LICENSED PROFESSIONAL ENGINEER

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	068.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

GENERAL NOTES AND INDEX TO DRAWINGS

GI002

SHEET NO. 2 OF 113

Copyright ©

Apr 29, 2026 - 3:29pm
F:\Projects\C68 - Syracuse Regional Airport Authority\068069001 - Comp Deicing Pad\Design\CADD\Sheet Files\068069001_GI Series.dwg

A1 LEGEND

SCALE: NOT TO SCALE

100	KEYED NOTE REFERENCE
P	EXISTING AIRPORT PROPERTY LINE
ROFA	EXISTING RUNWAY OBJECT FREE AREA
RSA	EXISTING RUNWAY SAFETY AREA
TOFA	EXISTING TAXIWAY OBJECT FREE AREA
TSA	EXISTING TAXIWAY SAFETY AREA
443	EXISTING CONTOUR LINE
	EXISTING SWALE CENTERLINE
X X X X X	EXISTING FENCE LINE
24" RCP ST	EXISTING DRAINAGE LINE
UD 6" UD	EXISTING UNDERDRAIN
CO	EXISTING UNDERDRAIN CLEANOUT
CB CB	EXISTING CATCH BASIN
DMH	EXISTING DRAINAGE MANHOLE
	EXISTING PIPE END SECTION
W 6" W	EXISTING WATER LINE
WV	EXISTING WATER VALVE
	EXISTING HYDRANT
12" SAN SS	EXISTING SANITARY LINE
SMH	EXISTING SANITARY MANHOLE
G G	EXISTING GAS LINE
G	EXISTING GAS LINE MARKER
8" GLFM	EXISTING GLYCOL SYSTEM FORCE MAIN
GLV	EXISTING GLYCOL SYSTEM VENT
GL ARV	EXISTING GLYCOL SYSTEM AIR RELEASE VAULT
T T	EXISTING UNDERGROUND TELEPHONE LINE
TMH	EXISTING TELEPHONE MANHOLE
E E	EXISTING UNDERGROUND ELECTRIC LINE
LP	EXISTING LIGHT POLE
	EXISTING BLOCK HEATER RECEPTACLE
	EXISTING DOUBLE POST TRAFFIC SIGN
	EXISTING SINGLE POST TRAFFIC SIGN
	EXISTING BOLLARD OR POST
	EXISTING RUNWAY GUARD LIGHT
	EXISTING RUNWAY OR TAXIWAY EDGE LIGHT
	EXISTING AIRFIELD GUIDANCE SIGN
EMH	EXISTING ELECTRICAL MANHOLE
JC	EXISTING JUNCTION CAN
TC-1/2	EXISTING AIRFIELD ELECTRICAL CIRCUIT LABEL
E E	EXISTING AIRFIELD LIGHTING CABLE IN CONDUIT
4WDB	EXISTING DUCT BANK
CP-16029	EXISTING SURVEY CONTROL POINT
BM 1	EXISTING BENCHMARK LOCATION
TP-4	TEST BORING LOCATION
B-2	SOIL BORING LOCATION
C/B-1	PAVEMENT CORE WITH SOIL BORING LOCATION
IT-2	INFILTRATION TRENCH LOCATION
24" RCP ST	EXISTING DRAINAGE LINE TO BE REMOVED
UD 6" UD	EXISTING UNDERDRAIN TO BE REMOVED
CO	EXISTING UNDERDRAIN CLEANOUT TO BE REMOVED
CB CB	EXISTING CATCH BASIN TO BE REMOVED
W W	EXISTING WATER LINE TO BE REMOVED
	EXISTING HYDRANT TO BE REMOVED
WV	EXISTING WATER VALVE TO BE REMOVED
12" SAN SS	EXISTING SANITARY LINE TO BE REMOVED
SMH	EXISTING SANITARY MANHOLE TO BE REMOVED
G G	EXISTING GAS LINE TO BE REMOVED
T T	EXISTING UNDERGROUND TELEPHONE LINE TO BE REMOVED
TMH	EXISTING TELEPHONE MANHOLE TO BE REMOVED
E E	EXISTING UNDERGROUND ELECTRIC LINE TO BE REMOVED
LP	EXISTING LIGHT POLE TO BE REMOVED
	EXISTING BOLLARD OR POST TO BE REMOVED
	EXISTING SINGLE POST TRAFFIC SIGN TO BE REMOVED
	EXISTING DOUBLE POST TRAFFIC SIGN TO BE REMOVED
	EXISTING TAXIWAY EDGE LIGHT TO BE REMOVED
	EXISTING AIRFIELD GUIDANCE SIGN TO BE REMOVED

EMH	EXISTING ELECTRICAL MANHOLE TO BE REMOVED
JC	EXISTING JUNCTION CAN TO BE REMOVED
E E	EXISTING AIRFIELD LIGHTING CABLE IN CONDUIT TO BE REMOVED
4WDB	EXISTING DUCT BANK TO BE REMOVED
417	PROPOSED CONTOUR LINE
416.2	PROPOSED INTERMEDIATE CONTOUR LINE
417.32	PROPOSED SPOT ELEVATION
	PROPOSED GRADE LINE
	PROPOSED SWALE CENTERLINE
24" RCP ST	PROPOSED DRAINAGE LINE
UD 6" UD	PROPOSED UNDERDRAIN
CO	PROPOSED UNDERDRAIN CLEANOUT
CB CB	PROPOSED CATCH BASIN
DMH	PROPOSED DRAINAGE MANHOLE
	PROPOSED UNDERGROUND STORMWATER MANAGEMENT SYSTEM INFILTRATION CHAMBERS
	PROPOSED UNDERGROUND STORMWATER MANAGEMENT SYSTEM SEPARATOR ROWS
15" GLD GL	PROPOSED GLYCOL SYSTEM DRAINAGE LINE
GLFM 12" FM	PROPOSED GLYCOL SYSTEM FORCE MAIN
GLMH	PROPOSED GLYCOL SYSTEM DRAINAGE MANHOLE
FO	PROPOSED UNDERGROUND FIBER OPTIC LINE
C C	PROPOSED UNDERGROUND COMMUNICATION LINE
CMH	PROPOSED COMMUNICATION MANHOLE
E E	PROPOSED UNDERGROUND ELECTRIC LINE
LP	PROPOSED LIGHT POLE
	PROPOSED BOLLARD
	PROPOSED DOUBLE POST TRAFFIC SIGN
	PROPOSED BASE MOUNTED TAXIWAY EDGE LIGHT
	PROPOSED IN-PAVEMENT LIGHT
	PROPOSED AIRFIELD GUIDANCE SIGN
43	PROPOSED SIGN UNIT ID TAG NUMBER
PB	PROPOSED PULLBOX
JC	PROPOSED JUNCTION CAN
TC-1/2 E E 4WDB	PROPOSED AIRFIELD LIGHTING CABLE IN CONDUIT WITH CIRCUIT NUMBER AND NUMBER OF CABLES
	PROPOSED DUCT BANK
CFS	PROPOSED COMPOST FILTER SOCK LOCATION
	PROPOSED DRY SWALE LOCATION
	PROPOSED INLET PROTECTION LOCATION
A	AIRFIELD BARRICADE LOCATION WITH WORK AREA DESIGNATION
	WORK AREA LIMITS
	AIRPORT OPERATIONS ESCORT VEHICLE
	FLAGPERSON LOCATION
	PROPOSED PAVEMENT
	EXISTING ASPHALT PAVEMENT TO BE REMOVED
	EXISTING ASPHALT PAVEMENT TO BE MILLED

A3 ABBREVIATIONS

SCALE: NOT TO SCALE

ABBREVIATIONS

ABAN. - ABANDONED
AP - ANGLE POINT
APPROX. - APPROXIMATE
ASPH. - ASPHALT
℄ - BASELINE
BLDG. - BUILDING
BM - BENCH MARK
℄ - CENTERLINE
CB - CATCH BASIN
CIP - CAST IRON PIPE
CLSM - CONTROLLED LOW STRENGTH MATERIAL
CMP - CORRUGATED METAL PIPE
COMM. - COMMUNICATION
CONC. - CONCRETE
COND. - CONDUIT
CPP - CORRUGATED POLYETHYLENE PIPE
CSP - CORRUGATED STEEL PIPE
DIA. - DIAMETER
ELEC. - ELECTRICAL
ELEV. - ELEVATION
EX. - EXISTING
FND. - FOUNDATION
GC - GRADE CHANGE
HP - HIGH POINT
INV. - INVERT
LT - LEFT
LP - LOW POINT
MAX. - MAXIMUM
MIN. - MINIMUM
MISC. - MISCELLANEOUS
N - NORTHING
NA - NOT APPLICABLE
OFA - OBJECT FREE AREA
O.C. - ON CENTER
OPER. - OPERATOR
PAPI - PRECISION APPROACH PATH INDICATOR
PAVT. - PAVEMENT
PC - POINT OF CURVATURE
PCC - PORTLAND CEMENT CONCRETE PAVEMENT
PI - POINT OF INTERSECTION
℗ - PROPERTY LINE
POC - POINT ON CURVE
PRC - POINT OF REVERSE CURVE
PT - POINT OF TANGENCY
PVI - POINT OF VERTICAL INTERSECTION
PVC - POINT OF CURVATURE (VERTICAL CURVE)
PVC - POLYVINYL CHLORIDE PIPE
PVT - POINT OF TANGENCY (VERTICAL CURVE)
R - RADIUS
RCP - REINFORCED CONCRETE PIPE
REIL - RUNWAY END INDICTOR LIGHT
ROFA - RUNWAY OBJECT FREE AREA
RSA - RUNWAY SAFETY AREA
ROW - RIGHT OF WAY
RPR - RESIDENT PROJECT REPRESENTATIVE
RPZ - RUNWAY PROTECTION ZONE
RT - RIGHT
RW - RUNWAY
SHDR. - SHOULDER
SICPP - SMOOTH INTERIOR CORRUGATED POLYETHYLENE PIPE
STA. - STATION
TELCOM - TELECOMMUNICATION
TOFA - TAXIWAY OBJECT FREE AREA
TSA - TAXIWAY SAFETY AREA
TW - TAXIWAY
TYP. - TYPICAL
UD - UNDERDRAIN
UGND - UNDERGROUND
V - VARIES

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK
CHRISTOPHER D. BRUBACH
NO. 083424
LICENSED PROFESSIONAL ENGINEER

SYR
SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

ABBREVIATIONS, AND LEGEND

GI003

SHEET NO. 3 OF 113

Copyright ©

Apr 29, 2026 - 2:29pm
F:\Project\O68 - Syracuse Regional Airport Authority\O68069001 - Corro Deicing Pad\Design\CADD\Sheet Files\O68069001_GI Series.dwg

ITEM NO	SPEC	DESCRIPTION	QTY.	UNITS
1	C-100-1	CONTRACTOR QUALITY CONTROL PROGRAM (CQCP)	1	LS
2	C-102-1	COMPLIANCE WITH TEMPORARY AIR AND WATER POLLUTION, SOIL EROSION AND SILTATION CONTROL	1	LS
3	C-102-2	INSTALLATION AND REMOVAL OF STORM DRAIN INLET PROTECTION	9	EACH
4	C-102-3	INSTALLATION AND REMOVAL OF COMPOST FILTER SOCK	4800	LF
5	C-102-4	INSTALLATION AND REMOVAL OF PREFORMED CHECK DAM	3	EACH
6	C-102-5	INSTALLATION OF STONE CHECK DAM	50	CY
7	C-102-6	INSTALLATION OF DRY SWALE	360	LF
8	C-105-1	MOBILIZATION (4% MAX.)	1	LS
9	C-105-2	FIELD OFFICE	1	LS
10	C-105-3	FIELD OFFICE EQUIPMENT	1	LS
11	C-106-1	SAFETY, SECURITY AND MAINTENANCE OF TRAFFIC	1	LS
12	C-107-1	PROJECT SURVEY AND STAKEOUT	1	LS
13	P-101-1	ASPHALT PAVEMENT REMOVAL, 15" AVERAGE THICKNESS	47650	SY
14	P-101-3	PROFILE MILLING ASPHALT PAVEMENT	7700	SY
15	P-152-1	UNCLASSIFIED EXCAVATION	63250	CY
16	P-153-1	CONTROLLED LOW STRENGTH MATERIAL (CLSM)	400	CY
17	P-156-1	CEMENT TREATED SUBGRADE, 12" THICK	94000	SY
18	P-160-1	CRUSHED STONE FOR UNDERCUT REPLACEMENT	1000	CY
19	P-209-1	CRUSHED AGGREGATE BASE COURSE	31500	CY
20	P-209-2	SEPARATION GEOTEXTILE	400	SY
21	P-401-1	ASPHALT SURFACE COURSE, GRADATION 2	25500	TON
22	P-401-2	ASPHALT BASE COURSE, GRADATION 1	34000	TON
23	P-407-1	ASPHALT TREATED PERMEABLE BASE COURSE (ATPB)	34000	TON
24	P-603-1	EMULSIFIED ASPHALT TACK COAT	24250	GAL
25	P-605-1	JOINT SEALING FILLER	8400	LF
26	P-620-1	SURFACE PREPARATION	1	LS
27	P-620-2	PERMANENT PAVEMENT MARKINGS	29500	SF
28	P-620-3	TEMPORARY PAVEMENT MARKINGS	3800	SF
29	P-620-4	PREFORMED THERMOPLASTIC PAVEMENT MARKINGS	3750	SF
30	P-620-5	PAVEMENT MARKING REMOVAL	8000	SF
31	P-621-1	SAW-CUT PAVEMENT GROOVING	35800	SY
32	P-640-1	ABANDONED ARFF BUILDING DEMOLITION	1	LS
33	P-640-2	MITIGATION AND REMOVAL OF HAZARDOUS BUILDING MATERIALS	1	LS
34	F-170-2	VEHICLE COLLISION PROTECTION BOLLARDS	21	EACH
35	D-701-2	18-INCH DIA. REINFORCED CONCRETE PIPE (RCP), CLASS V	150	LF
36	D-701-3	24-INCH DIA. REINFORCED CONCRETE PIPE (RCP), CLASS V	360	LF
37	D-701-4	36-INCH DIA. REINFORCED CONCRETE PIPE (RCP), CLASS V	775	LF
38	D-701-5	30-INCH ELLIPTICAL REINFORCED CONCRETE PIPE (RCP), CLASS V	350	LF
39	D-701-6	36-INCH ELLIPTICAL REINFORCED CONCRETE PIPE (RCP), CLASS V	200	LF
40	D-701-7	12-INCH DIA. HDPE GLYCOL FORCE MAIN PIPE	1550	LF
41	D-701-8	14-INCH DIA. HDPE GLYCOL FORCE MAIN PIPE	475	LF
42	D-701-9	12-INCH DIA. SMOOTH INTERIOR CORRUGATED POLYETHYLENE PIPE (SICPP)	1800	LF
43	D-701-10	15-INCH DIA. SMOOTH INTERIOR CORRUGATED POLYETHYLENE PIPE (SICPP)	250	LF
44	D-701-11	18-INCH DIA. SMOOTH INTERIOR CORRUGATED POLYETHYLENE PIPE (SICPP)	1375	LF
45	D-701-12	24-INCH DIA. SMOOTH INTERIOR CORRUGATED POLYETHYLENE PIPE (SICPP)	1050	LF
46	D-701-13	36-INCH DIA. SMOOTH INTERIOR CORRUGATED POLYETHYLENE PIPE (SICPP)	1400	LF
47	D-701-14	18-INCH DIA. DUCTILE IRON PIPE (DIP)	75	LF
48	D-701-15	24-INCH DIA. DUCTILE IRON PIPE (DIP)	55	LF
49	D-701-16	SUBSURFACE STORMWATER MANAGEMENT SYSTEM UG SWD #1	1	LS
50	D-701-17	SUBSURFACE STORMWATER MANAGEMENT SYSTEM UG SWD #1A	1	LS
51	D-701-18	SUBSURFACE STORMWATER MANAGEMENT SYSTEM UG SWD #2	1	LS
52	D-701-19	SUBSURFACE STORMWATER MANAGEMENT SYSTEM UG SWD #3	1	LS
53	D-705-1	6-INCH PERFORATED CORRUGATED POLYETHYLENE DRAINAGE PIPE UNDERDRAIN, SMOOTH INTERIOR, UNDER PAVEMENT	3700	LF
54	D-705-4	REMOVAL OF UNDERDRAIN CLEANOUT OR HEADWALL	5	EACH
55	D-707-1	8-INCH DIA. DUCTILE IRON WATER PIPE OR FORCE MAIN, CLASS 52	200	LF
56	D-707-3	4 OR 8-INCH DIA. DUCTILE IRON GATE VALVE	5	EACH
57	D-707-4	FIRE HYDRANT	1	EACH
58	D-751-1	STORMWATER CATCH BASIN OR MANHOLE	47	EACH
59	D-751-2	STORMWATER VALVE PIT STRUCTURE, VALVES AND ALL APPURTENANCES	2	EACH
60	D-751-3	STORMWATER PUMP STATION STRUCTURE, PUMPS, CONTROLS AND ALL APPURTENANCES	2	EACH
61	D-751-4	DRAINAGE MANHOLE WITH GLYCOL PIPE AIR RELEASE VALVE, CHECK VALVE AND ALL APPURTENANCES	1	EACH
62	D-751-5	DRAINAGE MANHOLE WITH TWO (2) CHECK VALVES AND ALL APPURTENANCES	1	EACH
63	D-751-6	STORMWATER CHANNEL DRAIN	2100	LF
64	D-751-7	MODIFICATION OF STORMWATER DRAINAGE STRUCTURE	6	EACH
65	D-751-8	REMOVAL OF SANITARY SEWER SEPTIC TANK, LEACH FIELD AND ALL APPURTENANCES	1	EACH
66	D-751-9	REMOVAL OF EXISTING DRAINAGE STRUCTURE, ALL TYPES AND SIZES	15	EACH
67	T-901-1	SEEDING, WET APPLIED	38100	SY
68	T-905-1	TOPSOIL (FURNISHED FROM ON SITE STRIPPING OPERATIONS)	5250	CY
69	T-908-1	MULCHING	38100	SY
70	L-100-1	35-FOOT HIGH APRON AREA FLOOD LIGHT, POLE AND FOUNDATION	2	EACH
71	L-100-3	REMOVAL OF LIGHT POLE AND FOUNDATION	5	EACH
72	L-108-1	NO. 8 AWG, 5 KV, L-824, TYPE C AIRFIELD LIGHTING CABLE	24700	LF
73	L-108-2	NO. 6 AWG, 5 KV, L-824, TYPE C AIRFIELD LIGHTING CABLE	2200	LF
74	L-108-3	NO. 6 AWG, SOLID, BARE COPPER COUNTERPOISE WIRE	11000	LF
75	L-108-4	NO. 12 AWG, 600V, 1/C, TYPE XLP USE-2, 1/C CABLE	4050	LF
76	L-108-5	NO. 10 AWG, 600V, 1/C, TYPE XLP USE-2, 1/C CABLE	1275	LF
77	L-108-6	NO. 8 AWG, 600V, 1/C, TYPE XLP USE-2, 1/C CABLE	250	LF
78	L-108-7	NO. 6 AWG, 600V, 1/C, TYPE XLP USE-2, 1/C CABLE	50	LF
79	L-108-9	NO. 3 AWG, 600V, 1/C, TYPE XLP USE-2, 1/C CABLE	4500	LF
80	L-108-10	NO. 1 AWG, 600V, 1/C, TYPE XLP USE-2, 1/C CABLE	3000	LF
81	L-108-11	NO. 2/0 AWG, 600V, 1/C, TYPE XLP USE-2, 1/C CABLE	750	LF
82	L-108-12	NO. 3/0 AWG, 600V, 1/C, TYPE XLP USE-2, 1/C CABLE	250	LF
83	L-108-13	NO. 300 KCMIL AWG, 600V, 1/C, TYPE XLP USE-2, 1/C CABLE	4500	LF
84	L-108-15	12 STRAND SINGLE MODE ARMORED JACKET DUCT RATED FIBER OPTIC CABLE WITH INNERDUCT	2750	LF
85	L-109-1	10' X 16' POWER AND CONTROL EQUIPMENT SHELTER	1	LS
86	L-109-2	4 KW CONSTANT CURRENT REGULATOR WITH SERIES CUTOUT	1	LS
87	L-109-3	TRANSFORMER WITHIN EQUIPMENT SHELTER	1	LS
88	L-109-4	AIRFIELD LIGHTING CONTROL AND MONITORING SYSTEM (ALCMS)	1	LS
89	L-109-6	PUMP STATION #1 POWER AND CONTROL EQUIPMENT, LOCAL CONDUITS AND CABLE	1	LS
90	L-109-7	PUMP STATION #2 POWER AND CONTROL EQUIPMENT, LOCAL CONDUITS AND CABLE	1	LS
91	L-109-8	MAIN FEED PAD MOUNTED TRANSFORMER AND SWITCHGEAR ASSEMBLY, SHELTER SITE POWER AND CONTROL EQUIPMENT	1	LS
92	L-110-1	2-WAY, 4-INCH CONCRETE ENCASED DUCT BANK	1400	LF
93	L-110-2	4-WAY, 4-INCH CONCRETE ENCASED DUCT BANK	3000	LF
94	L-110-3	2-INCH DIA. SCH. 80 PVC CONDUIT IN TURF	6000	LF
95	L-110-4	4-INCH DIA. SCH. 80 PVC CONDUIT IN TURF	1000	LF
96	L-110-5	2-INCH DIA. CONCRETE ENCASED SCH. 40 PVC CONDUIT IN PAVEMENT	5000	LF
97	L-110-6	4-INCH DIA. CONCRETE ENCASED SCH. 40 PVC CONDUIT IN PAVEMENT	1600	LF
98	L-110-7	CABLE REMOVAL IN EXISTING DUCT BANK OR CONDUIT	15400	LF
99	L-110-8	2-INCH DIA. SCH. 80 PVC ELECTRICAL DRAIN PIPE	1050	LF
100	L-115-1	PRECAST ELECTRICAL / COMMUNICATIONS PULL BOX	19	EACH
101	L-115-2	ELECTRICAL JUNCTION CAN	1	EACH
102	L-115-3	REMOVAL OF ELECTRICAL / COMMUNICATIONS PULL BOX OR MANHOLE	21	EACH
103	L-115-4	REMOVAL OF ELECTRICAL JUNCTION CAN	2	EACH
104	L-125-1	MEDIUM INTENSITY TAXIWAY EDGE LIGHT FIXTURE, ELEVATED, LED	29	EACH
105	L-125-2	MEDIUM INTENSITY TAXIWAY LIGHT FIXTURE, SEMI-FLUSH, LED	72	EACH
106	L-125-3	SALVAGE AND REINSTALL EXISTING MEDIUM INTENSITY TAXIWAY EDGE LIGHT FIXTURE, BASE MOUNTED	10	EACH
107	L-125-4	L-868B LOAD BEARING LIGHT BASE, IN PAVEMENT	72	EACH
108	L-125-5	L-867B NON LOAD BEARING LIGHT BASE, IN TURF	39	EACH
109	L-125-6	RETROREFLECTIVE STOP AND INTERNATIONAL NO AIRCRAFT ENTRY SIGN	3	EACH
110	L-125-7	AIRFIELD GUIDANCE SIGN AND FOUNDATION, LED, SIZE 3, 2 MODULE	5	EACH
111	L-125-8	AIRFIELD GUIDANCE SIGN AND FOUNDATION, LED, SIZE 3, 3 MODULES	1	EACH
112	L-125-9	AIRFIELD GUIDANCE SIGN AND FOUNDATION, LED, SIZE 3, 4 MODULES	1	EACH
113	L-125-10	REMOVAL OF GUIDANCE SIGN AND FOUNDATION	7	EACH
114	L-125-11	REMOVAL OF LIGHT FIXTURE AND APPURTENANCES	69	EACH
115	L-125-12	REMOVAL OF LIGHT BASE	69	EACH
116	L-125-13	SPARE PARTS (NOT TO EXCEED $10,000 OR 10% TOTAL COST)	1	LS
117	PQ-102-1	SPOIL AREA MATERIAL LINER SYSTEM, ALL SIDES ENCAPSULATED	226000	SF

A1 QUANTITIES - BASE BID
SCALE: NOT TO SCALE

ITEM NO	SPEC	DESCRIPTION	QTY.	UNITS
1	C-100-1	CONTRACTOR QUALITY CONTROL PROGRAM (CQCP)	1	LS
2	C-102-1	COMPLIANCE WITH TEMPORARY AIR AND WATER POLLUTION, SOIL EROSION AND SILTATION CONTROL	1	LS
3	C-102-2	INSTALLATION AND REMOVAL OF STORM DRAIN INLET PROTECTION	2	EACH
4	C-102-3	INSTALLATION AND REMOVAL OF COMPOST FILTER SOCK	750	LF
5	C-102-4	INSTALLATION AND REMOVAL OF PREFORMED CHECK DAM	1	EACH
6	C-102-5	INSTALLATION OF STONE CHECK DAM	36	CY
7	C-102-6	INSTALLATION OF DRY SWALE	220	LF
8	C-105-1	MOBILIZATION (4% MAX.)	1	LS
9	C-107-1	PROJECT SURVEY AND STAKEOUT	1	LS
10	P-101-2	ASPHALT PAVEMENT REMOVAL, 6" AVERAGE THICKNESS	100	SY
11	P-152-1	UNCLASSIFIED EXCAVATION	3620	CY
12	P-160-1	CRUSHED STONE FOR UNDERCUT REPLACEMENT	330	CY
13	P-209-1	CRUSHED AGGREGATE BASE COURSE	2560	CY
14	P-209-2	SEPARATION GEOTEXTILE	6120	SY
15	P-401-1	ASPHALT SURFACE COURSE, GRADATION 2	1130	TON
16	P-401-2	ASPHALT BASE COURSE, GRADATION 1	1660	TON
17	P-603-1	EMULSIFIED ASPHALT TACK COAT	960	GAL
18	P-605-1	JOINT SEALING FILLER	1230	LF
19	P-610-1	PORTLAND CEMENT CONCRETE PAVEMENT	270	CY
20	F-170-1	BOX BEAM GUIDE RAILING	190	LF
21	F-170-2	VEHICLE COLLISION PROTECTION BOLLARDS	22	EACH
22	D-701-1	12-INCH DIA. REINFORCED CONCRETE PIPE (RCP), CLASS V	140	LF
23	D-705-2	6-INCH PERFORATED CORRUGATED POLYETHYLENE DRAINAGE PIPE UNDERDRAIN, SMOOTH INTERIOR, IN TURF	620	LF
24	D-705-3	UNDERDRAIN CLEANOUT OR HEADWALL	3	EACH
25	D-707-2	4-INCH DIA. DUCTILE IRON WATER PIPE, CLASS 52	360	LF
26	D-707-3	4 OR 8-INCH DIA. DUCTILE IRON GATE VALVE	4	EACH
27	D-707-5	WATER PIPE RPZ AND METER IN HEATED ENCLOSURE	1	EACH
28	D-751-1	STORMWATER CATCH BASIN OR MANHOLE	2	EACH
29	T-901-1	SEEDING, WET APPLIED	2800	SY
30	T-905-1	TOPSOIL (FURNISHED FROM ON SITE STRIPPING OPERATIONS)	390	CY
31	T-908-1	MULCHING	2800	SY
32	L-100-2	22-FOOT HIGH AREA FLOOD LIGHT, POLE AND FOUNDATION	4	EACH
33	L-108-8	NO. 4 AWG, 600V, 1/C, TYPE XLP USE-2, 1/C CABLE	1500	LF
34	L-108-10	NO. 1 AWG, 600V, 1/C, TYPE XLP USE-2, 1/C CABLE	750	LF
35	L-108-14	NO. 350 KCMIL AWG, 600V, 1/C, TYPE XLP USE-2, 1/C CABLE	3000	LF
36	L-108-15	12 STRAND SINGLE MODE ARMORED JACKET DUCT RATED FIBER OPTIC CABLE WITH INNERDUCT	780	LF
37	L-109-5	DEICING FLUID STORAGE FACILITY POWER AND CONTROL EQUIPMENT, LOCAL CONDUITS AND CABLE	1	LS
38	L-110-3	2-INCH DIA. SCH. 80 PVC CONDUIT IN TURF	180	LF
39	L-110-4	4-INCH DIA. SCH. 80 PVC CONDUIT IN TURF	130	LF
40	L-110-5	2-INCH DIA. CONCRETE ENCASED SCH. 40 PVC CONDUIT IN PAVEMENT	640	LF
41	L-110-6	4-INCH DIA. CONCRETE ENCASED SCH. 40 PVC CONDUIT IN PAVEMENT	220	LF
42	PQ-101-1	20,000 GALLON HORIZONTAL CYLINDRICAL DOUBLE WALL ABOVE GROUND STEEL TANK WITH ALL APPURTENANCES INCLUDING CATWALK AND STAIRWAY	3	EACH
43	PQ-101-2	8-FOOT DIA., 5,600 GALLON VERTICAL CYLINDRICAL POLYETHYLENE TANK WITH ALL APPURTENANCES	2	EACH
44	PQ-101-3	DEICING FLUID STORAGE FACILITY EQUIPMENT	1	LS
45	PQ-101-4	DEICING FLUID STORAGE FACILITY EQUIPMENT INSTALLATION, SITE WORK, PLUMBING SYSTEM, PADS AND SUPPORTS	1	LS

A4 QUANTITIES - ADD ON #1
SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · NO. 083424 · LICENSED PROFESSIONAL ENGINEER

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

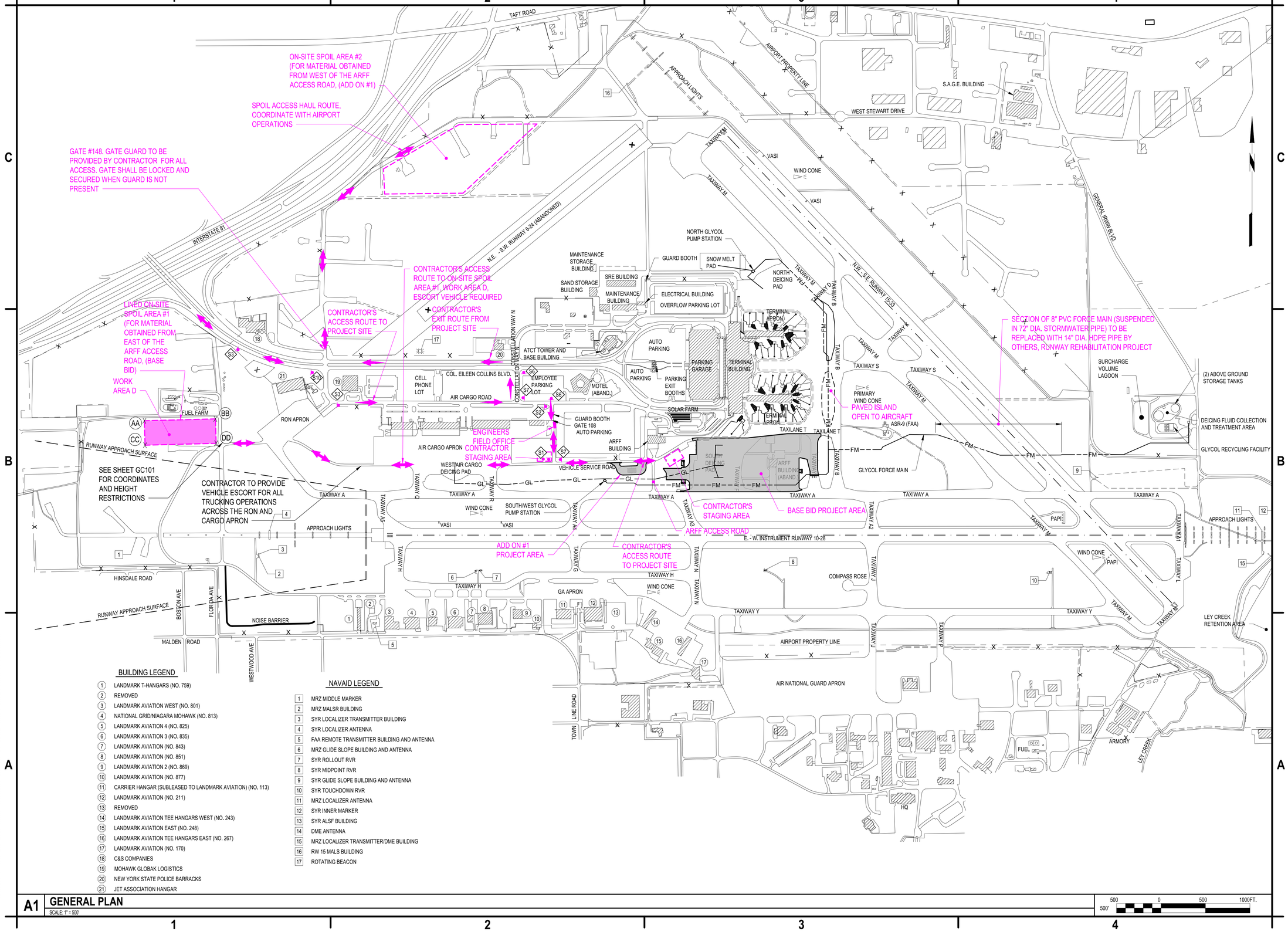
QUANTITIES

GI004

SHEET NO. 4 OF 113

Copyright ©

Apr 29, 2026 - 3:29pm
F:\Project\O68 - Syracuse Regional Airport Authority\O68069001 - Como Deicing Pad\Design\CADD\Sheet Files\O68069001_GI_Series.dwg



BUILDING LEGEND

1. LANDMARK T-HANGARS (NO. 759)
2. REMOVED
3. LANDMARK AVIATION WEST (NO. 801)
4. NATIONAL GRID/NIAGARA MOHAWK (NO. 813)
5. LANDMARK AVIATION 4 (NO. 825)
6. LANDMARK AVIATION 3 (NO. 835)
7. LANDMARK AVIATION (NO. 843)
8. LANDMARK AVIATION (NO. 851)
9. LANDMARK AVIATION 2 (NO. 869)
10. LANDMARK AVIATION (NO. 877)
11. CARRIER HANGAR (SUBLEASED TO LANDMARK AVIATION) (NO. 113)
12. LANDMARK AVIATION (NO. 211)
13. REMOVED
14. LANDMARK AVIATION TEE HANGARS WEST (NO. 243)
15. LANDMARK AVIATION EAST (NO. 248)
16. LANDMARK AVIATION TEE HANGARS EAST (NO. 267)
17. LANDMARK AVIATION (NO. 170)
18. C&S COMPANIES
19. MOHAWK GLOBAK LOGISTICS
20. NEW YORK STATE POLICE BARRACKS
21. JET ASSOCIATION HANGAR

NAVAID LEGEND

1. MRZ MIDDLE MARKER
2. MRZ MALSR BUILDING
3. SYR LOCALIZER TRANSMITTER BUILDING
4. SYR LOCALIZER ANTENNA
5. FAA REMOTE TRANSMITTER BUILDING AND ANTENNA
6. MRZ GLIDE SLOPE BUILDING AND ANTENNA
7. SYR ROLLOUT RVR
8. SYR MIDPOINT RVR
9. SYR GLIDE SLOPE BUILDING AND ANTENNA
10. SYR TOUCHDOWN RVR
11. MRZ LOCALIZER ANTENNA
12. SYR INNER MARKER
13. SYR ALSF BUILDING
14. DME ANTENNA
15. MRZ LOCALIZER TRANSMITTER/DME BUILDING
16. RW 15 MALS BUILDING
17. ROTATING BEACON

A1 GENERAL PLAN
SCALE: 1" = 500'

500 0 500 1000FT.
500'

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · NO. 083424 · LICENSED PROFESSIONAL ENGINEER

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	068.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

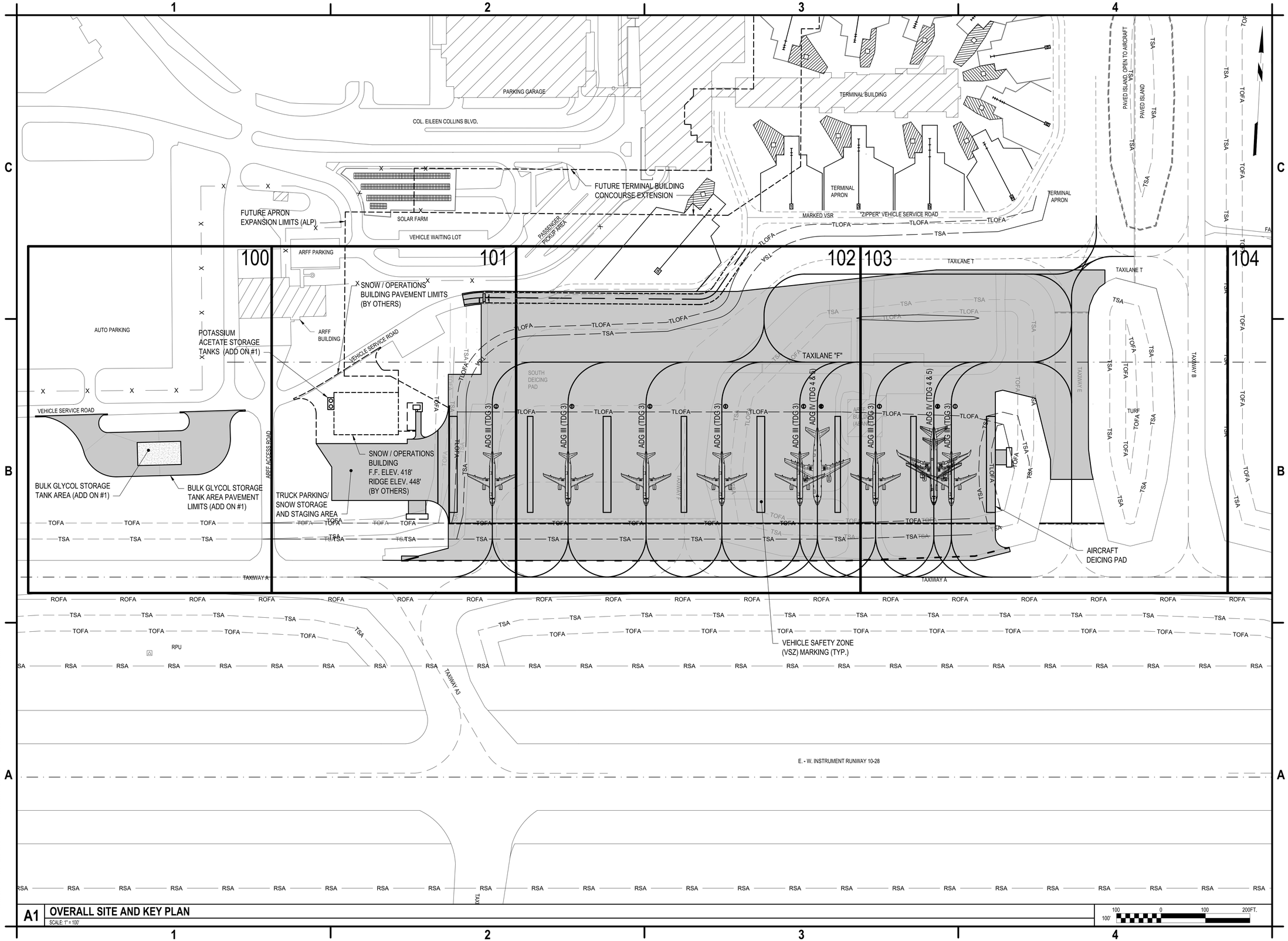
GENERAL PLAN

GI101

SHEET NO. 5 OF 113

Copyright ©

Apr 29, 2026 - 3:29pm
F:\Project\C68 - Syracuse Regional Airport Authority\068069001 - Comp Deicing Part\Design\CADD\Sheet Files\068069001_GC Series.dwg



A1 **OVERALL SITE AND KEY PLAN**
SCALE: 1" = 100'

100' 100 0 100 200FT.

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK
CHRISTOPHER D. BRUBACH
LICENSED PROFESSIONAL ENGINEER
NO. 083424

SYR
SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

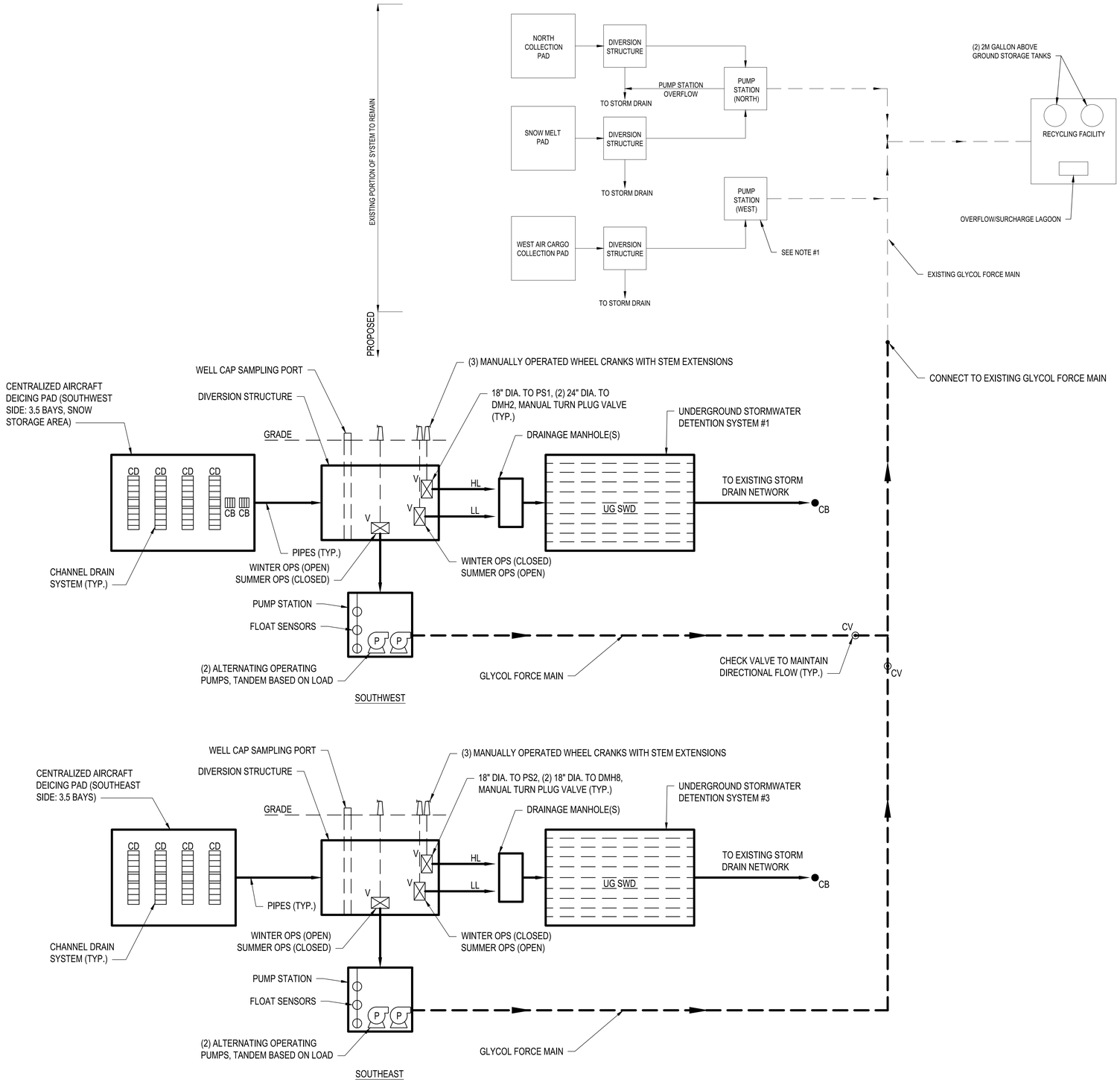
OVERALL SITE AND KEY PLAN

GI102

SHEET NO. 6 OF 113

Copyright ©

Apr 29, 2026 - 2:29pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O6806901 - Como Deicing Pad\Design\CADD\Sheet Files\O6806901_GC_Series.dwg



A1 GLYCOL COLLECTION SYSTEM PROCESS FLOW DIAGRAM
SCALE: NOT TO SCALE

NOTES:

1. THE EXISTING PUMP STATION IS CURRENTLY DESIGNATED AS THE "SOUTH" PUMP STATION AND SERVES THE SOUTH AND WEST COLLECTION PADS. THE SOUTH DEICING PAD IS BEING EXPANDED IN THE SAME GENERAL LOCATION TO BECOME THE CENTRALIZED DEICING FACILITY (CDF). THE CDF WILL USE (2) NEW PUMP STATIONS AS DETAILED ON THIS SHEET AND THE EXISTING PUMP STATION WILL THEN ONLY SERVE THE WEST AIR CARGO APRON.

2. PLUG VALVES WILL BE MANUALLY OPENED AND CLOSED AS SHOWN ON THE DIAGRAM AT THE START AND END OF THE DEICING FLUID COLLECTION SEASON (WINTER OPERATIONS). ANY GLYCOL AND PRECIPITATION FALLING ON THE CDF APRON, SNOW STAGING AREA AND TANK STORAGE FACILITY WILL BE COLLECTED AND SENT TO THE EXISTING TANK/RECYCLING FACILITY FOR THE DURATION OF THE WINTER SEASON. A WELL SAMPLING POINT IS PROVIDED IN EACH DIVERSION STRUCTURE TO TAKE A WATER SAMPLE AND CHECK FOR THE PRESENCE OF GLYCOL PRIOR TO CHANGING VALVE POSITIONS. IT IS EXPECTED THAT THE FLUSHING THE TRENCH DRAINS, CATCH BASINS, PIPE AND STRUCTURES WITH CLEAN WATER WILL BE NECESSARY TO FLUSH THE SYSTEM OF RESIDUAL GLYCOL PRIOR TO CHANGING VALVE POSITIONS. THE ABILITY FOR "REAL TIME" AUTOMATED COLLECTION MODE SWITCHING WITH MECHANICALLY OPERATED VALVES AND SENSORS IS NOT PROVIDED. THE OWNER WILL HAVE THE ABILITY TO CHANGE VALVE POSITIONS AS NECESSARY TO ACCOMMODATE FORECASTED LARGE VOLUME PRECIPITATION EVENTS.

3. EMERGENCY BYPASS/SYSTEM OVERLOAD: IN RUSH WATER VOLUMES THAT EXCEED THE PUMP CAPACITY WHILE IN PUMPING MODE IS INTENDED TO SURCHARGE AND BE TEMPORARILY STORED IN THE PUMP STATION WET WELL, STORMWATER PIPES AND INLET STRUCTURES. THE PLANNED INFRASTRUCTURE IS DESIGNED TO HOLD APPROXIMATELY 235,000 GALLONS (EAST) AND 233,000 GALLONS (WEST) OF SURPLUS GLYCOL/WATER IF THE 46.9 HP PUMP (EAST) AND 57.7 HP PUMP (WEST) CAPACITY OF 148,000 GAL/HOUR (BOTH) IS EXCEEDED. THIS TEMPORARY STORAGE CAPACITY IS EQUIVALENT TO 0.5 INCHES OF WATER (6 INCHES OF SNOW) OVER THE ENTIRE CDF APRON DURING THE 24 HOUR EVENT. THE PUMPS WILL CONTINUE TO OPERATE TO EVACUATE THE WATER/GLYCOL MIXTURE OVER TIME (ESTIMATED AT 24 HOURS AT FULL STORAGE CAPACITY). IF BOTH THE TEMPORARY STORAGE AND PUMP CAPACITY IS REACHED, THE WATER WILL OVERFLOW FROM THE LAST CHANNEL DRAIN AND PUMP STRUCTURE VENT (FLOOD ELEVATION OF WEST - 416.56 ASL) AND WILL BE DEPOSITED IN THE ADJACENT GRASS AREAS/SWALES WHICH LEAD DIRECTLY TO THE REGULATED INDUSTRIAL SPEDS PERMITTED OUTFALLS. AT THIS POINT, THE MIXTURE IS EXPECTED TO BE OF DILUTED GLYCOL CONCENTRATIONS AND MUCH OF THE VOLUME WILL BE INFILTRATED/PERCOLATED INTO THE SANDY SOILS.

4. SRAA INDICATES THAT THE RECENTLY CONSTRUCTED EXISTING GLYCOL COLLECTION STORAGE TANKS AND RECYCLING FACILITY HAVE SUFFICIENT CAPACITY TO ACCOMMODATE THE ADDITIONAL COLLECTION AREAS AND WATER VOLUMES PROVIDED UNDER THIS PROJECT AND THEREFORE THAT INFRASTRUCTURE WILL REMAIN EXISTING.

A4 SYSTEM NOTES
SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · NO. 083424 · LICENSED PROFESSIONAL ENGINEER

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

GLYCOL COLLECTION SYSTEM PROCESS FLOW DIAGRAM

GI601

SHEET NO. 7 OF 113

Copyright ©

Apr 29, 2026 - 3:39pm
P:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_GI Series.dwg

GENERAL WORK PHASING NOTES:

1. REFER TO THE CONSTRUCTION SAFETY AND PHASING PLAN (CSPP) FOR A COMPREHENSIVE DISSERTATION ON WORK PHASING REQUIREMENTS.

2. ALL WORK SHALL BE COMPLETED IN STRICT ACCORDANCE WITH THE CONSTRUCTION SAFETY AND PHASING PLAN (CSPP).

3. REFER TO SECTION 80 FOR THE ALLOWABLE CONTRACT TIME FOR THE ENTIRE PROJECT AND WORK AREAS ALONG WITH ASSOCIATED LIQUIDATED DAMAGES FOR NOT COMPLETING WITHIN THE DESIGNATED TIME.

4. THE AIRPORT WILL REMAIN OPEN TO AIRCRAFT TRAFFIC AT ALL TIMES DURING CONSTRUCTION.

5. THE CONTRACTOR'S PERSONNEL, EQUIPMENT AND MATERIALS SHALL REMAIN CLEAR OF ACTIVE RUNWAY SAFETY AREAS AND TAXIWAY OBJECT FREE AREAS UNLESS THE PAVEMENT IS CLOSED TO AIRCRAFT, INCLUDING PUBLISHED NOTICES TO AIR MISSIONS (NOTAMS) ISSUED.

6. THE CONTRACTOR SHALL PROVIDE AT LEAST 48 HOURS NOTICE TO THE AIRPORT BEFORE ACCESSING ANY WORK AREA. NO WORK AREAS SHALL BE CLOSED TO AIRCRAFT UNTIL AUTHORIZED BY THE AIRPORT. CONTACT THE RPR AND AIRPORT OPERATIONS FOR ALL COORDINATION.

7. ALL WORK DAYS SHALL BE PRE-ARRANGED AND APPROVED BY AIRPORT OPERATIONS WITH A MINIMUM ONE WEEK ADVANCE NOTICE. THE CONTRACTOR SHALL BE FLEXIBLE AND HAVE A CONTINGENCY PLAN TO SUPPORT SCHEDULED AIRPORT OPERATIONS AS DICTATED BY AIRPORT OPERATIONS.

8. ONE WEEK ADVANCE NOTICE TO AIRPORT OPERATIONS IS REQUIRED TO SCHEDULE THEIR ESCORT SERVICES REQUIRED TO ESTABLISH AND REMOVE MAINTENANCE AND PROTECTION OF TRAFFIC (M&PT) DEVICES. AIRPORT OPERATIONS ESCORTS WILL BE BASED ON AVAILABILITY AND ARE NOT GUARANTEED TO BE AVAILABLE THE EXACT DATES AND TIMES REQUESTED. THE CONTRACTOR SHALL ALLOW FOR FLEXIBILITY IN THE SCHEDULE TO ALLOW FOR AIRPORT OPERATIONS AVAILABILITY.

9. A DAILY START-UP AND SHUT-DOWN CHECKLIST WILL BE JOINTLY PREPARED BY THE CONTRACTOR AND AIRPORT WHICH WILL BE FOLLOWED THROUGHOUT THE PROJECT. THIS CHECKLIST WILL INCLUDE, BUT NOT BE LIMITED TO, BARRICADES, LOCATIONS, HAUL ROUTES, ACCESS POINTS, CLEANUP, ETC.

10. AT THE COMPLETION OF WORK IN ANY CONSTRUCTION PERIOD AND THIRTY (30) MINUTES PRIOR TO THE SCHEDULED OPENING OF THE DESIGNATED AIRFIELD FACILITIES, AN INSPECTION TO DETERMINE WHETHER THE RESPECTIVE AIRPORT FACILITIES ARE IN THE APPROPRIATE CONDITION TO BE OPENED SHALL BE PERFORMED BY AIRPORT OPERATIONS. THE CONTRACTOR'S CONSTRUCTION SUPERVISOR MUST BE PRESENT DURING THIS INSPECTION. THE CONTRACTOR SHALL HAVE STAFF AND EQUIPMENT AVAILABLE TO QUICKLY CORRECT ANY DEFICIENCIES PRIOR TO THE DESIGNATED OPENING TIME.

11. THE CONTRACTOR'S PROJECT SUPERINTENDENT OR QUALIFIED ALTERNATE DESIGNEE SHALL ATTEND WEEKLY PROJECT STATUS MEETINGS AT THE AIRPORT. THE DESIGNATED PERSON SHALL BE KNOWLEDGEABLE ABOUT THE PROJECT AND BE AUTHORIZED TO COMMENT AND MAKE DECISIONS ON BEHALF OF THE CONTRACTOR'S FIRM.

12. NO PERSONNEL OR VEHICLE SHALL EVER CROSS AN ACTIVE RUNWAY OR TAXIWAY (MOVEMENT AREA) WITHOUT A DESIGNATED AND APPROVED AIRPORT OPERATIONS ESCORT IN CONTACT WITH THE ATCT AND PRIOR AIRPORT OPERATIONS APPROVAL.

13. PROJECT ACCESS LOCATIONS, HAUL ROUTES AND STAGING AREAS ARE APPROXIMATE ONLY AND SHALL BE COORDINATED WITH THE AIRPORT PRIOR TO CONSTRUCTION.

14. THE CONTRACTOR SHALL COORDINATE AND MANAGE ALL AIRFIELD ACCESS LOCATIONS WITH THE AIRPORT. ALL GATES TO SECURE AIRPORT AREAS SHALL BE STAFFED AND MONITORED CONTINUOUSLY BY THE CONTRACTOR TO CONTROL ACCESS IN ACCORDANCE WITH THE AIRPORTS REQUIREMENTS.

15. THE CONTRACTOR SHALL PROVIDE STRICT SECURITY FOR ALL PERSONNEL AT THE SITE INCLUDING SUBCONTRACTORS AND DELIVERY VEHICLES. NO PERSON OR VEHICLE SHALL ENTER INTO AN ACTIVE AIRPORT OPERATING SURFACE AT ANY TIME. ANY VIOLATORS WILL BE PROMPTLY AND PERMANENTLY REMOVED FROM THE JOB PROJECT AND THE CONTRACTOR MAY FACE FINES IMPOSED BY THE AIRPORT AND/OR FAA.

16. THE CONTRACTOR SHALL PROVIDE EMPLOYEE PARKING OUTSIDE OF THE SECURED AREA. ONLY AUTHORIZED VEHICLES WILL BE ALLOWED INSIDE THE SECURITY FENCE. THE CONTRACTOR SHALL COORDINATE WITH AIRPORT OPERATIONS TO DETERMINE A SUITABLE ON-SITE EMPLOYEE PARKING LOCATION. THE EXACT LOCATION WILL BE DETERMINED BASED ON LOT AVAILABILITY.

17. AIRPORT SECURITY GATES SHALL BE LOCKED AT ALL TIMES WHEN NOT ACTIVELY MONITORED BY SRAA'S GUARD (STAFFED DURING NORMAL BUSINESS HOURS 6 A.M. - 4 P.M.) OR THE CONTRACTOR'S UNIFORMED GATE GUARD (OFF HOURS). THE GATES SHALL BE CLOSED WHEN NOT ACTIVELY BEING USED. ALL COSTS ASSOCIATED WITH THE CONTRACTORS GATE GUARDS SHALL BE INCLUDED IN MAINTENANCE AND PROTECTION OR TRAFFIC. THERE IS NO CHARGE FOR SRAA PROVIDED GATE GUARDS.

18. HAUL ROUTES THAT CROSS ACTIVE AIRCRAFT APRON (NON-MOVEMENT AREA) SHALL BE CONTROLLED BY THE CONTRACTOR'S ESCORT VEHICLES. THESE CROSSINGS MAY NOT BE USED UNLESS A CONTRACTOR PROVIDED ESCORT VEHICLE IS PRESENT. THE CONTRACTOR SHALL NEVER CROSS A NON-MOVEMENT MARKING, INTO AN AREA CONTROLLED BY THE ATCT.

19. TEMPORARY HAUL ROADS MAY BE CONSTRUCTED FROM MATERIALS STOCKPILED AT THE AIRPORT, IMPORTED GRANULAR MATERIALS OR MATERIALS SUCH AS STONE GRANULARS OR ASPHALT MILLINGS OBTAINED AS PART OF EXCAVATION. THE ROADS SHALL STRUCTURALLY SUPPORT ALL INTENDED CONSTRUCTION VEHICLES AND EQUIPMENT AND SHALL BE MAINTAINED FOR THE REQUIRED ACCESS DURATION. WHERE HAUL ROUTES MEET PERMANENT PAVEMENT, PRECAUTIONS SHALL BE TAKEN TO PROTECT THE PAVEMENT EDGES FROM DETERIORATION. HAUL ROUTES SHALL BE REMOVED AND RESTORED TO ORIGINAL CONDITION AT THE END OF THE PROJECT. NO SEPARATE PAYMENT SHALL BE MADE FOR TEMPORARY HAUL ROADS. THE CONSTRUCTION OF, MAINTENANCE, REMOVAL AND SITE RESTORATION SHALL BE INCLUDED IN MAINTENANCE AND PROTECTION OF TRAFFIC.

20. HAUL ROUTES SHALL BE CLEARLY DEFINED AND LINED WITH PLASTIC DRUMS OR OTHER STANDARD NYSDOT APPROVED M&PT DEVICES. THE PURPOSE IS TO PROVIDE CLEAR DELINEATION OF ACCESS ROUTES FOR ALL CONSTRUCTION PERSONNEL WITHOUT DEVIATING FROM AIRPORT APPROVED ROUTES.

21. THE PROJECT ACCESS ROUTES, INCLUDING PUBLIC AND AIRSIDE ROADS SHALL BE KEPT CLEANED AND MAINTAINED BY THE CONTRACTOR AT NO COST TO THE OWNER.

22. THE CONTRACTOR SHALL KEEP ALL AIRFIELD FACILITIES FREE OF FOREIGN OBJECT DEBRIS (FOD) SUCH AS SPILLED EARTH, ROCK, TIMBER AND OTHER ITEMS THAT MAY FALL FROM TRANSPORTING VEHICLES. MATERIALS SPILLED BY OR DROPPED OFF OF ANY VEHICLE ON PUBLIC OR AIRFIELD ROADS SHALL BE REMOVED IMMEDIATELY.

23. THE CONTRACTOR SHALL HAVE A VACUUM SWEEPER AND POWERED BROOM ON SITE AT ALL TIMES FOR THE DURATION OF THE PROJECT FOR THE PURPOSE OF CLEANING AIRFIELD PAVEMENT, HAUL ROUTES AND TRAVELED PUBLIC ROADS. THE VACUUM SWEEPER SHALL MEET THE REQUIREMENTS OF MAINTENANCE AND PROTECTION OF TRAFFIC. THE CONTRACTOR WILL NOT BE ALLOWED TO WORK ON THE AIRFIELD PAVEMENTS WITHOUT AN APPROVED VACUUM SWEEPER AND OPERATOR ON SITE AVAILABLE FOR USE. THE VACUUM SHALL BE STAGED DIRECTLY ADJACENT TO ANY HAUL ROUTES THAT TRAVERSE ACTIVE AIRFIELD APRONS AND TAXIWAYS.

24. TEMPORARY AIRFIELD PAVEMENT MARKINGS SHALL BE APPLIED AT THE COMPLETION OF EACH WORK AREA IF IT IS INTENDED TO BE OPENED TO AIRCRAFT. FINAL AIRFIELD PAVEMENT MARKINGS SHALL BE APPLIED AFTER THE REQUIRED MINIMUM 30 DAY PAVEMENT CURING PERIOD. IF NECESSARY, A TEMPORARY SUSPENSION OF WORK MAY BE GRANTED UPON COMPLETION OF THE LAST WORK AREA FOR THE CURING PERIOD AND WILL NOT COUNT TOWARD THE COMPLETION TIME. ALL PAVEMENTS SHALL BE OPEN TO AIRCRAFT DURING THE CURING PERIOD AND TEMPORARILY CLOSED IN ORDER TO APPLY THE PERMANENT FINAL PAVEMENT MARKINGS AND GROOVING.

25. DURING THE WORK OF THIS CONTRACT, THE CONTRACTOR SHALL FURNISH, ERECT AND MAINTAIN WHATEVER TEMPORARY CABLES MAY BE NECESSARY TO KEEP THE TAXIWAYS, RUNWAYS AND APRONS IN OPERATING CONDITION WHEN OPEN FOR AIRCRAFT.

26. ALL AIRFIELD LIGHTING CIRCUITS SHALL BE MAINTAINED BY THE CONTRACTOR DURING OPERATIONAL PERIODS. ALL SIGNS AND LIGHTS ASSOCIATED WITH ACTIVE/OPEN AIRFIELD PAVEMENT SHALL BE ILLUMINATED AT THE END OF EACH WORK SHIFT.

27. ELECTRICAL CIRCUIT JUMPERS ARE REQUIRED TO DEACTIVATE LIGHTS AND SIGNS ASSOCIATED WITH CLOSED PAVEMENT. ELECTRICAL JUMPERS ARE NOT SPECIFICALLY SHOWN AND WILL BE DICTATED BY THE CONTRACTOR'S MEANS AND METHODS. THE EXACT CONFIGURATION OF ELECTRICAL JUMPERS SHALL BE DETERMINED BY THE CONTRACTOR AND APPROVED BY THE AIRPORT ELECTRICIAN AND RPR. REFER TO TECHNICAL SPECIFICATION L-108 FOR ADDITIONAL INFORMATION ON TEMPORARY ELECTRICAL JUMPERS. PAYMENT SHALL BE MADE UNDER ITEM L-108, PER LINEAR FOOT.

28. ALL INTERRUPTIONS OF APRON, TAXIWAY OR RUNWAY LIGHTING SHALL BE COORDINATED WITH AIRPORT OPERATIONS AND SHALL BE SUBJECT TO THE APPROVAL OF AIRPORT OPERATIONS.

29. ALL APPROPRIATE NOTICES TO AIR MISSIONS (NOTAMS) SHALL BE ISSUED FOR EACH WORK AREA. THE CONTRACTOR SHALL COORDINATE WITH AIRPORT OPERATIONS AT LEAST 48 HOURS IN ADVANCE WHO WILL BE RESPONSIBLE FOR ISSUING ALL APPROPRIATE NOTAMS.

30. IN GENERAL, THE WORK AREA LIMITS ARE SHOWN TO THE ASSOCIATED RUNWAY SAFETY AREA (RSA) OR TAXIWAY OBJECT FREE AREA (TOFA) LIMIT. THE AIRFIELD BARRICADES SHALL BE PLACED AT THE RSA/TOFA LIMIT WHILE NOT IMPEDING INTO THE PROTECTED AREAS. THE ACTUAL WORK AREA SHALL STOP 10'-25' SHORT OF THE PROTECTED AREA TO ALLOW FOR A WORKING BUFFER.

31. THE CONSTRUCTION SAFETY AND PHASING DRAWINGS WORK IN CONJUNCTION WITH THE WRITTEN CONSTRUCTION SAFETY AND PHASING PLAN (CSPP) LOCATED IN THE PROJECT MANUAL. THESE DOCUMENTS WORK IN HARMONY TO CONTROL AND REGULATE WORK ON THE PROJECT IN AN EFFORT TO FACILITATE WORK WHILE MINIMIZING IMPACTS TO AIRPORT OPERATIONS.

31.1. THE CONSTRUCTION SAFETY AND PHASING DRAWINGS DEPICT THE WORK AREAS AND DETAILED OPERATIONAL IMPACTS, M&PT REQUIREMENTS AND RESTRICTIONS ASSOCIATED WITH EACH WORK AREA.

31.2. THE WRITTEN CSPP DOCUMENTS CONVEY WORK PHASING AND SAFETY REQUIREMENTS AND THE CONTRACTORS COMPLIANCE REQUIREMENTS. THE CSPP IS MODELED FROM THE FEDERAL AVIATION ADMINISTRATION (FAA) ADVISORY CIRCULAR (AC) 150/5370-2 OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION.

31.2.1. THE CONTRACTOR SHALL BE REQUIRED TO SUBMIT A SAFETY PLAN COMPLIANCE DOCUMENT (SPCD) TO THE AIRPORT OPERATOR DESCRIBING HOW THE CONTRACTOR WILL COMPLY WITH THE REQUIREMENTS SET FORTH IN THIS CSPP AND THE REQUIREMENTS SET FORTH IN AC.

31.3. SECTION 80 DESCRIBES THE GENERAL SCOPE OF PROJECT WORK TASKS AND DEFINES TIME CONSTRAINTS, SEQUENCING AND LIQUIDATED DAMAGES.

31.4. IN GENERAL, DATA IS NOT DUPLICATED ON THE DIFFERENT DOCUMENTS AS EACH SERVES AN INTENDED PURPOSE AND ALL THE DOCUMENTS MUST BE REFERENCED.

32. IN THE EVENT THAT CONSTRUCTION IS NOT FULLY COMPLETED PRIOR TO THE START OF AIRCRAFT DEICING SEASON, OCTOBER 15TH - MAY 1ST, THE CONTRACTOR SHALL ENSURE AT LEAST 3 DEICING BAYS ARE FULLY USABLE, EITHER IN THE EXISTING OR PROPOSED CONFIGURATION. THIS REQUIREMENT SHALL BE CONSIDERED AND VERIFIED PRIOR TO BEGINNING WORK AREA.

33. NO SEPARATE MEASUREMENT OR PAYMENT SHALL BE MADE FOR TEMPORARY MARKINGS OR MARKING REMOVAL ASSOCIATED WITH CONSTRUCTION WORK PHASING. TEMPORARY MARKING PLACEMENT AND REMOVAL ARE PAID FOR UNDER ITEM C-107, SAFETY SECURITY AND MAINTENANCE OF TRAFFIC, AND ARE GENERALLY SHOWN ON THE CONSTRUCTION WORK PHASING DRAWINGS.

A1 GENERAL WORK PHASING NOTES
SCALE: NOT TO SCALE

C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · NO. 083424 · LICENSED PROFESSIONAL ENGINEER

SYRACUSE HANCOCK INTERNATIONAL AIRPORT

SYRACUSE HANCOCK INTERNATIONAL AIRPORT (CDF)
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

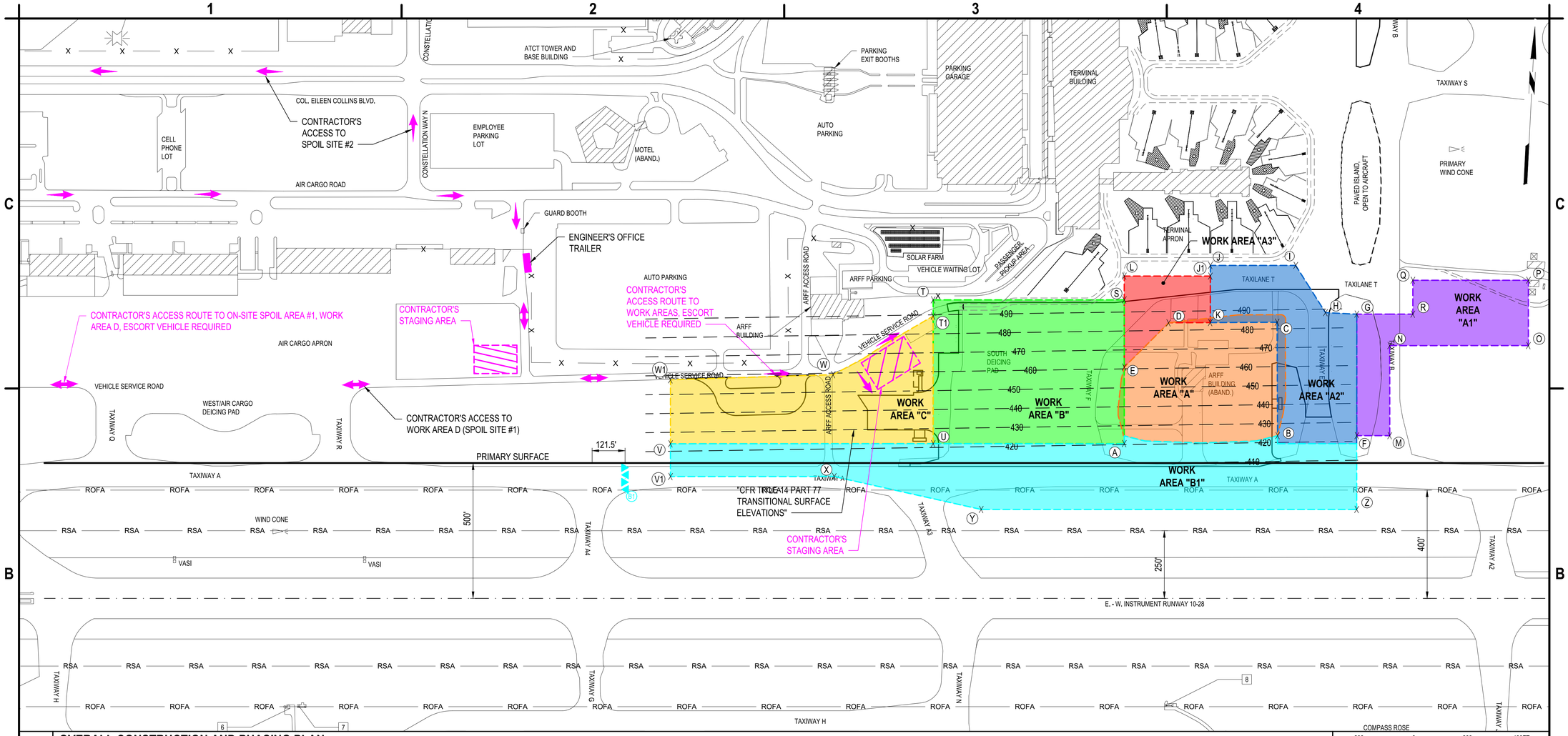
GENERAL WORK PHASING NOTES

GC001

SHEET NO. 8 OF 113

Copyright ©

Apr 29, 2026 - 3:39pm
P:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Devlong Pavt\Design\CADD\Sheet Files\O68069001_GC Details.dwg



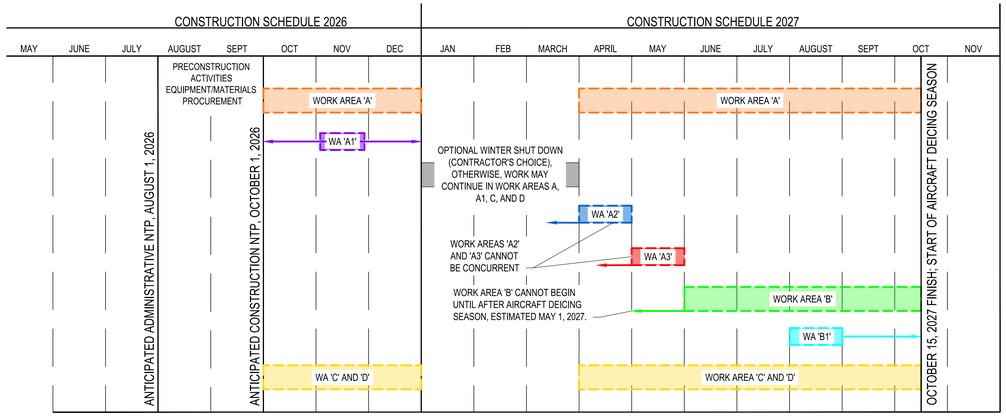
B1 OVERALL CONSTRUCTION AND PHASING PLAN

SCALE: 1" = 200'

COMPASS ROSE

200' 200 0 200 400FT.

REFER TO SHEET GI101 FOR THE LOCATION OF WORK AREA D (SPOIL SITE)



A1 WORK PHASING NOTES AND SCHEDULE

SCALE: NOT TO SCALE

COORDINATE TABLE

POINT ID	LATITUDE	LONGITUDE	MAX. HEIGHT	GROUND ELEV.	MAX ELEV.
A	N43° 06' 36.97"	W76° 06' 39.01"	25'	413.64'	438.64'
AA	N43° 06' 40.99"	W76° 08' 11.29"	25'	412.00'	437.00'
B	N43° 06' 37.51"	W76° 06' 31.40"	25'	413.77'	438.77'
BB	N43° 06' 41.55"	W76° 08' 00.54"	25'	412.00'	437.00'
C	N43° 06' 41.64"	W76° 06' 31.68"	60'	414.85'	474.85'
CC	N43° 06' 38.28"	W76° 08' 11.03"	25'	413.00'	438.00'
D	N43° 06' 41.44"	W76° 06' 37.08"	25'	416.58'	441.58'
DD	N43° 06' 38.84"	W76° 08' 00.27"	25'	411.00'	436.00'
E	N43° 06' 39.76"	W76° 06' 39.18"	25'	416.97'	441.97'
F	N43° 06' 37.64"	W76° 06' 27.46"	25'	412.00'	437.00'
G	N43° 06' 42.07"	W76° 06' 27.73"	70'	413.34'	483.34'
H	N43° 06' 42.07"	W76° 06' 29.29"	70'	414.26'	484.26'
I	N43° 06' 43.74"	W76° 06' 30.88"	70'	416.61'	486.61'

COORDINATE TABLE

POINT ID	LATITUDE	LONGITUDE	MAX. HEIGHT	GROUND ELEV.	MAX ELEV.
J	N43° 06' 43.61"	W76° 06' 35.13"	70'	416.00'	486.00'
J1	N43° 06' 43.22"	W76° 06' 35.10"	70'	416.00'	486.00'
K	N43° 06' 41.52"	W76° 06' 35.00"	25'	416.32'	441.32'
L	N43° 06' 43.08"	W76° 06' 39.38"	70'	416.44'	486.44'
M	N43° 06' 37.69"	W76° 06' 25.82"	25'	413.96'	438.96'
N	N43° 06' 40.98"	W76° 06' 26.03"	50'	414.52'	464.52'
O	N43° 06' 41.20"	W76° 06' 19.13"	50'	410.99'	460.99'
P	N43° 06' 43.58"	W76° 06' 19.28"	50'	410.00'	460.00'
Q	N43° 06' 43.40"	W76° 06' 25.02"	50'	415.14'	465.14'
R	N43° 06' 42.16"	W76° 06' 24.95"	50'	414.76'	464.76'
S	N43° 06' 42.21"	W76° 06' 39.33"	70'	415.52'	485.52'
T	N43° 06' 41.90"	W76° 06' 48.83"	70'	416.18'	486.18'
T1	N43° 06' 41.31"	W76° 06' 48.80"	70'	416.43'	486.43'

COORDINATE TABLE

POINT ID	LATITUDE	LONGITUDE	MAX. HEIGHT	GROUND ELEV.	MAX ELEV.
U	N43° 06' 36.66"	W76° 06' 48.51"	25'	417.59'	442.59'
V	N43° 06' 36.22"	W76° 07' 01.57"	25'	413.00'	438.00'
V1	N43° 06' 35.03"	W76° 07' 01.50"	25'	416.00'	441.00'
W	N43° 06' 39.01"	W76° 06' 53.64"	40'	416.00'	456.00'
W1	N43° 06' 38.55"	W76° 07' 01.71"	40'	414.00'	454.00'
X	N43° 06' 35.29"	W76° 06' 53.36"	25'	417.31'	442.31'
Y	N43° 06' 34.34"	W76° 06' 45.97"	25'	410.41'	435.41'
Z	N43° 06' 34.95"	W76° 06' 27.30"	25'	409.00'	434.00'

WORK AREAS DEFINED BY PERIMETER POINTS AS FOLLOWS:

- A: A, B, C, D, E
- A1: F, M, N, O, P, Q, R, G
- A2: B, F, G, H, I, J, K, C
- A3: E, D, K, J1, L
- B: U, A, S, T
- B1: V1, X, Y, Z, F, V
- C: V, U, T1, W, W1
- D: (SPOIL SITE): AA, BB, CC, DD

A3 WORK AREA LIMIT TABLE

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · NO. 083424 · LICENSED PROFESSIONAL ENGINEER

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	M. HERNANDEZ
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

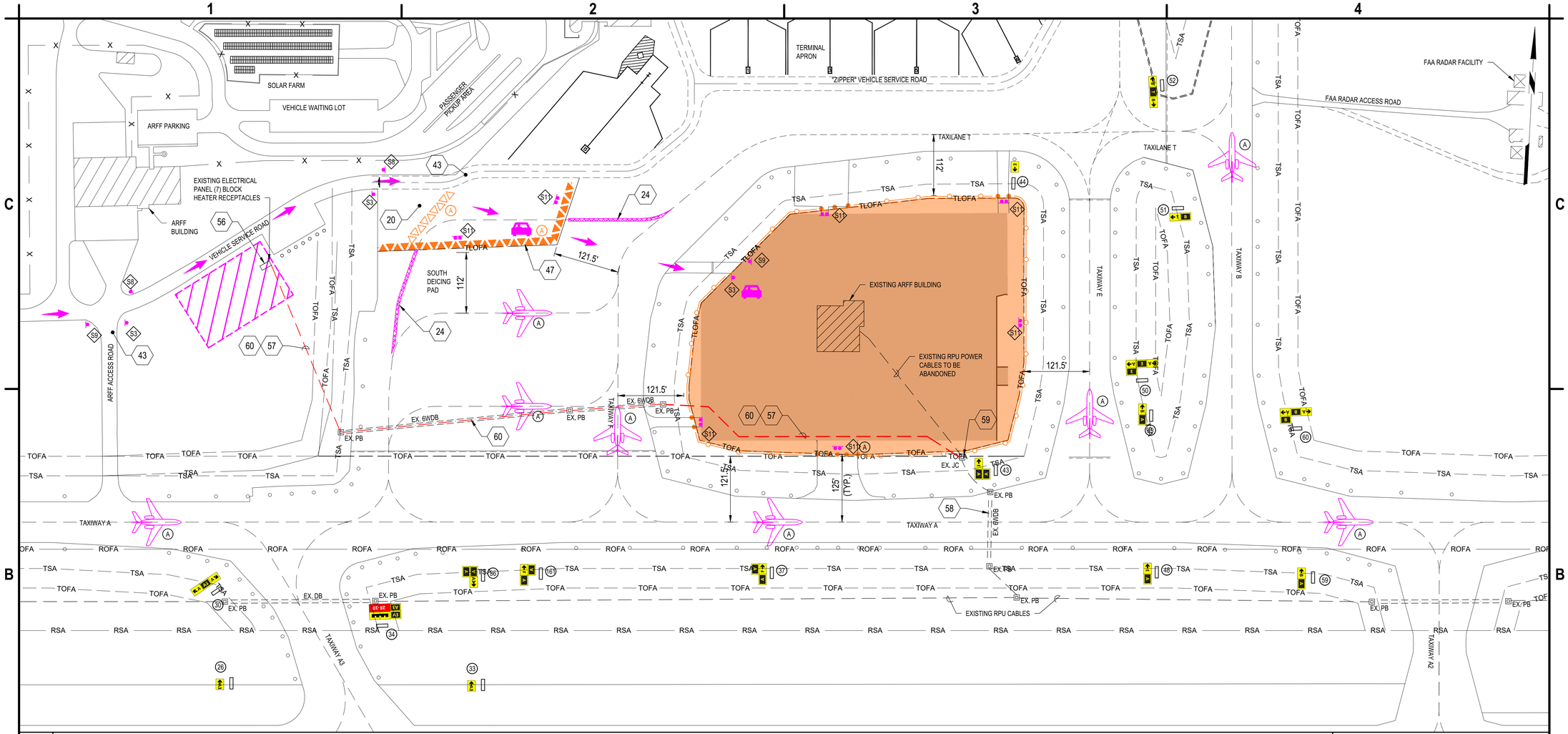
OVERALL CONSTRUCTION SAFETY AND PHASING PLAN

GC101

SHEET NO. 9 OF 113

Copyright ©

Apr 29, 2026 - 3:30pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_GC Series.dwg



B1 CONSTRUCTION SAFETY AND PHASING PLAN - WORK AREA A

SCALE: 1" = 100'

100' 100 0 100 200FT.

A1 WORK PHASING NOTES

SCALE: NOT TO SCALE

DESCRIPTION:

- CONSTRUCTION WORK EAST OF TAXIWAY "F", SOUTH OF TERMINAL BUILDING APRON, WEST OF TAXIWAY E AND NORTH OF TAXIWAY A.

AOA OPERATIONAL IMPACTS:

- NONE

M&PT REQUIREMENTS:

- PLACE BARRICADES PER PLAN
- INSTALL TEMPORARY CONSTRUCTION ACCESS CONTROL SIGNS.
- INSTALL TEMPORARY CONSTRUCTION LIMIT FENCING.
- RWIS RPU #2 & #3 ARE CURRENTLY POWERED FROM PANEL P2 IN THE OLD ARFF BUILDING SCHEDULED FOR DEMOLITION IN WORK AREA A. THE CONTRACTOR SHALL MAINTAIN ELECTRICAL SERVICE TO THE RPU'S FOR THE DURATION OF THE PROJECT. TEMPORARY POWER CABLES SHALL BE INSTALLED PRIOR TO ARFF BUILDING DEMOLITION. REMOVE TEMPORARY CABLES CONDUIT AFTER PERMANENT SERVICE IS ESTABLISHED. ALL COST ASSOCIATED WITH THE TEMPORARY POWER SHALL BE INCLUDED IN ITEM C-106.

CONTRACTOR RESTRICTIONS:

- ALL PAVEMENT ALONG THE CONTRACTOR'S ACCESS ROUTE SHALL BE VACUUM CLEANED AT THE END OF EACH WORKING DAY AND AS NEEDED THROUGHOUT EACH WORKING DAY.
- WORK AREA A MAY BE CONCURRENT WITH ANY OTHER WORK AREA AND MAY OCCUR ANYTIME THROUGHOUT THE CONTRACT DURATION.
- WORK AREA A AND SUB-AREAS A1 AND A2 SHALL BE STARTED FIRST (PRIOR TO WORK AREA B)
- ACCESS TO WORK AREA A REQUIRES CROSSING AIRPORT OPERATING SURFACES AND THEREFORE CONTRACTOR PROVIDED ESCORT VEHICLES MUST BE REQUIRED.
- THE CONTRACTOR MAY NOT CROSS INTO ANY ACTIVE RUNWAY SAFETY AREA OR TAXIWAY OBJECT FREE AREAS UNLESS THE PAVEMENT IS CLOSED AS PART OF ANOTHER WORK AREA.

A3 KEYED LEGEND

SCALE: NOT TO SCALE

- PROJECT WORK AREA A LIMITS.
- AIRCRAFT TAXI ROUTE, WITH WORK AREA DESIGNATION.
- CONTRACTOR ACCESS AND HAUL ROUTE TO WORK AREAS.
- LOW PROFILE AIRFIELD BARRICADE, WITH WORK AREA DESIGNATION. SEE DETAIL A2/GC501.
- INTERIM LOW PROFILE AIRFIELD BARRICADE, WITH WORK AREA DESIGNATION. SEE DETAIL A2/GC501.
- CONTRACTOR PROVIDED ESCORT VEHICLE REQUIRED FOR CROSSING ACTIVE APRON. AIRCRAFT HAVE THE RIGHT-OF-WAY.
- EXISTING LIGHT TO BE TURNED OFF/OBSCURED. SEE DETAIL A1/GC502.
- S1 TEMPORARY NO ENTRY CONSTRUCTION SIGN, SEE DETAIL B3/GC501.
- SX TEMPORARY CONSTRUCTION SIGN, SEE DETAIL B1/GC501 AND C1/GC501.
- TEMPORARY ORANGE CONSTRUCTION FENCE. SEE DETAIL C4/GC501.
- PLASTIC CONSTRUCTION DRUM BARRICADE. SEE DETAIL A3/GC501.
- CONTRACTOR'S STAGING AREA.
- (6) #6 AWG 5 kV TEMPORARY AIRFIELD LIGHTING CABLES:
  IN 2" PVC
  IN EXISTING DUCTBANK

A4 KEYED NOTES

SCALE: NOT TO SCALE

20. CONTRACTOR SHALL HAVE A SWEEPER AND/OR VACUUM TRUCK STATIONED AT THIS LOCATION TO KEEP ACTIVE AOA CLEAR OF ALL FOD.
24. EXISTING TAXIWAY CENTERLINE MARKING LEADING TO CLOSED PAVEMENTS SHALL BE TEMPORALLY REMOVED AND RESTORED UPON COMPLETION OF THE PROJECT WORK AREA, ITEM C-106 (TYP.).
43. CONTRACTOR SHALL NEVER BLOCK ARFF ACCESS OR VEHICLE SERVICE ROADS.
47. CONTRACTOR SHALL RELOCATE THIS SECTION OF BARRICADES TO THE EDGE OF THE GATE PARKING ENVELOPE AS SHOWN WHEN GATE 15 IS ACTIVE. GATE 15 SCHEDULE TO BE COORDINATED BETWEEN AIRLINES AND RPR.
56. INSTALL (2) SINGLE POLE 20 AMP ELECTRICAL BREAKERS IN EXISTING PANEL, ITEM C-106.
57. TEMPORARY 2" PVC CONDUIT ON GRADE, PAINTED RED AND SECURED WITH SANDBAGS, PAID UNDER ITEM C-106.
58. EXISTING RPU #2 & #3 POWER CABLES (4) #8 AWG 5 kV POWER AND (2) #6 AWG GROUNDS
59. SPLICE PROPOSED TEMPORARY POWER CABLES TO EXISTING AT EXISTING JUNCTION CAN; RPU #2 & #3.
60. PROVIDE (6) #6 AWG 5 kV TEMPORARY AIRFIELD LIGHTING CABLES TO POWER RPU #2 & #3 PRIOR TO OLD ARFF BUILDING DEMOLITION. APPROXIMATELY 1,600 LF, PAID UNDER C-106.

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · LICENSED PROFESSIONAL ENGINEER · NO. 083424

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	M. HERNANDEZ
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

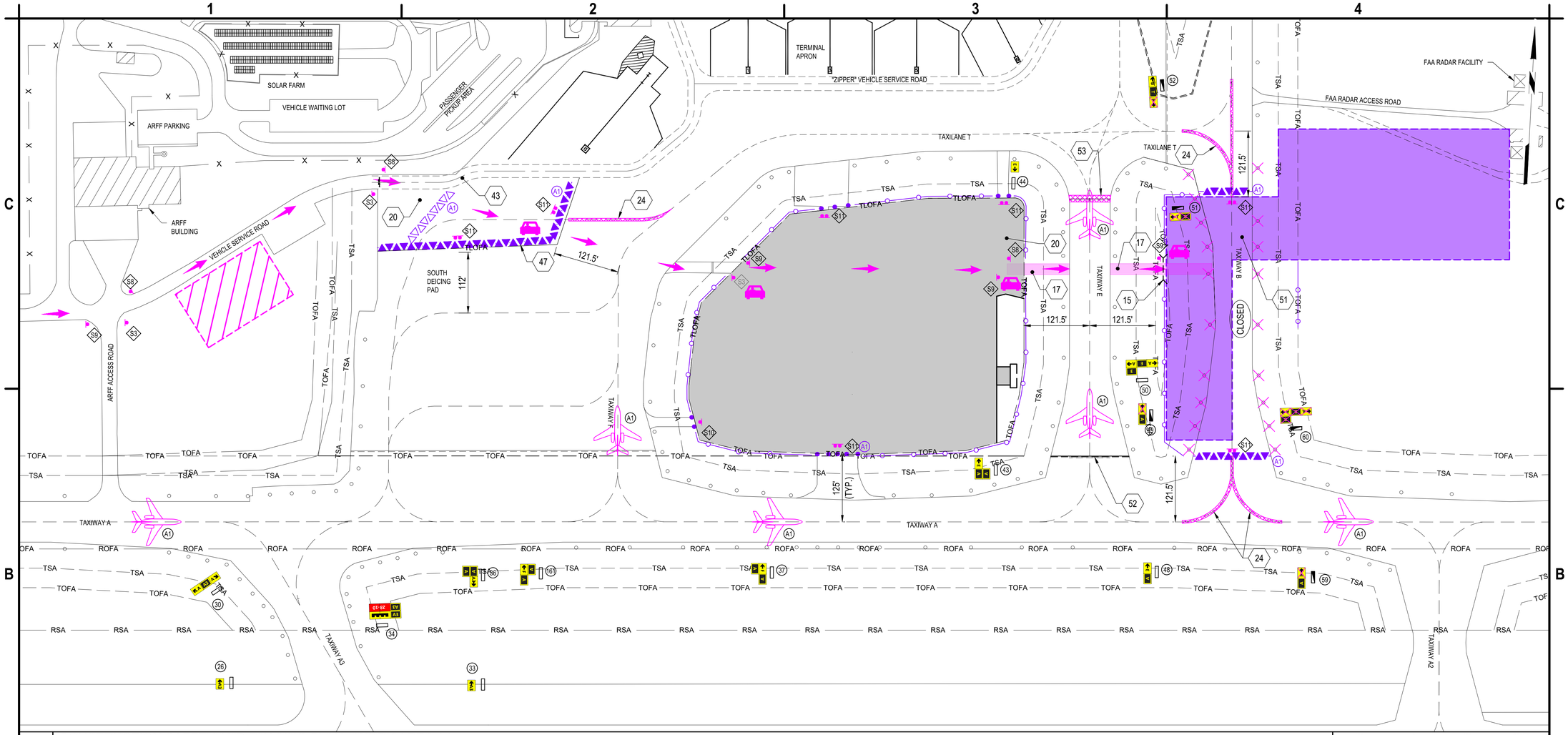
CONSTRUCTION SAFETY AND PHASING PLAN - WORK AREA A

GC102

SHEET NO. 10 OF 113

Copyright ©

Apr 29, 2026 - 3:39pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_GC Series.dwg



B1 CONSTRUCTION SAFETY AND PHASING PLAN - WORK AREA A1

SCALE: 1" = 100'

100' 100 0 100 200FT.

A1 WORK PHASING NOTES

SCALE: NOT TO SCALE

DESCRIPTION:

- WORK WITHIN TAXIWAY "B" OBJECT FREE AREA GENERALLY INCLUDING ACCESS ROAD CONSTRUCTION, GRADING AND DRAINAGE WORK

AOA OPERATIONAL IMPACTS:

- CLOSE A PORTION OF TAXIWAY "B" BETWEEN TAXIWAY "T" AND TAXIWAY "A"

M&PT REQUIREMENTS:

- DE-ENERGIZE, COVER OR REMOVE TAXIWAY "B", EDGE LIGHTS LOCATED WITHIN WORK AREA LIMITS
- COVER OR REMOVE GUIDANCE SIGNS PER PLAN
- PLACE BARRICADES PER PLAN
- TEMPORARILY ERADICATE PAVEMENT MARKINGS AND/OR PROVIDE TEMPORARY AND PERMANENT PAVEMENT MARKINGS AS SHOWN
- INSTALL TEMPORARY CONSTRUCTION ACCESS CONTROL SIGNS.
- INSTALL TEMPORARY CONSTRUCTION LIMIT FENCING.

CONTRACTOR RESTRICTIONS:

- ALL PAVEMENT ALONG THE CONTRACTOR'S ACCESS ROUTE SHALL BE VACUUM CLEANED AT THE END OF EACH WORKING DAY AND AS NEEDED THROUGHOUT EACH WORKING DAY.
- WORK AREA A1 MAY BE CONCURRENT WITH WORK AREA A AND A3.
- WORK AREA A1 CANNOT BE CONCURRENT WITH WORK AREA A2.
- ACCESS TO WORK AREA A1 REQUIRES CROSSING AIRPORT OPERATING SURFACES AND THEREFORE CONTRACTOR PROVIDED ESCORT VEHICLES WILL BE REQUIRED.
- THE CONTRACTOR MAY NOT CROSS INTO ANY ACTIVE RUNWAY SAFETY AREA OR TAXIWAY OBJECT FREE AREAS UNLESS THE PAVEMENT IS CLOSED AS PART OF ANOTHER WORK AREA.

A3 KEYED LEGEND

SCALE: NOT TO SCALE

- PROJECT WORK AREA A1 LIMITS
- AIRCRAFT TAXI ROUTE, WITH WORK AREA DESIGNATION.
- CONTRACTOR ACCESS AND HAUL ROUTE TO WORK AREAS.
- LOW PROFILE AIRFIELD BARRICADE, WITH WORK AREA DESIGNATION. SEE DETAIL A2/GC501.
- INTERIM LOW PROFILE AIRFIELD BARRICADE, WITH WORK AREA DESIGNATION. SEE DETAIL A2/GC501.
- CONTRACTOR PROVIDED ESCORT VEHICLE REQUIRED FOR CROSSING ACTIVE APRON. AIRCRAFT HAVE THE RIGHT-OF-WAY.
- EXISTING LIGHT TO BE TURNED OFF/OBSCURED. SEE DETAIL A1/GC502.
- EXISTING SIGN/SIGN PANEL TO BE PARTIALLY OR FULLY OBSCURED WITH WORK AREA.
- TEMPORARY NO ENTRY CONSTRUCTION SIGN, SEE DETAIL B3/GC501.
- TEMPORARY CONSTRUCTION SIGN, SEE DETAIL B1/GC501 AND C1/GC501.
- TEMPORARY ORANGE CONSTRUCTION FENCE. SEE DETAIL C4/GC501.
- PLASTIC CONSTRUCTION DRUM BARRICADE. SEE DETAIL A3/GC501.
- CONTRACTOR'S STAGING AREA.

A4 KEYED NOTES

SCALE: NOT TO SCALE

15. TEMPORARY 18" DIA. SMOOTH INTERIOR PLASTIC DRAINAGE PIPE UNDER HAUL ROAD. INSTALLED BY OTHERS IN FY 2026.
17. TEMPORARY HAUL ROAD. INSTALLED BY OTHERS IN FY 2026.
20. CONTRACTOR SHALL HAVE A SWEEPER AND/OR VACUUM TRUCK STATIONED AT THIS LOCATION TO KEEP ACTIVE AOA CLEAR OF ALL FOD.
24. EXISTING TAXIWAY CENTERLINE MARKING LEADING TO CLOSED PAVEMENTS SHALL BE TEMPORALLY REMOVED AND RESTORED UPON COMPLETION OF THE PROJECT WORK AREA, ITEM C-106 (TYP.).
43. CONTRACTOR SHALL NEVER BLOCK ARFF ACCESS OR VEHICLE SERVICE ROADS.
47. CONTRACTOR SHALL RELOCATE THIS SECTION OF BARRICADES TO THE EDGE OF THE GATE PARKING ENVELOPE AS SHOWN WHEN GATE 15 IS ACTIVE. GATE 15 SCHEDULE TO BE COORDINATED BETWEEN AIRLINES AND RPR.
51. TAXIWAY B IS BEING REHABILITATED BY OTHERS IN 2026. THE NEW PAVEMENT SHALL BE PROTECTED FROM DAMAGE DUE TO CONSTRUCTION VEHICLE TRAFFIC.
52. NON-MOVEMENT AREA MARKING MOVED TO FINAL POSITION, SEE SHEET XM103. REMOVE EXISTING INTERMEDIATE HOLDING POSITION MARKING, SEE DETAIL A4/XM501.
53. EXISTING NON-MOVEMENT MARKING SHALL BE PERMANENTLY REMOVED, ITEM C-106.

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · LICENSED PROFESSIONAL ENGINEER · NO. 083424

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	M. HERNANDEZ
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

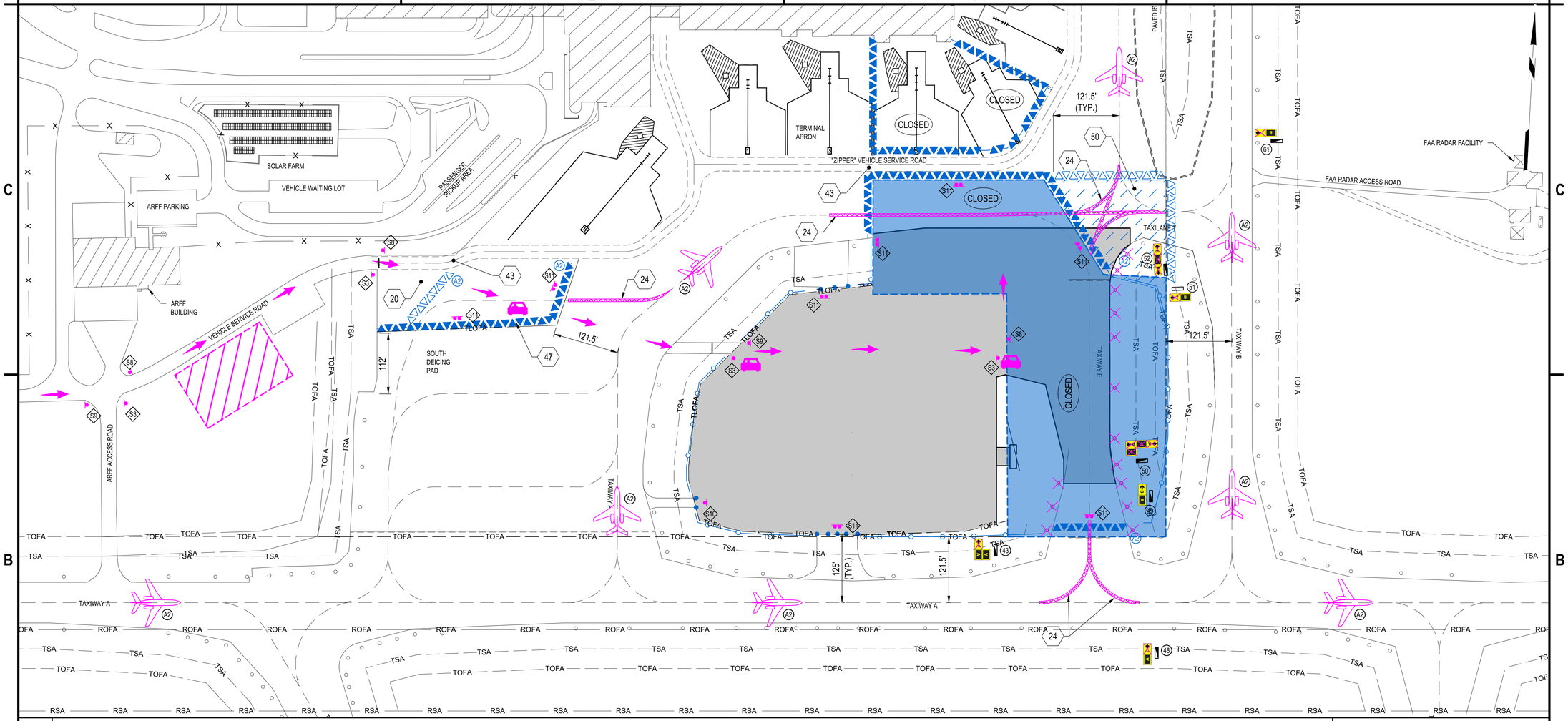
CONSTRUCTION SAFETY AND PHASING PLAN - WORK AREA A1

GC103

SHEET NO. 11 OF 113

Copyright ©

Apr 29, 2026 - 3:30pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_GC Series.dwg



B1 CONSTRUCTION SAFETY AND PHASING PLAN - WORK AREA A2

SCALE: 1" = 100'

100 0 100 200FT.
100'

DESCRIPTION:

- WORK WITHIN TAXIWAY "E" OBJECT FREE AREA INCLUDING AREA SOUTH OF TERMINAL BUILDING.

AOA OPERATIONAL IMPACTS:

- CLOSE TAXIWAY "E"
- CLOSE GATE 5
- CLOSE GATE 6
- WORK AREA A2 REQUIRES RESTRICTION OF AIRPORT MOVEMENTS ON TERMINAL APRON. IN THE EVENT OF ADDITIONAL TEMPORARY CLOSURE FOR AIRCRAFT TERMINAL GATE PARKING, ONLY TWO GATES MAY BE CLOSED AT ANY GIVEN TIME PENDING AIRPORT OPERATIONS APPROVAL (NOT GUARANTEED).

M&PT REQUIREMENTS:

- DE-ENERGIZE, COVER OR REMOVE TAXIWAY "E", EDGE LIGHTS LOCATED WITHIN WORK AREA LIMITS
- COVER OR REMOVE GUIDANCE SIGNS PER PLAN
- PLACE BARRICADES PER PLAN
- TEMPORARILY ERADICATE PAVEMENT MARKINGS AND/OR PROVIDE TEMPORARY PAVEMENT MARKINGS AS SHOWN
- INSTALL TEMPORARY CONSTRUCTION ACCESS CONTROL SIGNS.
- INSTALL TEMPORARY CONSTRUCTION LIMIT FENCING.
- THE CONTRACTOR SHALL PROVIDE A MINIMUM 2 WEEKS ADVANCE NOTICE PRIOR TO STARTING WORK AREA A2 SO THAT SRAA MAY COORDINATE WITH ALL STAKEHOLDERS. AIRLINES WILL BE REQUIRED TO TEMPORARILY USE OTHER GATES.

CONTRACTOR RESTRICTIONS:

- ALL PAVEMENT ALONG THE CONTRACTOR'S ACCESS ROUTE SHALL BE VACUUM CLEANED AT THE END OF EACH WORKING DAY AND AS NEEDED THROUGHOUT EACH WORKING DAY.
- WORK AREA A2 MAY BE CONCURRENT WITH WORK AREA A.
- WORK AREA A2 CANNOT BE CONCURRENT WITH WORK AREAS A1 OR A3.
- ACCESS TO WORK AREA A2 REQUIRES CROSSING AIRPORT OPERATING SURFACES AND THEREFORE CONTRACTOR PROVIDED ESCORT VEHICLES WILL BE REQUIRED.
- THE CONTRACTOR MAY NOT CROSS INTO ANY ACTIVE RUNWAY SAFETY AREA OR TAXIWAY OBJECT FREE AREAS UNLESS THE PAVEMENT IS CLOSED AS PART OF ANOTHER WORK AREA.
- ASPHALT PAVEMENT AND TEMPORARY PAVEMENT MARKINGS SHALL BE COMPLETE IN WORK AREA A2 AT THE COMPLETION OF THE WORK AREA AS IT WILL BE OPENED TO AIRCRAFT.

A1 WORK PHASING NOTES

SCALE: NOT TO SCALE

- PROJECT WORK AREA A2 LIMITS.
- AIRCRAFT TAXI ROUTE, WITH WORK AREA DESIGNATION.
- CONTRACTOR ACCESS AND HAUL ROUTE TO WORK AREAS.
- LOW PROFILE AIRFIELD BARRICADE, WITH WORK AREA DESIGNATION. SEE DETAIL A2/GC501.
- INTERIM LOW PROFILE AIRFIELD BARRICADE, WITH WORK AREA DESIGNATION. SEE DETAIL A2/GC501.
- CONTRACTOR PROVIDED ESCORT VEHICLE REQUIRED FOR CROSSING ACTIVE APRON. AIRCRAFT HAVE THE RIGHT-OF-WAY.
- EXISTING LIGHT TO BE TURNED OFF/OBSCURED. SEE DETAIL A1/GC502.
- EXISTING SIGN/SIGN PANEL TO BE PARTIALLY OR FULLY OBSCURED WITH WORK AREA.
- TEMPORARY NO ENTRY CONSTRUCTION SIGN, SEE DETAIL B3/GC501.
- TEMPORARY CONSTRUCTION SIGN, SEE DETAIL B1/GC501 AND C1/GC501.
- TEMPORARY ORANGE CONSTRUCTION FENCE. SEE DETAIL C4/GC501.
- PLASTIC CONSTRUCTION DRUM BARRICADE. SEE DETAIL A3/GC501.
- CONTRACTOR'S STAGING AREA.

A3 KEYED LEGEND

SCALE: NOT TO SCALE

20. CONTRACTOR SHALL HAVE A SWEEPER AND/OR VACUUM TRUCK STATIONED AT THIS LOCATION TO KEEP ACTIVE AOA CLEAR OF ALL FOD.
24. EXISTING TAXIWAY CENTERLINE MARKING LEADING TO CLOSED PAVEMENTS SHALL BE TEMPORALLY REMOVED AND RESTORED UPON COMPLETION OF THE PROJECT WORK AREA, ITEM C-106 (TYP.).
43. CONTRACTOR SHALL NEVER BLOCK ARFF ACCESS OR VEHICLE SERVICE ROADS.
47. CONTRACTOR SHALL RELOCATE THIS SECTION OF BARRICADES TO THE EDGE OF THE GATE PARKING ENVELOPE AS SHOWN WHEN GATE 15 IS ACTIVE. GATE 15 SCHEDULE TO BE COORDINATED BETWEEN AIRLINES AND RPR.
50. COORDINATE SHORT TERM TAXIWAY "T" CLOSURE FOR UP TO A MAXIMUM OF 5 DAYS OF MILLING AND REPAVING WITH AIRPORT OPERATIONS AND THE RPR.

A4 KEYED NOTES

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK
CHRISTOPHER D. BRUBACH
LICENSED PROFESSIONAL ENGINEER
NO. 083424

SYR
SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	M. HERNANDEZ
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

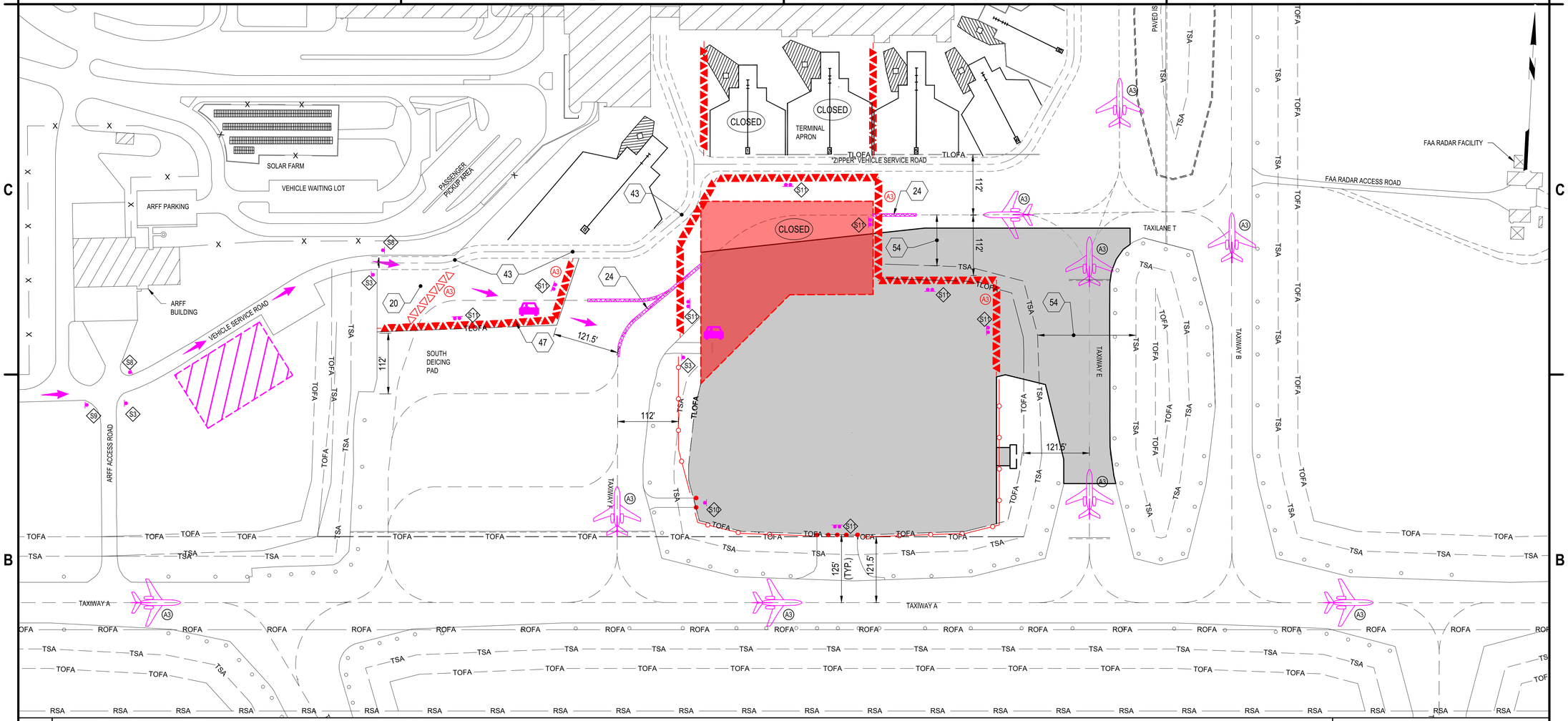
CONSTRUCTION SAFETY AND PHASING PLAN - WORK AREA A2

GC104

SHEET NO. 12 OF 113

Copyright ©

Apr 29, 2026 - 3:39pm
P:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_GC Series.dwg



B1 CONSTRUCTION SAFETY AND PHASING PLAN - WORK AREA A3

SCALE: 1" = 100'

100 0 100 200FT.
100'

DESCRIPTION:

- CONSTRUCTION WORK SOUTH OF TERMINAL BUILDING AND EAST OF TAXIWAY "F".

AOA OPERATIONAL IMPACTS:

- CLOSE GATE 1
- CLOSE GATE 3
- WORK AREA A3 REQUIRES RESTRICTION OF AIRPORT MOVEMENTS ON TERMINAL APRON. IN THE EVENT OF ADDITIONAL TEMPORARY CLOSURE FOR AIRCRAFT TERMINAL GATE PARKING, ONLY TWO GATES MAY BE CLOSED AT ANY GIVEN TIME PENDING AIRPORT OPERATIONS APPROVAL (NOT GUARANTEED)..

M&PT REQUIREMENTS:

- DE-ENERGIZE, COVER OR REMOVE EDGE LIGHTS LOCATED WITHIN WORK AREA LIMITS
- COVER OR REMOVE GUIDANCE SIGNS PER PLAN
- PLACE BARRICADES PER PLAN
- TEMPORARILY ERADICATE PAVEMENT MARKINGS AND/OR PROVIDE TEMPORARY PAVEMENT MARKINGS AS SHOWN
- INSTALL TEMPORARY CONSTRUCTION ACCESS CONTROL SIGNS.
- INSTALL TEMPORARY CONSTRUCTION LIMIT FENCING.
- THE CONTRACTOR SHALL PROVIDE A MINIMUM 2 WEEKS ADVANCE NOTICE PRIOR TO STARTING WORK AREA A2 SO THAT SRAA MAY COORDINATE WITH ALL STAKEHOLDERS. AIRLINES WILL BE REQUIRED TO TEMPORARILY USE OTHER GATES.

CONTRACTOR RESTRICTIONS:

- ALL PAVEMENT ALONG THE CONTRACTOR'S ACCESS ROUTE SHALL BE VACUUM CLEANED AT THE END OF EACH WORKING DAY AND AS NEEDED THROUGHOUT EACH WORKING DAY.
- WORK AREA A3 MAY BE CONCURRENT WITH WORK AREA A AND A1.
- WORK AREA A3 CANNOT BE CONCURRENT WITH WORK AREA A2.
- ACCESS TO WORK AREA A3 REQUIRES CROSSING AIRPORT OPERATING SURFACES AND THEREFORE CONTRACTOR PROVIDED ESCORT VEHICLES WILL BE REQUIRED.
- THE CONTRACTOR MAY NOT CROSS INTO ANY ACTIVE RUNWAY SAFETY AREA OR TAXIWAY OBJECT FREE AREAS UNLESS THE PAVEMENT IS CLOSED AS PART OF ANOTHER WORK AREA.
- ASPHALT PAVEMENT AND TEMPORARY PAVEMENT MARKINGS SHALL BE COMPLETE IN WORK AREA A3 AT THE COMPLETION OF THE WORK AREA AS IT WILL BE OPENED TO AIRCRAFT.

A1 WORK PHASING NOTES

SCALE: NOT TO SCALE

PROJECT WORK AREA A3 LIMITS.

AIRCRAFT TAXI ROUTE, WITH WORK AREA DESIGNATION.

CONTRACTOR ACCESS AND HAUL ROUTE TO WORK AREAS.

LOW PROFILE AIRFIELD BARRICADE, WITH WORK AREA DESIGNATION. SEE DETAIL A2/GC501.

INTERIM LOW PROFILE AIRFIELD BARRICADE, WITH WORK AREA DESIGNATION. SEE DETAIL A2/GC501.

CONTRACTOR PROVIDED ESCORT VEHICLE REQUIRED FOR CROSSING ACTIVE APRON. AIRCRAFT HAVE THE RIGHT-OF-WAY.

TEMPORARY NO ENTRY CONSTRUCTION SIGN, SEE DETAIL B3/GC501.

TEMPORARY CONSTRUCTION SIGN, SEE DETAIL B1/GC501 AND C1/GC501.

TEMPORARY ORANGE CONSTRUCTION FENCE. SEE DETAIL C4/GC501.

PLASTIC CONSTRUCTION DRUM BARRICADE. SEE DETAIL A3/GC501.

CONTRACTOR'S STAGING AREA.

A3 KEYED LEGEND

SCALE: NOT TO SCALE

20. CONTRACTOR SHALL HAVE A SWEEPER AND/OR VACUUM TRUCK STATIONED AT THIS LOCATION TO KEEP ACTIVE AOA CLEAR OF ALL FOD.
24. EXISTING TAXIWAY CENTERLINE MARKING LEADING TO CLOSED PAVEMENTS SHALL BE TEMPORALLY REMOVED AND RESTORED UPON COMPLETION OF THE PROJECT WORK AREA, ITEM C-106 (TYP.).
43. CONTRACTOR SHALL NEVER BLOCK ARFF ACCESS OR VEHICLE SERVICE ROADS.
47. CONTRACTOR SHALL RELOCATE THIS SECTION OF BARRICADES TO THE EDGE OF THE GATE PARKING ENVELOPE AS SHOWN WHEN GATE 15 IS ACTIVE. GATE 15 SCHEDULE TO BE COORDINATED BETWEEN AIRLINES AND RPR.
54. WORK AREA 2 MUST BE SUBSTANTIALLY COMPLETED AND OPEN TO AIRCRAFT PRIOR TO STARTING WORK AREA A3, INCLUDING SURFACE STANDARDS UP TO THE TSA.

A4 KEYED NOTES

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK
CHRISTOPHER D. BRUBACH
LICENSED PROFESSIONAL ENGINEER
NO. 083424

SYR
SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	M. HERNANDEZ
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

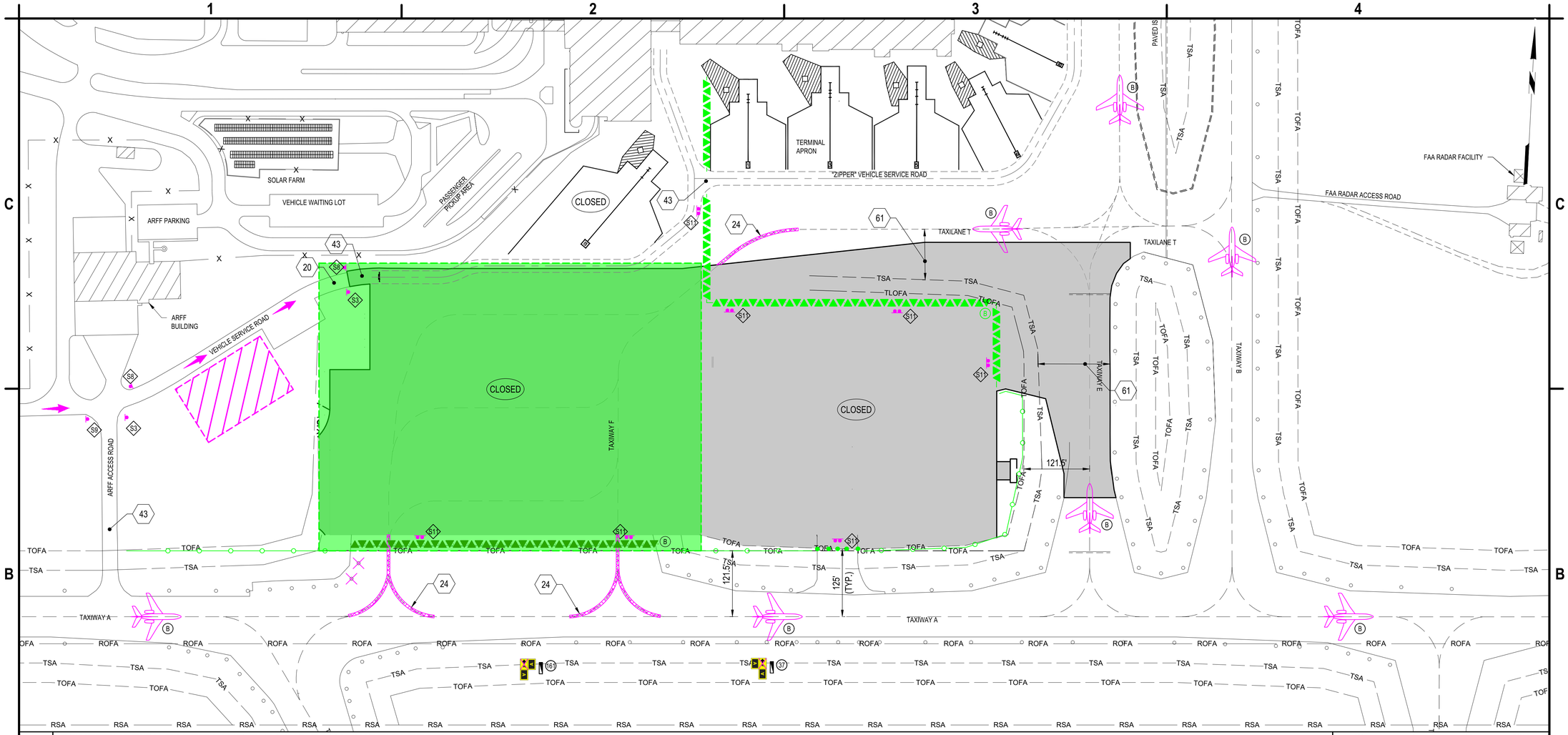
CONSTRUCTION SAFETY AND PHASING PLAN - WORK AREA A3

GC105

SHEET NO. 13 OF 113

Copyright ©

Apr 29, 2026 - 3:39pm
P:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_GC Series.dwg



B1 CONSTRUCTION SAFETY AND PHASING PLAN - WORK AREA B

SCALE: 1" = 100'

100 0 100 200FT.
100'

A1 WORK PHASING NOTES

SCALE: NOT TO SCALE

DESCRIPTION:

- WORK WITHIN TAXIWAY "F" OBJECT FREE AREA INCLUDING AREA OF SOUTH DEICING PAD

AOA OPERATIONAL IMPACTS:

- CLOSE TAXIWAY "F"
- CLOSE SOUTH DEICING PAD
- CLOSE GATE 15

M&PT REQUIREMENTS:

- DE-ENERGIZE, COVER OR REMOVE TAXIWAY "F", EDGE LIGHTS LOCATED WITHIN WORK AREA LIMITS
- COVER OR REMOVE GUIDANCE SIGNS PER PLAN
- PLACE BARRICADES PER PLAN
- TEMPORARILY ERADICATE PAVEMENT MARKINGS AND/OR PROVIDE TEMPORARY PAVEMENT MARKINGS AS SHOWN
- INSTALL TEMPORARY CONSTRUCTION ACCESS CONTROL SIGNS.
- INSTALL TEMPORARY CONSTRUCTION LIMIT FENCING.

CONTRACTOR RESTRICTIONS:

- ALL PAVEMENT ALONG THE CONTRACTOR'S ACCESS ROUTE SHALL BE VACUUM CLEANED AT THE END OF EACH WORKING DAY AND AS NEEDED THROUGHOUT EACH WORKING DAY.
- WORK AREA B MAY BE CONCURRENT WITH WORK AREAS A AND B1.
- THE CONTRACTOR MAY NOT CROSS INTO ANY ACTIVE RUNWAY SAFETY AREA OR TAXIWAY OBJECT FREE AREAS UNLESS THE PAVEMENT IS CLOSED AS PART OF ANOTHER WORK AREA.
- IN THE EVENT THAT CONSTRUCTION IS NOT FULLY COMPLETED PRIOR TO THE START OF AIRCRAFT DEICING SEASON, OCTOBER 15TH - MAY 1ST, THE CONTRACTOR SHALL ENSURE AT LEAST 3 DEICING BAYS ARE FULLY USABLE, EITHER IN THE EXISTING OR PROPOSED CONFIGURATION. THIS REQUIREMENT SHALL BE CONSIDERED AND VERIFIED PRIOR TO BEGINNING WORK AREA B.

A3 KEYED LEGEND

SCALE: NOT TO SCALE

- PROJECT WORK AREA B LIMITS.
- AIRCRAFT TAXI ROUTE, WITH WORK AREA DESIGNATION.
- CONTRACTOR ACCESS AND HAUL ROUTE TO WORK AREAS.
- LOW PROFILE AIRFIELD BARRICADE, WITH WORK AREA DESIGNATION. SEE DETAIL A2/GC501.
- CONTRACTOR PROVIDED ESCORT VEHICLE REQUIRED FOR CROSSING ACTIVE APRON. AIRCRAFT HAVE THE RIGHT-OF-WAY.
- EXISTING LIGHT TO BE TURNED OFF/OBSCURED. SEE DETAIL A1/GC502.
- EXISTING SIGN/SIGN PANEL TO BE PARTIALLY OR FULLY OBSCURED WITH WORK AREA.
- TEMPORARY NO ENTRY CONSTRUCTION SIGN, SEE DETAIL B3/GC501.
- TEMPORARY CONSTRUCTION SIGN, SEE DETAIL B1/GC501 AND C1/GC501.
- TEMPORARY ORANGE CONSTRUCTION FENCE. SEE DETAIL C4/GC501.
- PLASTIC CONSTRUCTION DRUM BARRICADE. SEE DETAIL A3/GC501.
- CONTRACTOR'S STAGING AREA.

A4 KEYED NOTES

SCALE: NOT TO SCALE

20. CONTRACTOR SHALL HAVE A SWEEPER AND/OR VACUUM TRUCK STATIONED AT THIS LOCATION TO KEEP ACTIVE AOA CLEAR OF ALL FOD.
24. EXISTING TAXIWAY CENTERLINE MARKING LEADING TO CLOSED PAVEMENTS SHALL BE TEMPORALLY REMOVED AND RESTORED UPON COMPLETION OF THE PROJECT WORK AREA, ITEM C-106 (TYP.).
43. CONTRACTOR SHALL NEVER BLOCK ARFF ACCESS OR VEHICLE SERVICE ROADS.
61. WORK AREA A2 & A3 MUST BE SUBSTANTIALLY COMPLETED AND OPEN TO AIRCRAFT PRIOR TO STARTING WORK AREA B, INCLUDING SURFACE STANDARDS UP TO THE TSA.

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · LICENSED PROFESSIONAL ENGINEER · NO. 083424

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	M. HERNANDEZ
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

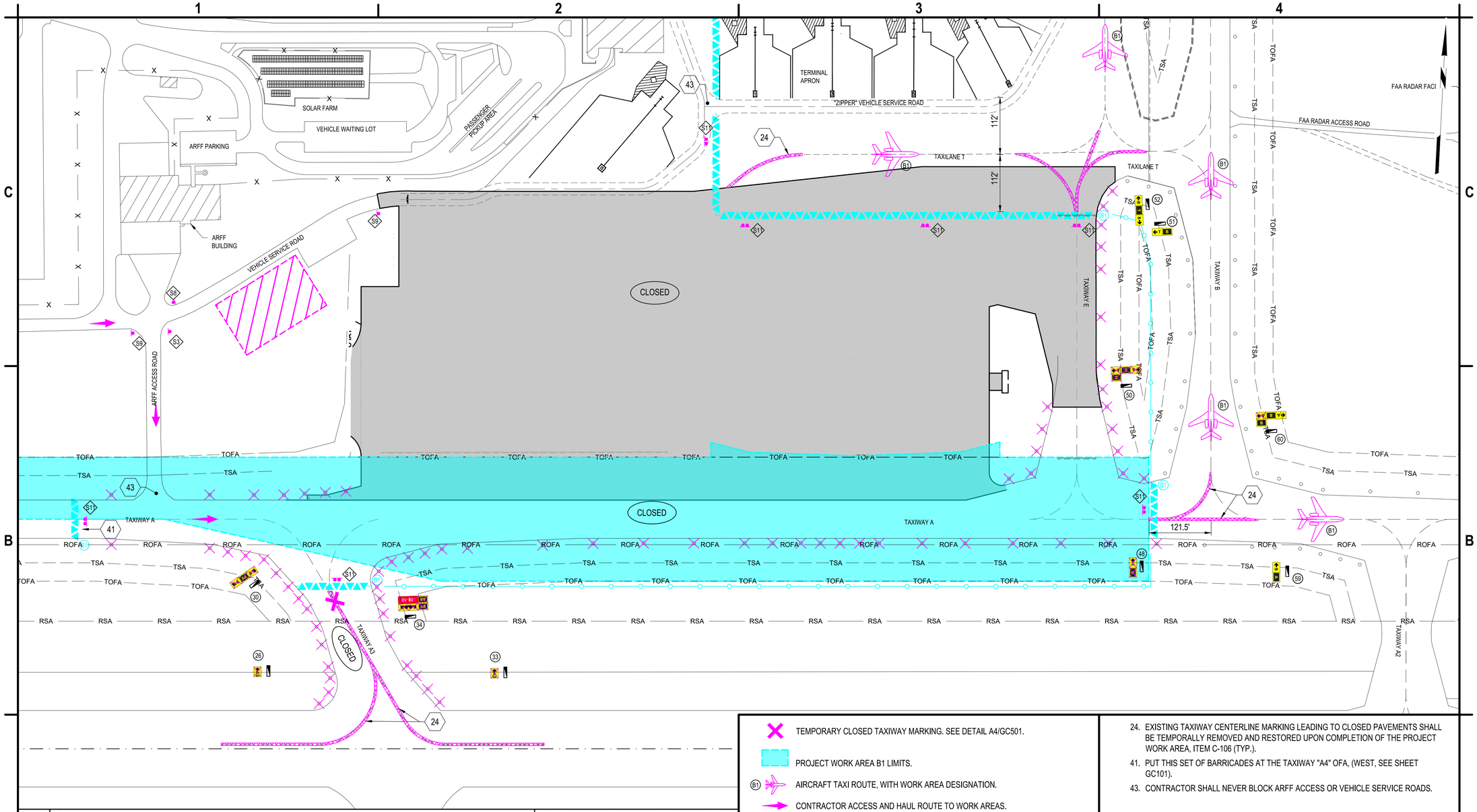
CONSTRUCTION SAFETY AND PHASING PLAN - WORK AREA B

GC106

SHEET NO. 14 OF 113

Copyright ©

Apr 29, 2026 - 3:39pm
P:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_GC Series.dwg



B1 CONSTRUCTION SAFETY AND PHASING PLAN - WORK AREA B1

SCALE: 1" = 100'

100 0 100 200FT.
100'

DESCRIPTION:

- WORK WITHIN TAXIWAY "A" OBJECT FREE AREA INCLUDING AREA OF SOUTH DEICING PAD, EAST OF TAXIWAY "Z" AND WEST OF TAXIWAY "E"

AOA OPERATIONAL IMPACTS:

- CLOSE A PORTION OF TAXIWAY "A", LOCATED BETWEEN TAXIWAY "A4" AND TAXIWAY "B"
- CLOSE TAXIWAY "E"
- CLOSE TAXIWAY "A3"
- CLOSE SOUTH DEICING PAD
- CLOSE GATE 15

M&PT REQUIREMENTS:

- DE-ENERGIZE, COVER OR REMOVE TAXIWAY "A", EDGE LIGHTS LOCATED WITHIN WORK AREA LIMITS
- COVER OR REMOVE GUIDANCE SIGNS PER PLAN
- PLACE BARRICADES PER PLAN
- TEMPORARILY ERADICATE PAVEMENT MARKINGS AND/OR PROVIDE TEMPORARY PAVEMENT MARKINGS AS SHOWN
- INSTALL TEMPORARY CONSTRUCTION ACCESS CONTROL SIGNS.
- INSTALL TEMPORARY CONSTRUCTION LIMIT FENCING.

CONTRACTOR RESTRICTIONS:

- WORK AREA B1 MAY BE CONCURRENT WITH WORK AREA A, B, C AND D.
- WORK AREA B1 CANNOT BE CONCURRENT WITH WORK AREAS A1, A2 AND A3.
- THE CONTRACTOR MAY NOT CROSS INTO ANY ACTIVE RUNWAY SAFETY AREA OR TAXIWAY OBJECT FREE AREAS UNLESS THE PAVEMENT IS CLOSED AS PART OF ANOTHER WORK AREA.

A1 WORK PHASING NOTES

SCALE: NOT TO SCALE

- TEMPORARY CLOSED TAXIWAY MARKING. SEE DETAIL A4/GC501.
- PROJECT WORK AREA B1 LIMITS.
- AIRCRAFT TAXI ROUTE, WITH WORK AREA DESIGNATION.
- CONTRACTOR ACCESS AND HAUL ROUTE TO WORK AREAS.
- LOW PROFILE AIRFIELD BARRICADE, WITH WORK AREA DESIGNATION. SEE DETAIL A2/GC501.
- CONTRACTOR PROVIDED ESCORT VEHICLE REQUIRED FOR CROSSING ACTIVE APRON. AIRCRAFT HAVE THE RIGHT-OF-WAY.
- EXISTING LIGHT TO BE TURNED OFF/OBSCURED. SEE DETAIL A1/GC502.
- EXISTING SIGN/SIGN PANEL TO BE PARTIALLY OR FULLY OBSCURED WITH WORK AREA.
- TEMPORARY NO ENTRY CONSTRUCTION SIGN, SEE DETAIL B3/GC501.
- TEMPORARY CONSTRUCTION SIGN, SEE DETAIL B1/GC501 AND C1/GC501.
- TEMPORARY ORANGE CONSTRUCTION FENCE. SEE DETAIL C4/GC501, ITEM C-106.
- PLASTIC CONSTRUCTION DRUM BARRICADE. SEE DETAIL A3/GC501.
- CONTRACTOR'S STAGING AREA.

A3 KEYED LEGEND

SCALE: NOT TO SCALE

24. EXISTING TAXIWAY CENTERLINE MARKING LEADING TO CLOSED PAVEMENTS SHALL BE TEMPORALLY REMOVED AND RESTORED UPON COMPLETION OF THE PROJECT WORK AREA, ITEM C-106 (TYP.).
41. PUT THIS SET OF BARRICADES AT THE TAXIWAY "A4" OFA, (WEST, SEE SHEET GC101).
43. CONTRACTOR SHALL NEVER BLOCK ARFF ACCESS OR VEHICLE SERVICE ROADS.

A4 KEYED NOTES

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · LICENSED PROFESSIONAL ENGINEER · NO. 083424

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	M. HERNANDEZ
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

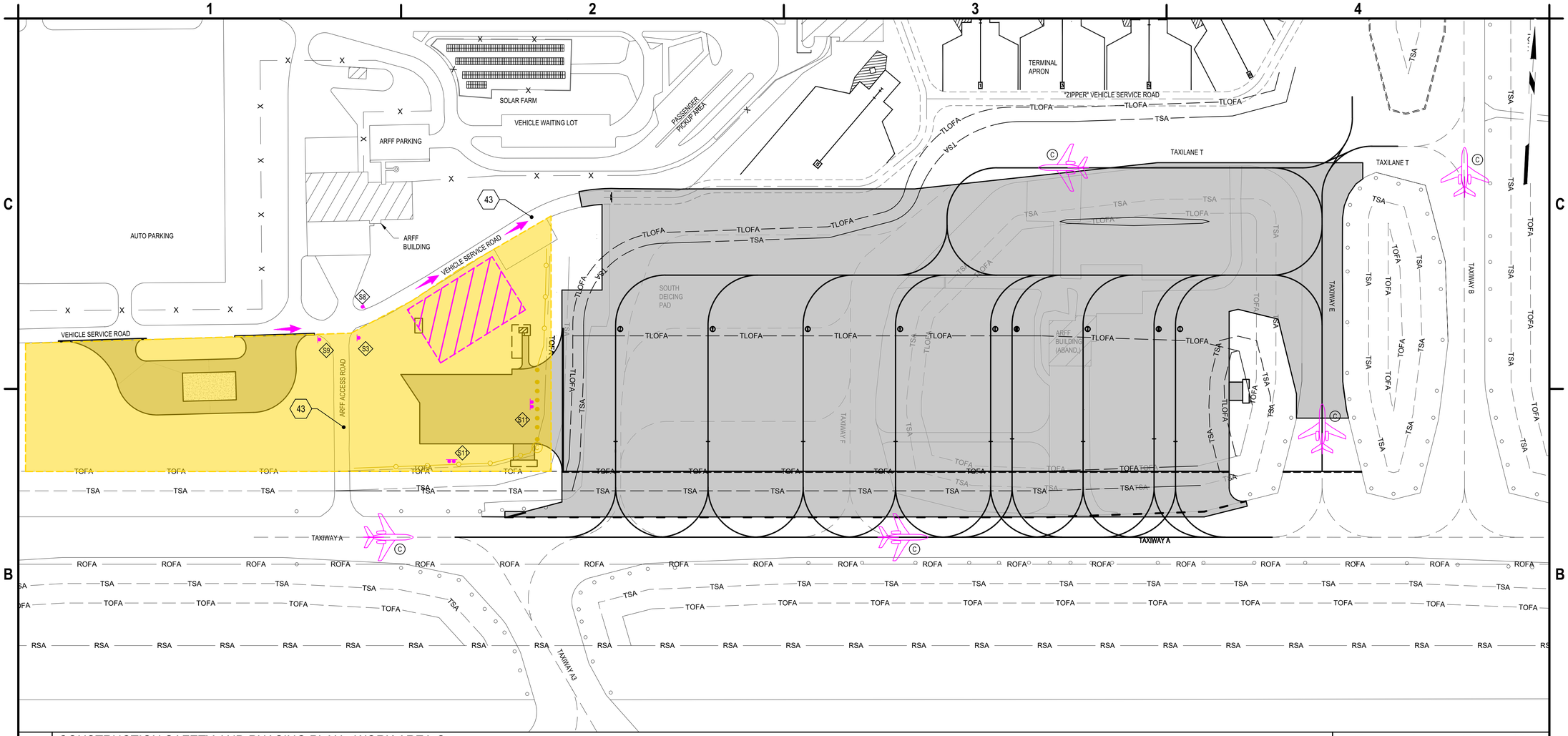
CONSTRUCTION SAFETY AND PHASING PLAN - WORK AREA B1

GC107

SHEET NO. 15 OF 113

Copyright ©

Apr 29, 2026 - 3:31pm
P:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_GC Series.dwg



B1 CONSTRUCTION SAFETY AND PHASING PLAN - WORK AREA C

SCALE: 1" = 100'

100 0 100 200FT.
100'

A1 WORK PHASING NOTES

SCALE: NOT TO SCALE

DESCRIPTION:

- WORK NORTH OF TAXIWAY "A" OBJECT FREE AREA INCLUDING AREA WEST OF SOUTH DEICING PAD

AOA OPERATIONAL IMPACTS:

- NONE

M&PT REQUIREMENTS:

- WORK AREA C CAN BE COMPLETED ANYTIME
- PLACE BARRICADES PER PLAN

CONTRACTOR RESTRICTIONS:

- ALL PAVEMENT ALONG THE CONTRACTOR'S ACCESS ROUTE SHALL BE VACUUM CLEANED AT THE END OF EACH WORKING DAY AND AS NEEDED THROUGHOUT EACH WORKING DAY.
- WORK AREA C MAY BE CONCURRENT WITH ANY WORK AREA.
- THE CONTRACTOR MAY NOT CROSS INTO ANY ACTIVE RUNWAY SAFETY AREA OR TAXIWAY OBJECT FREE AREAS UNLESS THE PAVEMENT IS CLOSED AS PART OF ANOTHER WORK AREA.

A3 KEYED LEGEND

SCALE: NOT TO SCALE

- PROJECT WORK AREA C LIMITS.
- AIRCRAFT TAXI ROUTE, WITH WORK AREA DESIGNATION.
- CONTRACTOR ACCESS AND HAUL ROUTE TO WORK AREAS.
- LOW PROFILE AIRFIELD BARRICADE, WITH WORK AREA DESIGNATION. SEE DETAIL A2/GC501.
- CONTRACTOR PROVIDED ESCORT VEHICLE REQUIRED FOR CROSSING ACTIVE APRON. AIRCRAFT HAVE THE RIGHT-OF-WAY.
- TEMPORARY NO ENTRY CONSTRUCTION SIGN, SEE DETAIL B3/GC501.
- TEMPORARY CONSTRUCTION SIGN, SEE DETAIL B1/GC501 AND C1/GC501.
- TEMPORARY ORANGE CONSTRUCTION FENCE. SEE DETAIL C4/GC501.
- PLASTIC CONSTRUCTION DRUM BARRICADE. SEE DETAIL A3/GC501.
- CONTRACTOR'S STAGING AREA.

A4 KEYED NOTES

SCALE: NOT TO SCALE

43. CONTRACTOR SHALL NEVER BLOCK ARFF ACCESS OR VEHICLE SERVICE ROADS.

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK
CHRISTOPHER D. BRUBACH
LICENSED PROFESSIONAL ENGINEER
NO. 083424

SYR
SYRACUSE
HANCOCK
INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	M. HERNANDEZ
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

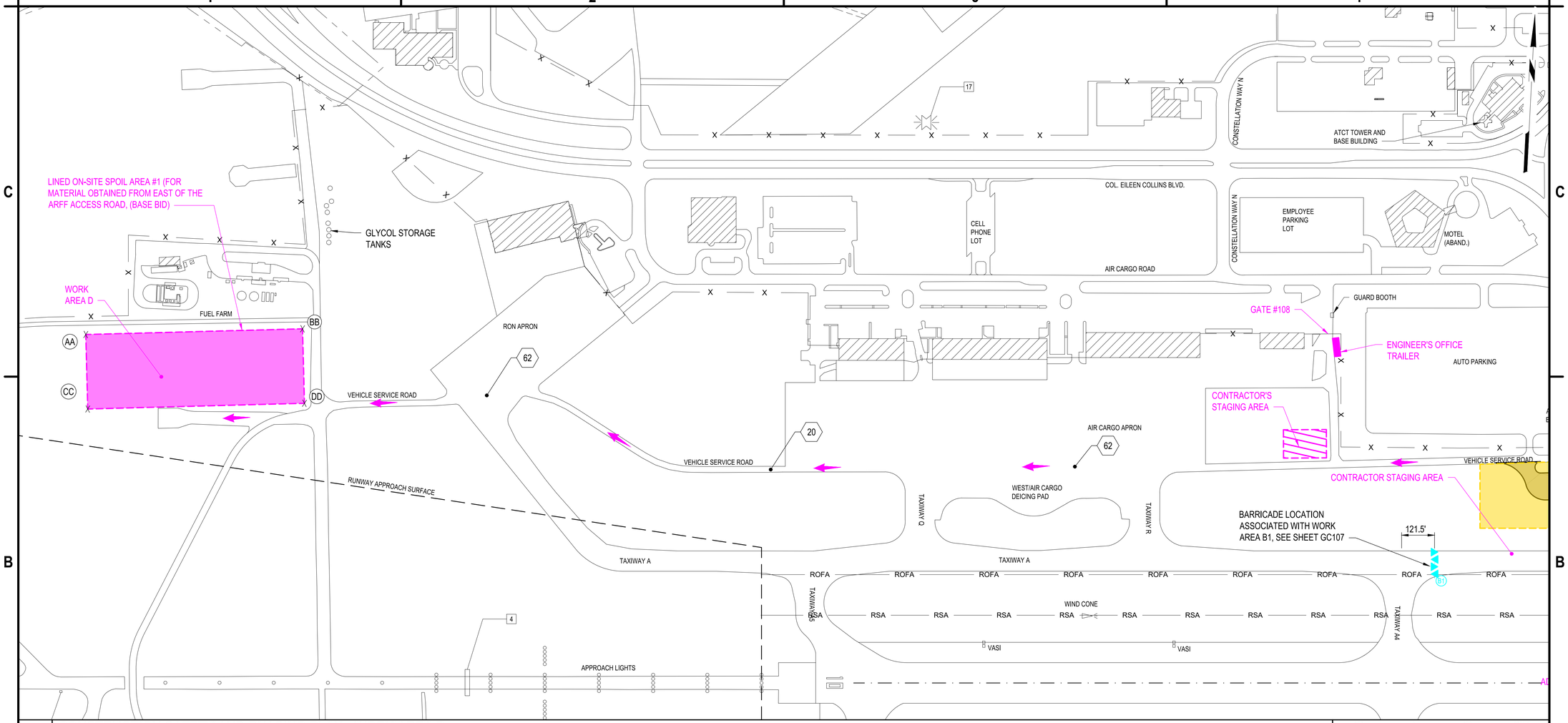
CONSTRUCTION SAFETY AND PHASING PLAN - WORK AREA C

GC108

SHEET NO. 16 OF 113

Copyright ©

Apr 29, 2026 - 3:31pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_GC_Series.dwg



B1 CONSTRUCTION SAFETY AND PHASING PLAN - WORK AREA D

SCALE: 1" = 200'

200 0 200 400FT.
200'

DESCRIPTION:

- ON SITE SPOIL SITE

AOA OPERATIONAL IMPACTS:

- NONE

M&PT REQUIREMENTS:

- WORK AREA D CAN BE COMPLETED ANYTIME

CONTRACTOR RESTRICTIONS:

- ALL PAVEMENT ALONG THE CONTRACTOR'S ACCESS ROUTE SHALL BE VACUUM CLEANED AT THE END OF EACH WORKING DAY AND AS NEEDED THROUGHOUT EACH WORKING DAY.
- WORK AREA D MAY BE CONCURRENT WITH ANY WORK AREA.
- THE CONTRACTOR MAY NOT CROSS INTO ANY ACTIVE RUNWAY SAFETY AREA OR TAXIWAY OBJECT FREE AREAS UNLESS THE PAVEMENT IS CLOSED AS PART OF ANOTHER WORK AREA.

A1 WORK PHASING NOTES

SCALE: NOT TO SCALE

- PROJECT WORK AREA D LIMITS.
- (X) AIRCRAFT TAXI ROUTE, WITH WORK AREA DESIGNATION.
- CONTRACTOR ACCESS AND HAUL ROUTE TO WORK AREAS.
- (X) LOW PROFILE AIRFIELD BARRICADE, WITH WORK AREA DESIGNATION. SEE DETAIL A2/GC501.
- CONTRACTOR PROVIDED ESCORT VEHICLE REQUIRED FOR CROSSING ACTIVE APRON. AIRCRAFT HAVE THE RIGHT-OF-WAY.
- TEMPORARY ORANGE CONSTRUCTION FENCE. SEE DETAIL C4/GC501.
- PLASTIC CONSTRUCTION DRUM BARRICADE. SEE DETAIL A3/GC501.
- CONTRACTOR'S STAGING AREA.

A3 KEYED LEGEND

SCALE: NOT TO SCALE

20. CONTRACTOR SHALL HAVE A SWEEPER AND/OR VACUUM TRUCK STATIONED AT THIS LOCATION TO KEEP ACTIVE AOA CLEAR OF ALL FOD.
62. CONTRACTOR TO PROVIDE VEHCILE ESCORT FOR ALL TRUCKING OPERATIONS ACROSS THE RON AND CARGO APRON.

A4 KEYED NOTES

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · NO. 083424 · LICENSED PROFESSIONAL ENGINEER

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	M. HERNANDEZ
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

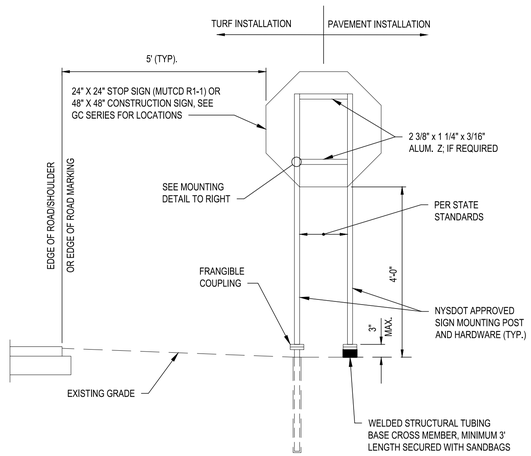
CONSTRUCTION SAFETY AND PHASING PLAN - WORK AREA D

GC109

SHEET NO. 17 OF 113

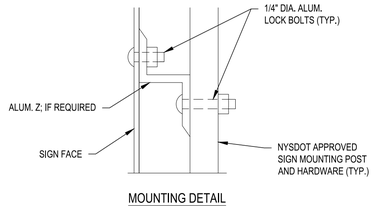
Copyright ©

Apr 29, 2026 - 3:31pm
P:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_GC Series.dwg



C1 TEMPORARY CONSTRUCTION SIGN ASSEMBLY DETAIL

SCALE: NOT TO SCALE



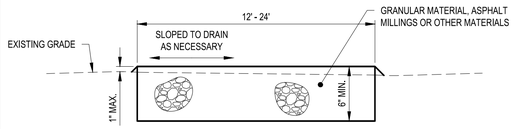
MOUNTING DETAIL

NOTES:

1. COST FOR FURNISHING, INSTALLING, MAINTAINING AND REMOVAL OF TEMPORARY SIGNS SHALL BE INCLUDED UNDER ITEM C-106.
2. ALL SIGNS SHALL CONFORM IN SIZE, APPEARANCE AND RELECTORIZATION TO THE REQUIREMENTS OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
3. AT PROJECT COMPLETION, ALL POSTS AND SIGNS SHALL BE REMOVED FROM AIRPORT PROPERTY AND SHALL REMAIN PROPERTY OF THE CONTRACTOR.
4. SIGNS SHALL NOT BE INSTALLED WITHIN ANY ACTIVE RSA, TSA, TOFA OR ROFA.

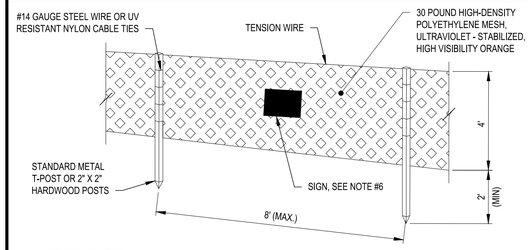
NOTE:

1. THE ROAD HAS BEEN CONSTRUCTED BY OTHERS UNDER THE TAXIWAY "B" REHABILITATION PROJECT.
2. THE ROAD AND STORMWATER PIPES SHALL BE REMOVED AND THE SURFACE GRADED AND RESTORED TO ORIGINAL CONDITION AFTER CONSTRUCTION. SITE RESTORATION SHALL INCLUDE REMOVAL OF GRANULAR MATERIALS. GEOTEXTILE, TOPSOIL REPLACEMENT AND SEEDING AND MULCHING. THE COST FOR ROAD REMOVAL AND RESTORATION SHALL BE INCLUDED UNDER ITEM C-106.



C3 EXISTING TEMPORARY HAUL ROAD DETAIL

SCALE: NOT TO SCALE

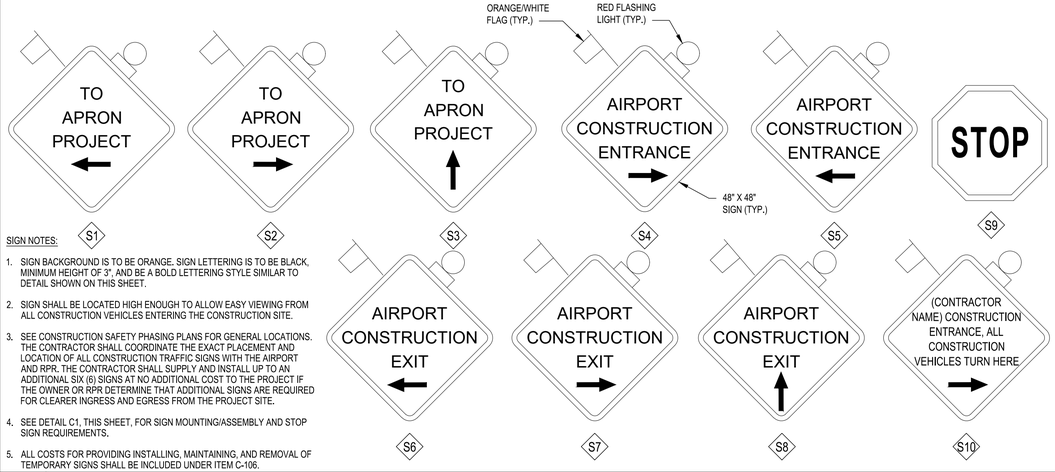


SAFETY FENCE NOTES:

1. COST FOR FURNISHING, INSTALLING, MAINTAINING AND REMOVAL OF SAFETY FENCE SHALL BE INCLUDED UNDER ITEM C-106.
2. THE RPR MAY REQUIRE A STRONGER FENCE FABRIC, CLOSER SPACE POSTS, AND/OR BRACES IN AREAS SUBJECT TO JET BLAST.
3. AT PROJECT COMPLETION, ALL FENCE POSTS AND FABRIC SHALL BE REMOVED FROM AIRPORT PROPERTY AND SHALL REMAIN PROPERTY OF THE CONTRACTOR.
4. FENCE SHALL BE INSTALLED WITH THE FABRIC ON THE CONTRACTORS WORK AREA SIDE OF THE POST. FENCE SHALL BE NOT BE LOCATED WITHIN ANY ACTIVE RUNWAY SAFETY AREA OR TAXIWAY OBJECT FREE AREA
5. FENCE SHALL BE MAINTAINED FOR THE PROJECT DURATION AND REPAIRED IMMEDIATELY AS REQUESTED BY AIRPORT OPERATIONS OR THE RPR. THE CONTRACTOR SHALL ASSURE THAT THE MATERIALS DO NOT BECOME LOOSE, CREATING FOD.
6. PROVIDE PLASTIC/VINYL SIGNS AT 500' INTERVALS SECURED TO THE FINAL FENCE/POSTS WITH WIRE OR CABLE TIES. SIGN MESSAGE AS FOLLOWS: "NO ENTRY AUTHORIZED PERSONNEL ONLY"

C4 CONSTRUCTION FENCE DETAIL

SCALE: NOT TO SCALE

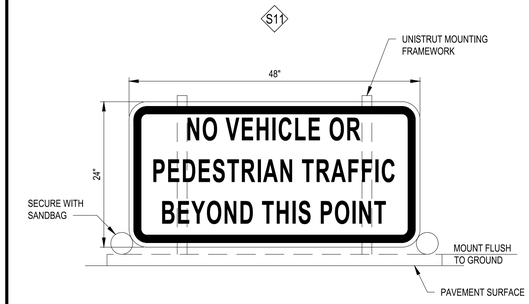


SIGN NOTES:

1. SIGN BACKGROUND IS TO BE ORANGE. SIGN LETTERING IS TO BE BLACK, MINIMUM HEIGHT OF 3", AND BE A BOLD LETTERING STYLE SIMILAR TO DETAIL SHOWN ON THIS SHEET.
2. SIGN SHALL BE LOCATED HIGH ENOUGH TO ALLOW EASY VIEWING FROM ALL CONSTRUCTION VEHICLES ENTERING THE CONSTRUCTION SITE.
3. SEE CONSTRUCTION SAFETY PHASING PLANS FOR GENERAL LOCATIONS. THE CONTRACTOR SHALL COORDINATE THE EXACT PLACEMENT AND LOCATION OF ALL CONSTRUCTION TRAFFIC SIGNS WITH THE AIRPORT AND RPR. THE CONTRACTOR SHALL SUPPLY AND INSTALL UP TO AN ADDITIONAL SIX (6) SIGNS AT NO ADDITIONAL COST TO THE PROJECT IF THE OWNER OR RPR DETERMINE THAT ADDITIONAL SIGNS ARE REQUIRED FOR CLEARER INGRESS AND EGRESS FROM THE PROJECT SITE.
4. SEE DETAIL C1, THIS SHEET, FOR SIGN MOUNTING/ASSEMBLY AND STOP SIGN REQUIREMENTS.
5. ALL COSTS FOR PROVIDING INSTALLING, MAINTAINING, AND REMOVAL OF TEMPORARY SIGNS SHALL BE INCLUDED UNDER ITEM C-106.

B1 TEMPORARY CONSTRUCTION SIGN DETAIL

SCALE: NOT TO SCALE

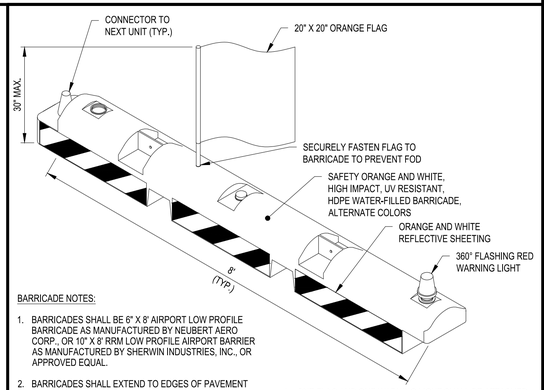


NOTES:

1. SIGN BACKGROUND IS TO BE RED. SIGN LETTERING IS TO BE WHITE, MINIMUM HEIGHT OF 3", AND BE A BOLD LETTERING STYLE SIMILAR TO DETAIL SHOWN ON THIS SHEET.
2. SEE CONSTRUCTION SAFETY PHASING PLANS FOR GENERAL LOCATIONS. THE CONTRACTOR SHALL COORDINATE THE EXACT PLACEMENT AND LOCATION OF ALL CONSTRUCTION TRAFFIC SIGNS WITH THE AIRPORT AND RPR.
3. ALL COSTS FOR PROVIDING INSTALLING, MAINTAINING, AND REMOVAL OF TEMPORARY SIGNS SHALL BE INCLUDED UNDER ITEM C-106.
4. PLACE AT AIRFIELD BARRICADE LIMITS.

B3 TEMPORARY NO ENTRY CONSTRUCTION SIGN DETAIL

SCALE: NOT TO SCALE

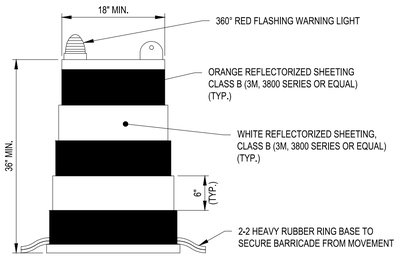


BARRICADE NOTES:

1. BARRICADES SHALL BE 6" X 8' AIRPORT LOW PROFILE BARRICADE AS MANUFACTURED BY NEUBERT AERO CORP., OR 10" X 8' RRM LOW PROFILE AIRPORT BARRIER AS MANUFACTURED BY SHERWIN INDUSTRIES, INC., OR APPROVED EQUAL.
2. BARRICADES SHALL EXTEND TO EDGES OF PAVEMENT UNLESS OTHERWISE SHOWN. EXACT LOCATIONS SHALL BE DETERMINED DURING CONSTRUCTION.
3. BARRICADES SHALL BE FILLED WITH WATER AND INTERLOCKED WITH EACH OTHER. BARRICADES WHICH HAVE TO BE MOVED DAILY MAY BE ANCHORED TO THE PAVEMENT BY AN ALTERNATE METHOD APPROVED BY AIRPORT OPERATION OR THE RPR.
4. ONE FLAG AND ONE WARNING LIGHT SHALL BE ATTACHED TO EACH BARRICADE.
5. IN AREAS OF JET BLAST, USE METAL STRAPS AND EXPANSION ANCHORS TO SECURE BARRICADES TO THE PAVEMENT.
6. ALL COSTS ASSOCIATED WITH DETAIL TO BE PAID UNDER ITEM C-106.

A2 INTERLOCKING AIRFIELD BARRICADE DETAIL

SCALE: NOT TO SCALE

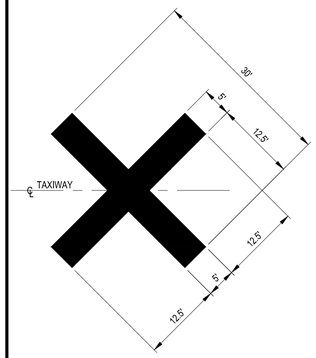


NOTES:

1. DRUM BARRICADES SHALL NOT BE USED IN ANY TAXIWAY AND/OR RUNWAY SAFETY AREA OR TAXIWAY AND/OR RUNWAY OBJECT FREE AREA.
2. THE INTENT FOR DRUM BARRICADES IS TO CONTROL CONSTRUCTION EQUIPMENT FROM ENTERING AIRPORT OPERATING AREAS.]
3. ALL COSTS ASSOCIATED WITH DETAIL TO BE PAID UNDER ITEM C-106.

A3 PLASTIC DRUM BARRICADE DETAIL

SCALE: NOT TO SCALE



NOTES:

1. CLOSED TAXIWAY MARKINGS SHALL BE YELLOW AS MANUFACTURED BY NEUBERT AERO CORP., TAMPA FLA., OR APPROVED EQUAL. IN LIEU THEREOF, CONTRACTOR MAY CONSTRUCT CLOSED TAXIWAY MARKINGS FROM ANY OF THE FOLLOWING MATERIALS: DOUBLE-LAYERED PAINTED SNOW FENCE, COLORED PLASTIC, PAINTED SHEETS OF PLYWOOD, OR SIMILAR MATERIALS.
2. CLOSED TAXIWAY MARKINGS SHALL BE SECURED TO PREVENT MOVEMENT BY PROP WASH, JET BLAST, OR OTHER WIND CURRENTS.
3. ALL COSTS ASSOCIATED WITH DETAIL TO BE PAID UNDER ITEM C-106.

A4 CLOSED TAXIWAY MARKING DETAIL

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · NO. 083424 · LICENSED PROFESSIONAL ENGINEER

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

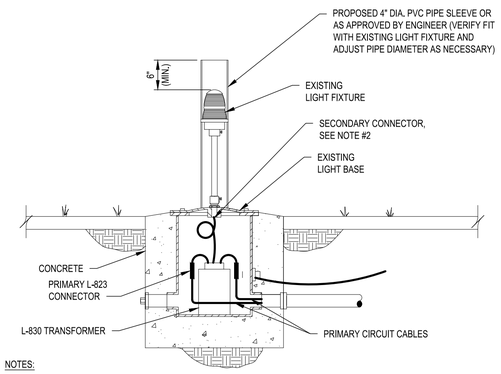
CONSTRUCTION SAFETY AND PHASING DETAILS

GC501

SHEET NO. 18 OF 113

Copyright ©

Apr 29, 2026 - 2:31pm
F:\Project\O68 - Syracuse Regional Airport Authority\O68069001 - Como Deicing Pad\Design\CADD\Sheet Files\O68069001_GC Details.dwg

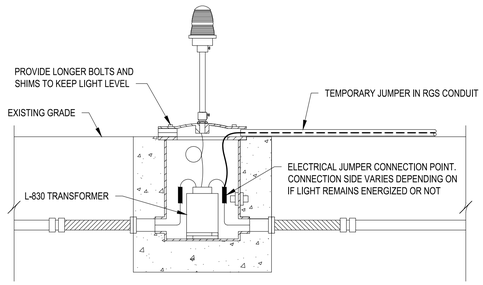


NOTES:

1. ALL COSTS ASSOCIATED WITH EDGE LIGHT COVERS SHALL BE INCLUDED IN ITEM C-106.
2. THE CONTRACTOR MAY ELECT TO DISCONNECT THE LIGHT AT THE TRANSFORMER SECONDARY L-823 CONNECTION AT NO ADDITIONAL COST. CIRCUIT CONNECTIVITY MUST BE MAINTAINED FOR THOSE SECTIONS OF TAXIWAY / RUNWAY NOT CLOSED TO AIRCRAFT TRAFFIC.
3. EDGE LIGHT COVERS ARE NOT REQUIRED ON LIGHTS THAT ARE COMPLETELY DE-ENERGIZED VIA ELECTRICAL JUMPERS.

A1 TEMPORARY EDGE LIGHT COVER DETAIL

SCALE: NOT TO SCALE

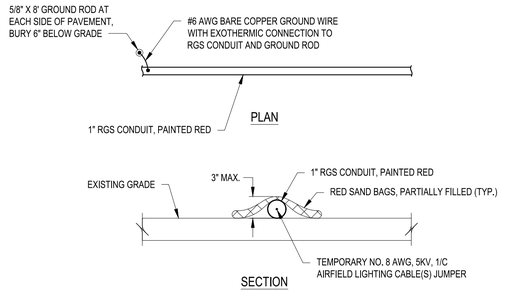


NOTES:

1. ALL COSTS ASSOCIATED WITH FURNISHING, MAINTAINING, AND REMOVAL OF ELECTRICAL JUMPER CONNECTIONS SHALL BE INCLUDED UNDER ITEM C-106, SAFETY, SECURITY AND MAINTENANCE OF TRAFFIC.

A2 ELECTRICAL JUMPER CONNECTION DETAIL

SCALE: NOT TO SCALE



NOTES:

1. CONNECT CABLES AT EXISTING TRANSFORMER OR AT EXISTING CABLE SPLICE POINTS. DO NOT INTRODUCE ANY NEW SPLICES.
2. CONDUIT STRAPS WITH MASONRY FASTENERS MAY BE USED IN LIEU OF SANDBAGS, ONLY ON PAVEMENT TO BE DEMOLISHED. FASTENERS SHALL NOT BE USED ON NEW PAVEMENT OR EXISTING PAVEMENT TO REMAIN. SPACING SHALL NOT EXCEED 5 FEET.
3. ALL COSTS ASSOCIATED WITH FURNISHING, MAINTAINING, AND REMOVAL OF TEMPORARY JUMPER CABLES SHALL BE INCLUDED UNDER ITEM C-106, SAFETY, SECURITY AND MAINTENANCE OF TRAFFIC.
4. TEMPORARY CABLE IN GRASS AREAS SHALL BE MARKED WITH STAKES AND FLAGGING. TEMPORARY CABLES IN PAVED AREAS SHALL BE MARKED WITH BARRICADES.
5. THE CONTRACTOR MAY ELECT TO USE TRAFFIC RATED, INTERCONNECTING CHANNEL CABLE GUARDS AT NO ADDITIONAL COST

A3 TEMPORARY JUMPER CONDUIT DETAIL

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK
CHRISTOPHER D. BRUBACH
LICENSED PROFESSIONAL ENGINEER
NO. 083424

SYR
SYRACUSE
HANCOCK
INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

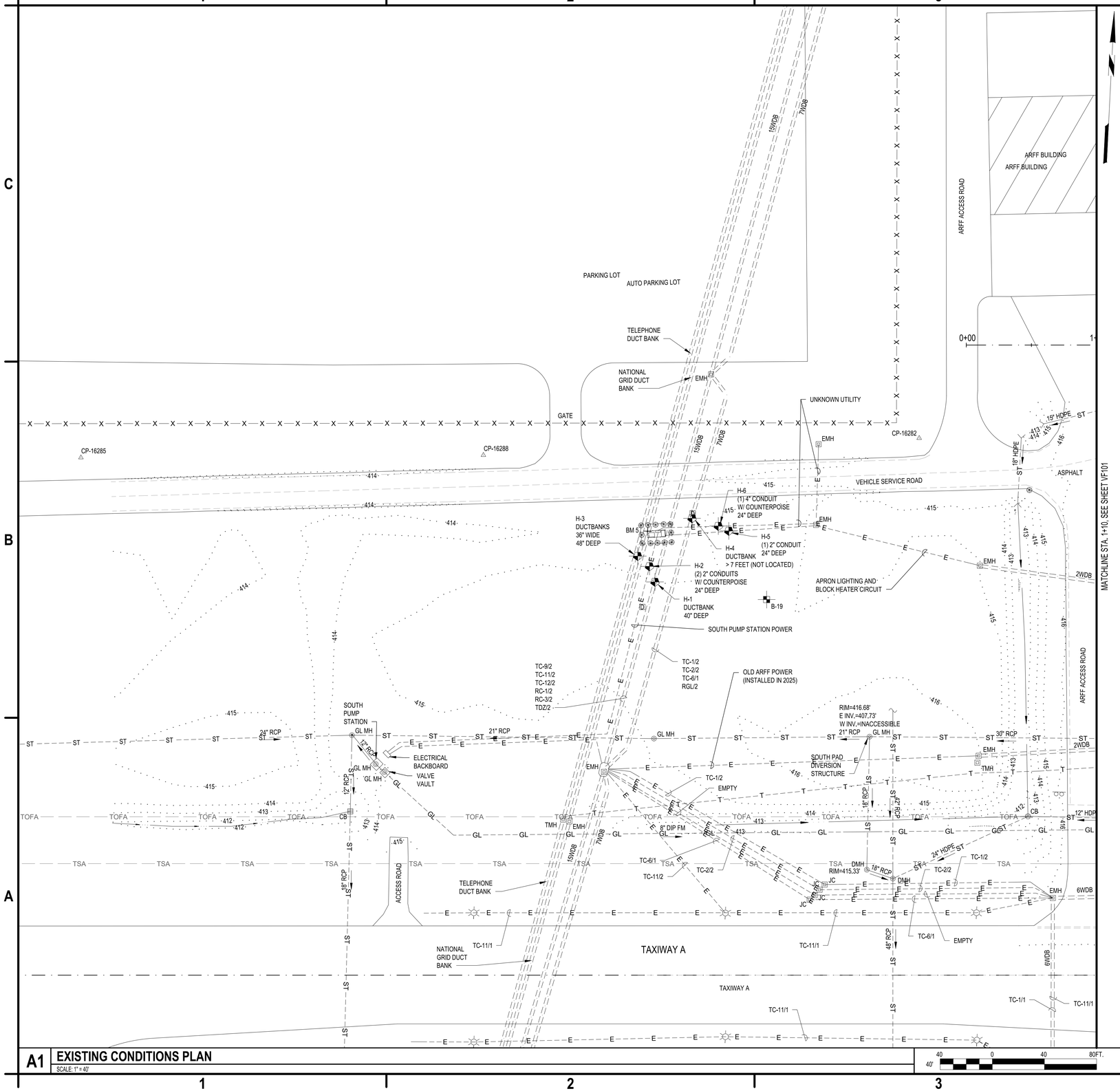
CONSTRUCTION SAFETY AND PHASING DETAILS

GC502

SHEET NO. 19 OF 113

Copyright ©

Apr 29, 2026 - 3:31pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Como Deicing Pad\Design\CADD\Sheet Files\O68069001_GC Details.dwg



SOFT-DIG INVESTIGATION, PERFORMED BY HYRDO X, LCC, ON APRIL 2ND 2026

A1 EXISTING CONDITIONS PLAN
SCALE: 1" = 40'

40' 40 0 40 80FT.

A4 LEGEND
SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK
CHRISTOPHER D. BRUBACH
LICENSED PROFESSIONAL ENGINEER
NO. 083424

SYR
SYRACUSE
HANCOCK
INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
REVISIONS		

PROJECT NO:	068.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	J. CONESE
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

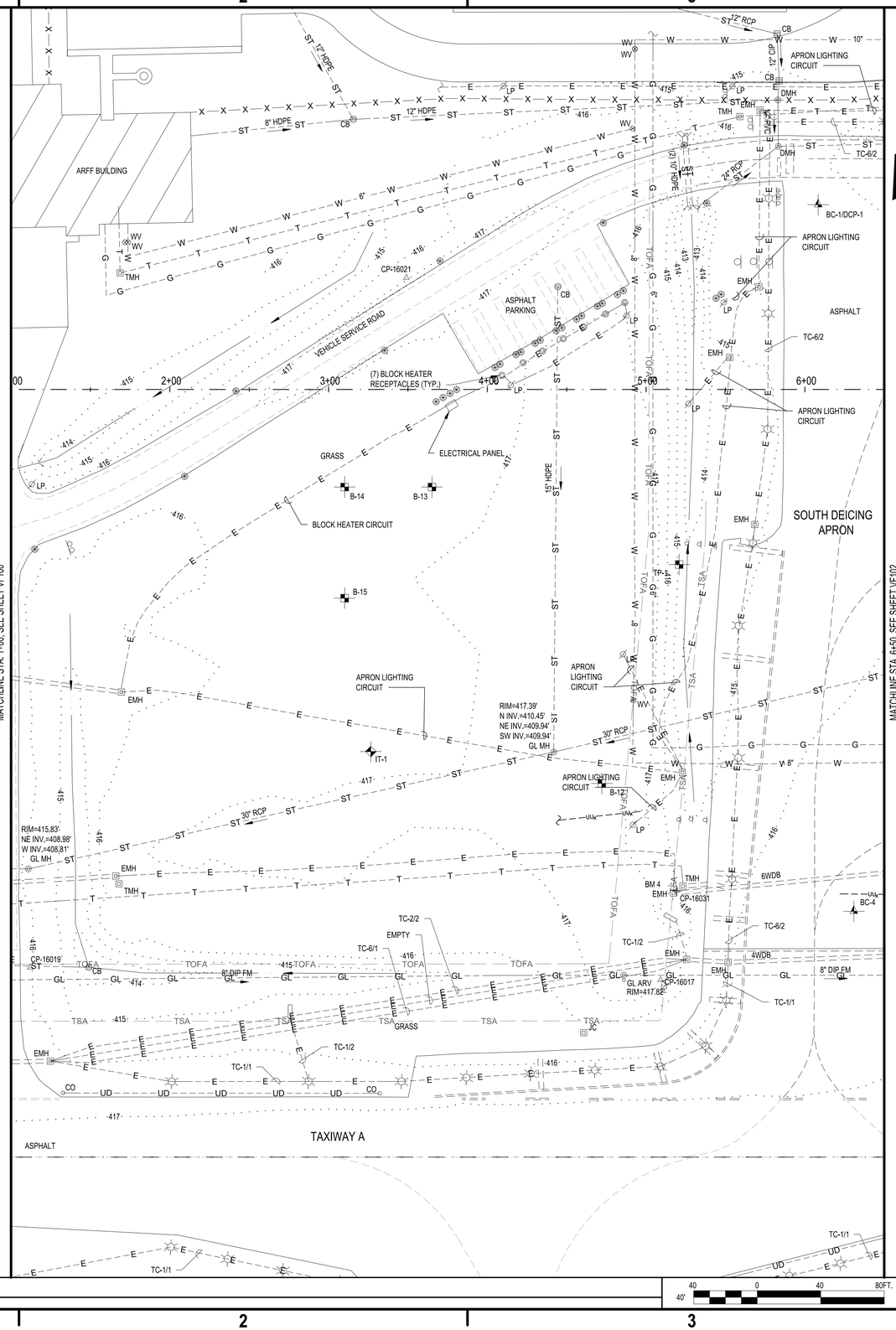
EXISTING CONDITIONS PLAN

VF100

SHEET NO. 20 OF 113

Copyright ©

Apr 29, 2026 - 3:31pm
F:\Project\C068 - Syracuse Regional Airport Authority\C068069001 - Comp Deicing Pad\Design\CADD\Sheet Files\C068069001_VF Series.dwg



A1 **EXISTING CONDITIONS PLAN**
SCALE: 1" = 40'

40' 40 0 40 80FT.

Apr 29, 2026 - 3:31pm
F:\Project\O68 - Syracuse Regional Airport Authority\O68069001 - Como Deicing Pad\Design\CADD\Sheet Files\O68069001_VF Series.dwg

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK
CHRISTOPHER D. BRUBACH
LICENSED PROFESSIONAL ENGINEER
NO. 083424

SYR
SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

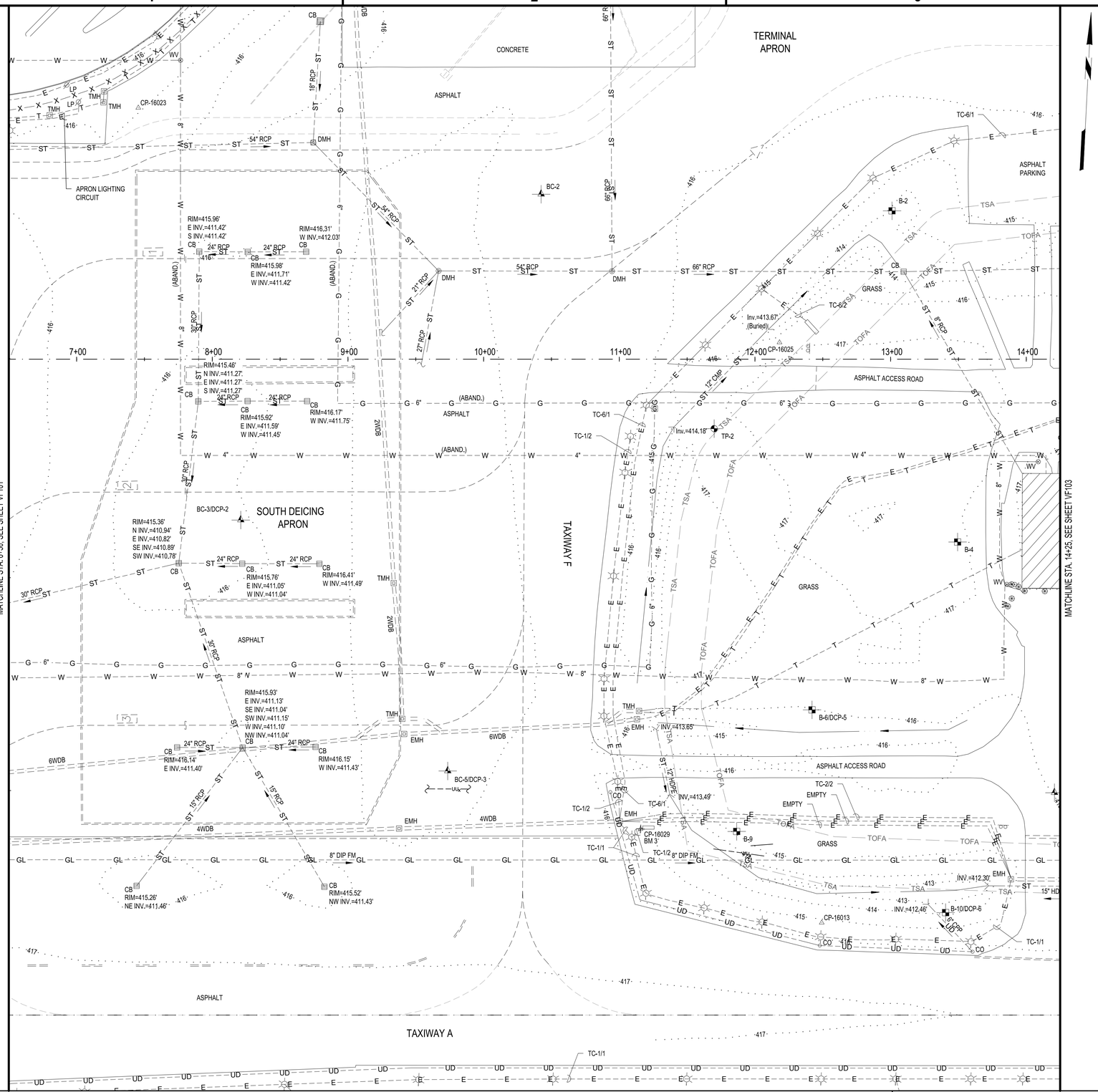
NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

EXISTING CONDITIONS PLAN

VF101

SHEET NO. 21 OF 113

Copyright ©



A1 **EXISTING CONDITIONS PLAN**
SCALE: 1" = 40'

40' 40 0 40 80FT.

Apr 29, 2026 - 3:31pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Como Deicing Pad\Design\CADD\Sheet Files\O68069001_VF Series.dwg

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · LICENSED PROFESSIONAL ENGINEER · NO. 083424

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

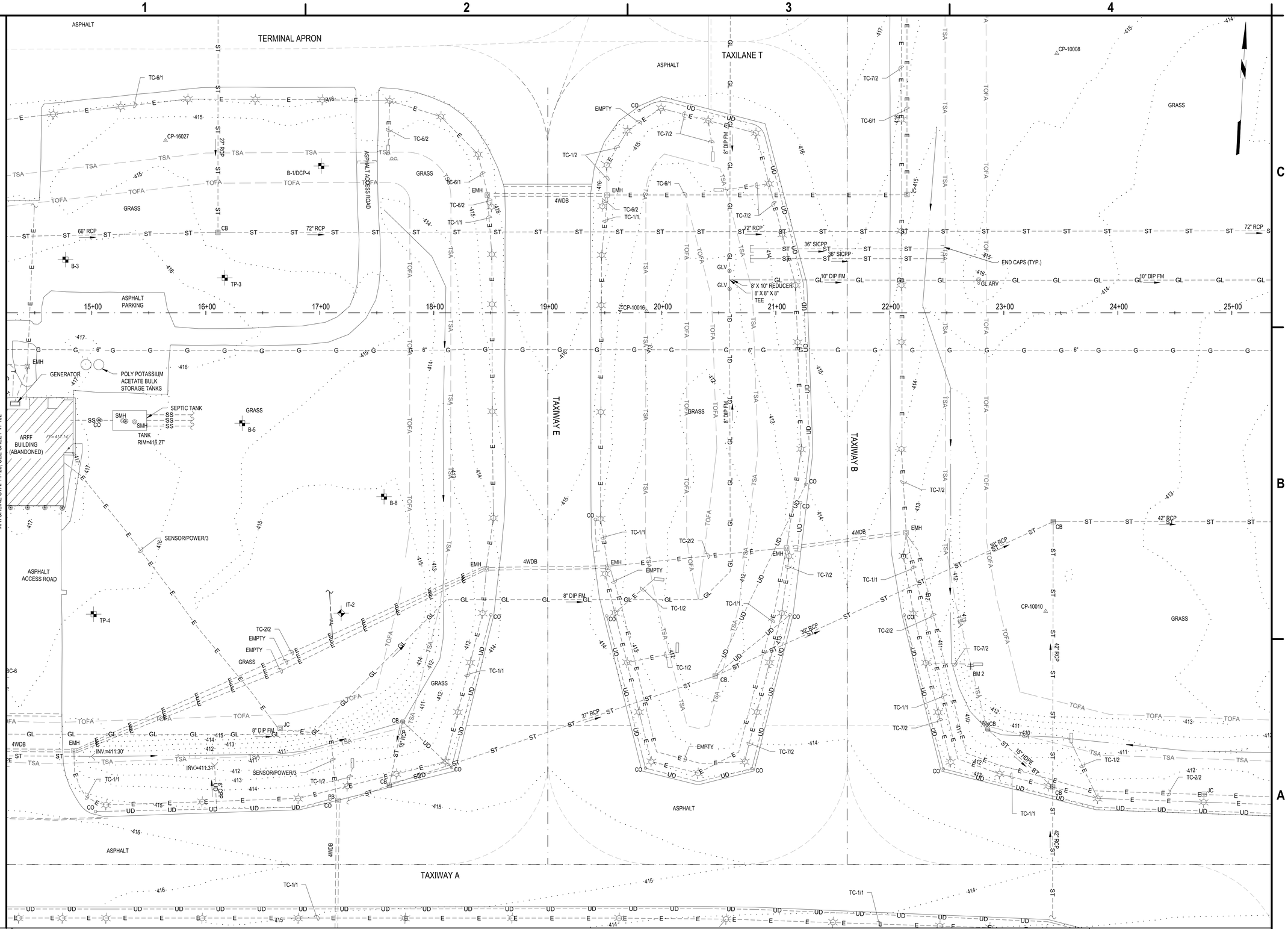
NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

EXISTING CONDITIONS PLAN

VF102

SHEET NO. 22 OF 113

Copyright ©



A1 **EXISTING CONDITIONS PLAN**
SCALE: 1" = 40'

40 0 40 80FT.
40'

Apr 29, 2026 - 3:31pm
F:\Project\C&S - Syracuse Regional Airport Authority\O68\068001 - Comp Deicing Part\Design\CAD\Sheet Files\O68068001_VF Series.dwg

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK
CHRISTOPHER D. BRUBACH
LICENSED PROFESSIONAL ENGINEER
NO. 083424

SYR
SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

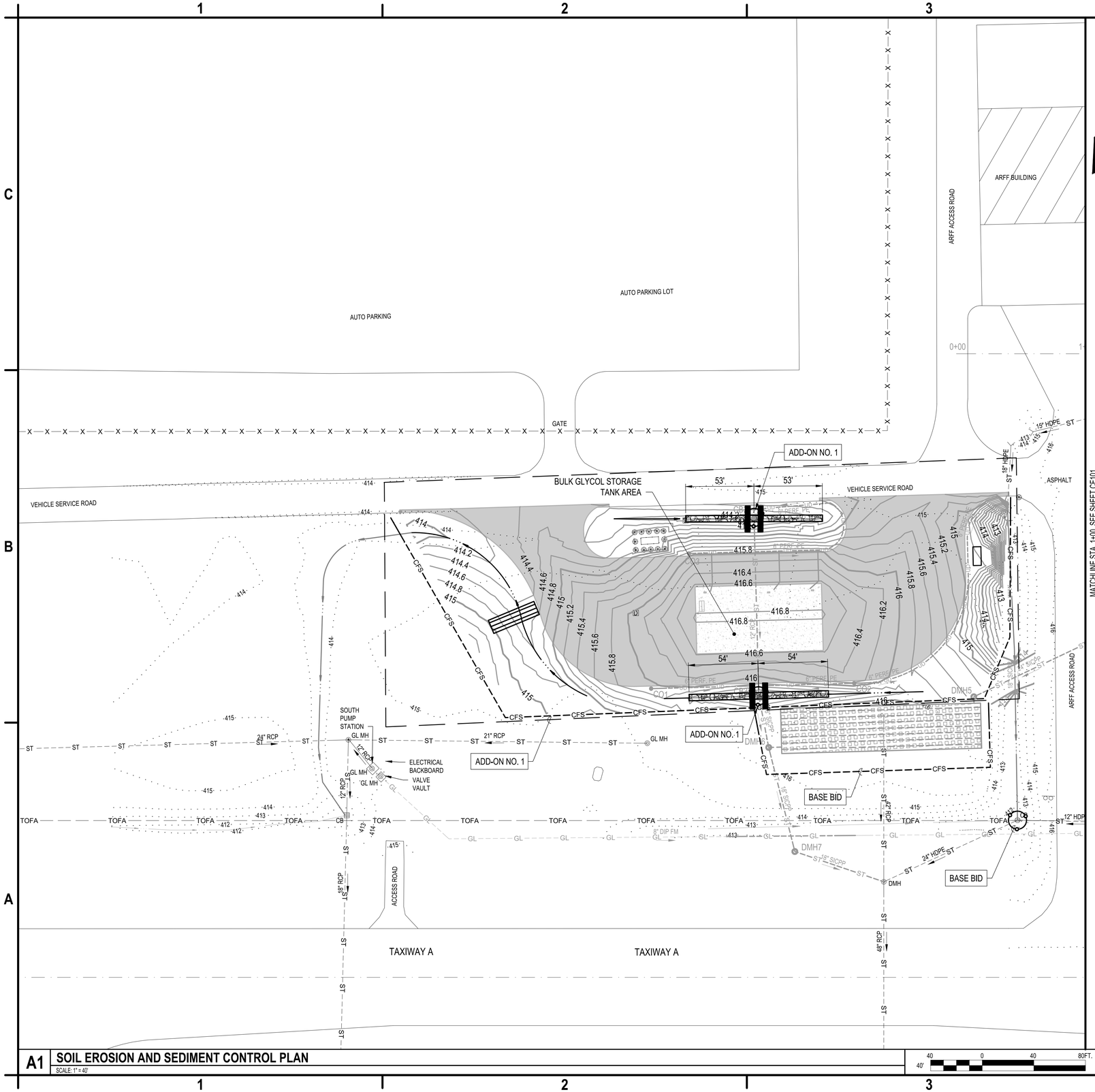
NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

EXISTING CONDITIONS PLAN

VF103

SHEET NO. 23 OF 113

Copyright ©



A1 SOIL EROSION AND SEDIMENT CONTROL PLAN
SCALE: 1" = 40'

40' 40 0 40 80FT.

B4 KEYED NOTES
SCALE: NOT TO SCALE

CFS — TEMPORARY PROPOSED COMPOST FILTER SOCK, ITEM C-102, SEE DETAIL B3/CE501.

PERMANENT DRY SWALE, LENGTH PER DIMENSION ON PLANS, ITEM C-102, SEE DETAIL A1/CE501.

TEMPORARY INLET PROTECTION, ITEM C-102, SEE DETAIL A2/CE501.

PERMANENT STONE CHECK DAM, ITEM C-102, SEE DETAIL C3/CE501.

TEMPORARY PRE-FORMED FABRIC/FOAM TRIANGULAR CHECK DAM, ITEM C-102, SEE DETAIL C1/CE501.

A4 KEYED LEGEND
SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · LICENSED PROFESSIONAL ENGINEER · NO. 083424

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	J. CONESE
DESIGNED BY:	J. FRAZEE
CHECKED BY:	C. BRUBACH

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

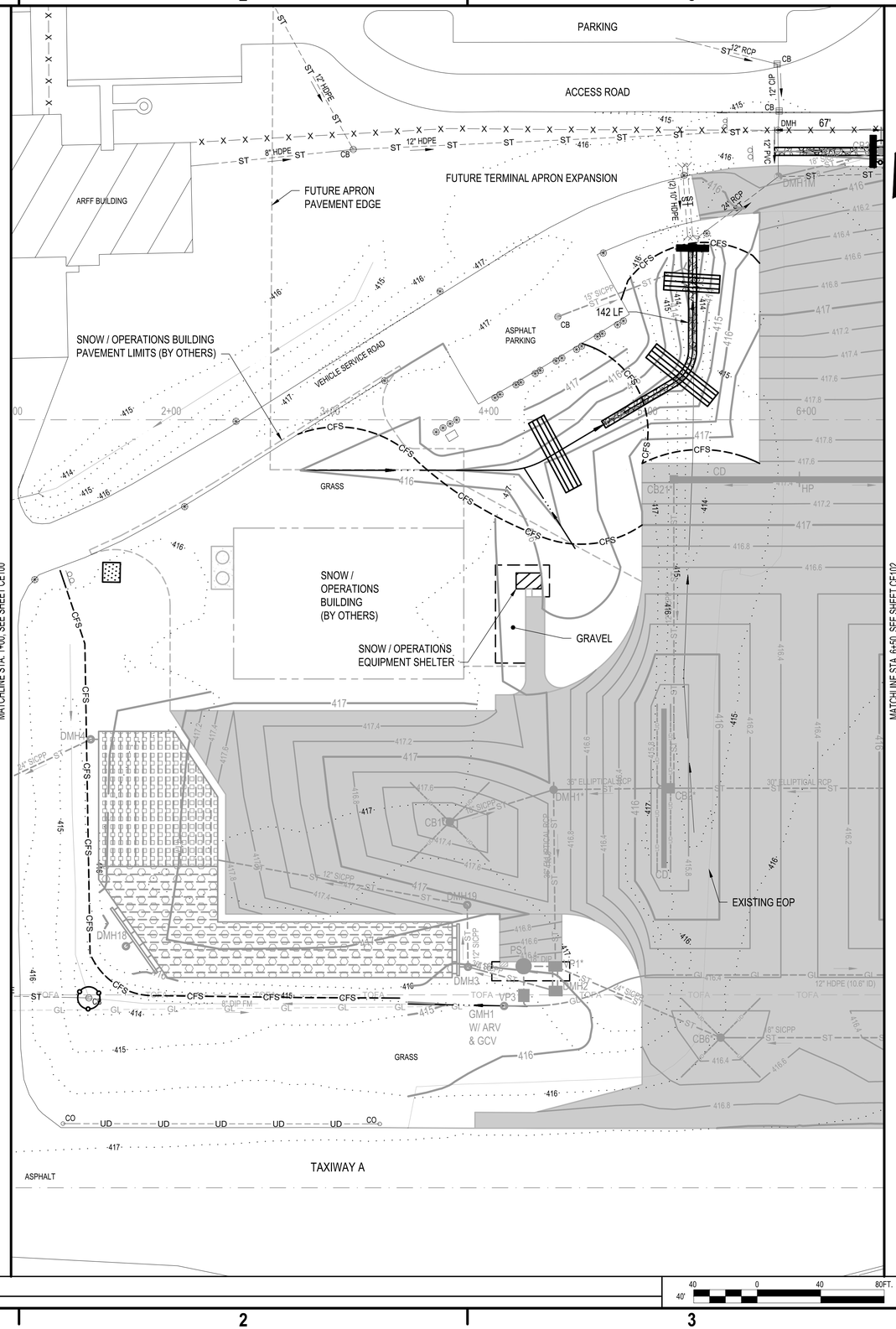
SOIL EROSION AND SEDIMENT CONTROL PLAN

CE100

SHEET NO. 24 OF 113

Copyright ©

Apr 29, 2026 - 3:31pm
F:\Project\O68 - Syracuse Regional Airport Authority\O68069001 - Como Deicing Pad\Design\CADD\Sheet Files\O68069001_CE Series.dwg



A1 SOIL EROSION AND SEDIMENT CONTROL PLAN
SCALE: 1" = 40'

40 0 40 80FT.
40'

B4 KEYED NOTES
SCALE: NOT TO SCALE

PERMANENT DRY SWALE, LENGTH PER DIMENSION ON PLANS, ITEM C-102, SEE DETAIL A1/CE501.

TEMPORARY INLET PROTECTION, ITEM C-102, SEE DETAIL A2/CE501.

CFS — TEMPORARY PROPOSED COMPOST FILTER SOCK, ITEM C-102, SEE DETAIL B3/CE501.

PERMANENT STONE CHECK DAM, ITEM C-102, SEE DETAIL C3/CE501.

TEMPORARY PRE-FORMED FABRIC/FOAM TRIANGULAR CHECK DAM, ITEM C-102, SEE DETAIL C1/CE501.

TEMPORARY CONCRETE WASHOUT, EXACT LOCATION(S) TO BE DETERMINED IN THE FIELD, INCIDENTAL TO ITEM C-102, SEE DETAIL B1/CE501.

A4 KEYED LEGEND
SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK
CHRISTOPHER D. BRUBACH
LICENSED PROFESSIONAL ENGINEER
NO. 083424

SYR
SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	J. FRAZEE
CHECKED BY:	C. BRUBACH

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

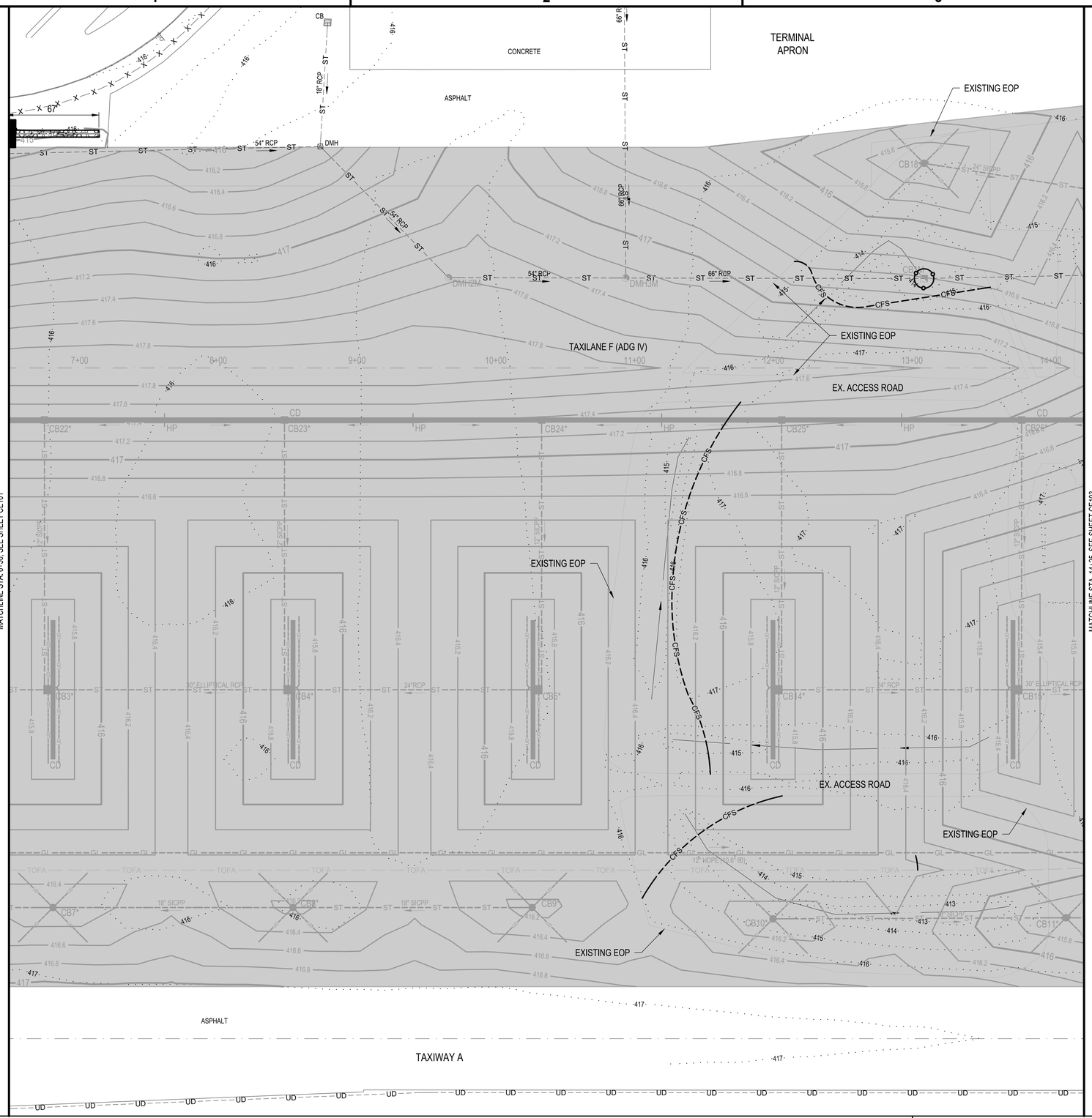
SOIL EROSION AND SEDIMENT CONTROL PLAN

CE101

SHEET NO. 25 OF 113

Copyright ©

Apr 29, 2026 - 3:32pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CAD\Sheet Files\O68069001_CE Series.dwg



A1 SOIL EROSION AND SEDIMENT CONTROL PLAN
SCALE: 1" = 40'

40' 40 0 40 80FT.

B4 KEYED NOTES
SCALE: NOT TO SCALE

PERMANENT DRY SWALE, LENGTH PER DIMENSION ON PLANS, ITEM C-102, SEE DETAIL A1/CE501.

TEMPORARY INLET PROTECTION, ITEM C-102, SEE DETAIL A2/CE501.

CFS — TEMPORARY PROPOSED COMPOST FILTER SOCK, ITEM C-102, SEE DETAIL B3/CE501.

PERMANENT STONE CHECK DAM, ITEM C-102, SEE DETAIL C3/CE501.

A4 KEYED LEGEND
SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · LICENSED PROFESSIONAL ENGINEER · NO. 083424

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	J. FRAZEE
CHECKED BY:	C. BRUBACH

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

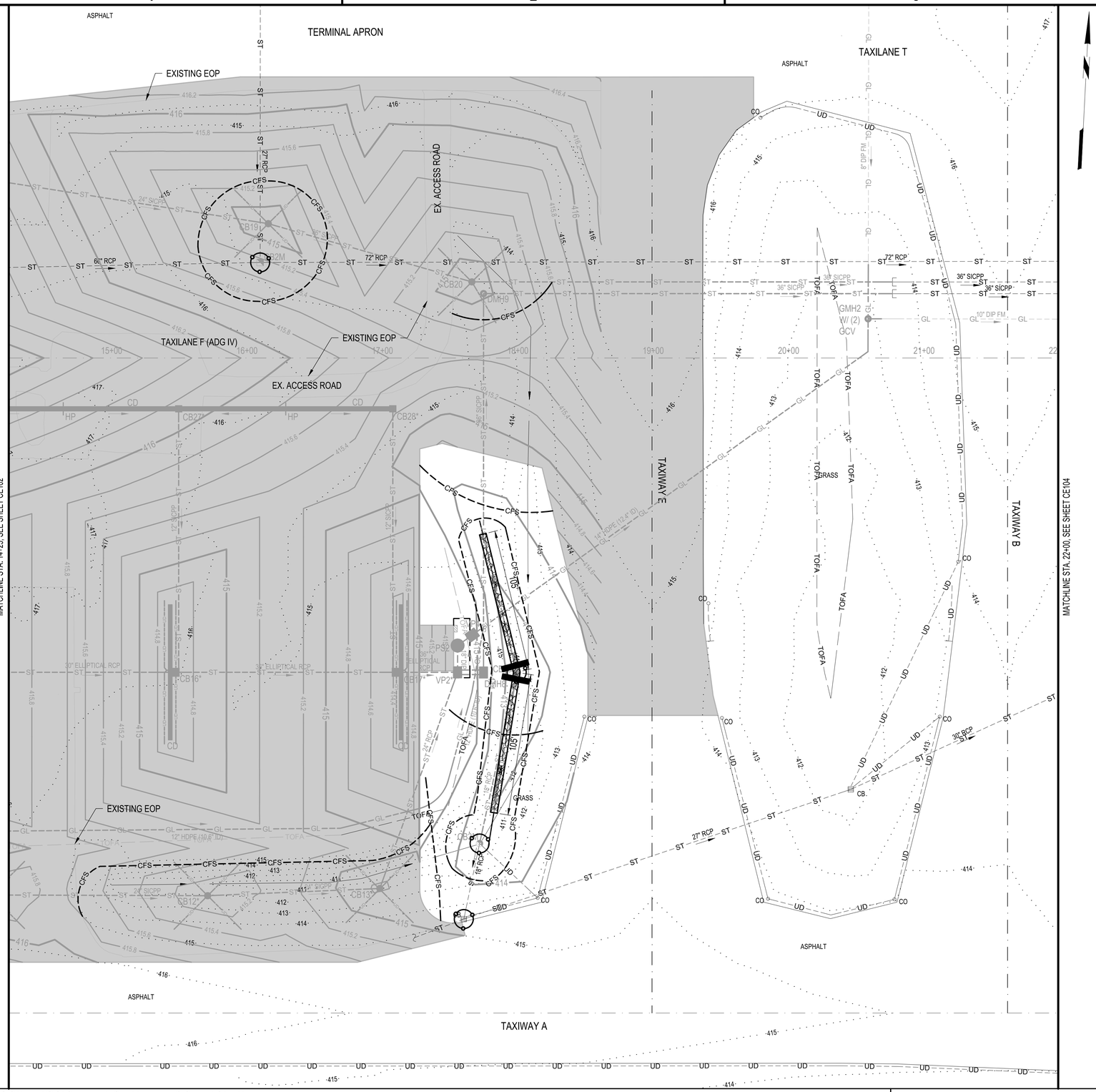
SOIL EROSION AND SEDIMENT CONTROL PLAN

CE102

SHEET NO. 26 OF 113

Copyright ©

Apr 29, 2026 - 3:32pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_CE Series.dwg



A1 SOIL EROSION AND SEDIMENT CONTROL PLAN
SCALE: 1" = 40'

40 0 40 80FT.
40'

B4 KEYED NOTES
SCALE: NOT TO SCALE

NOTE:
A. ABOVE GRADE SOIL EROSION CONTROL DEVICES SHALL NOT BE PLACED IN AN ACTIVE TOFA. REMOVE PRIOR TO OPENING THE TAXIWAY TO AIRCRAFT.

B4 SHEET NOTES
SCALE: NOT TO SCALE

PERMANENT DRY SWALE, LENGTH PER DIMENSION ON PLANS, ITEM C-102, SEE DETAIL A1/CE501.

TEMPORARY INLET PROTECTION, ITEM C-102, SEE DETAIL A2/CE501.

CFS — TEMPORARY PROPOSED COMPOST FILTER SOCK, ITEM C-102, SEE DETAIL B3/CE501.

PERMANENT STONE CHECK DAM, ITEM C-102, SEE DETAIL C3/CE501.

A4 KEYED LEGEND
SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK
CHRISTOPHER D. BRUBACH
LICENSED PROFESSIONAL ENGINEER
NO. 083424

SYR
SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	J. FRAZEE
CHECKED BY:	C. BRUBACH

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

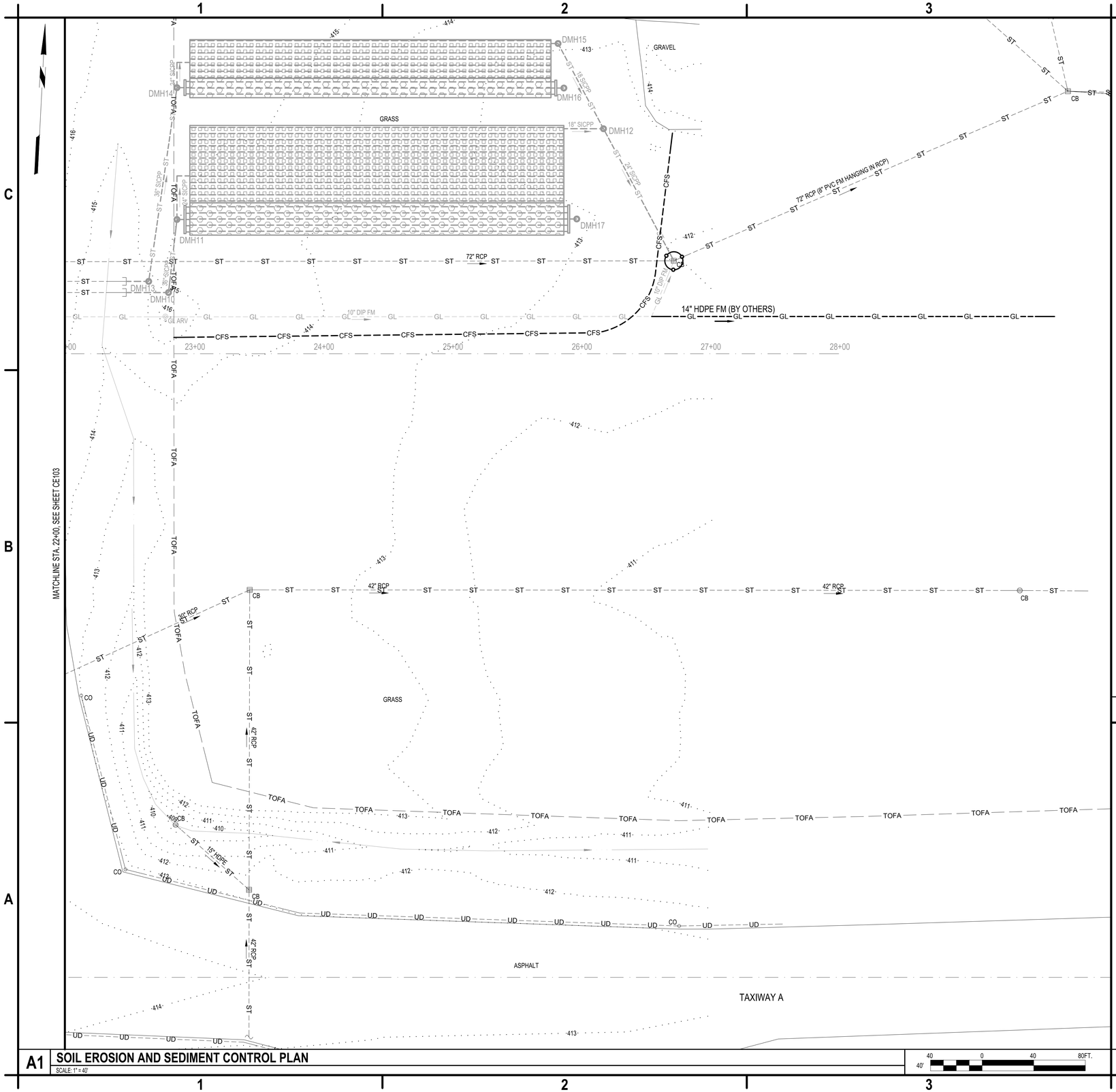
SOIL EROSION AND SEDIMENT CONTROL PLAN

CE103

SHEET NO. 27 OF 113

Copyright ©

Apr 29, 2026 - 3:32pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_CE Series.dwg



A1 SOIL EROSION AND SEDIMENT CONTROL PLAN

SCALE: 1" = 40'

40' 40 0 40 80FT.

C4 KEYED NOTES

SCALE: NOT TO SCALE

TEMPORARY INLET PROTECTION, ITEM C-102, SEE DETAIL A2/CE501.

CFS TEMPORARY PROPOSED COMPOST FILTER SOCK, ITEM C-102, SEE DETAIL B3/CE501.

A4 KEYED LEGEND

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · NO. 083424 · LICENSED PROFESSIONAL ENGINEER

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	J. FRAZEE
CHECKED BY:	C. BRUBACH

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

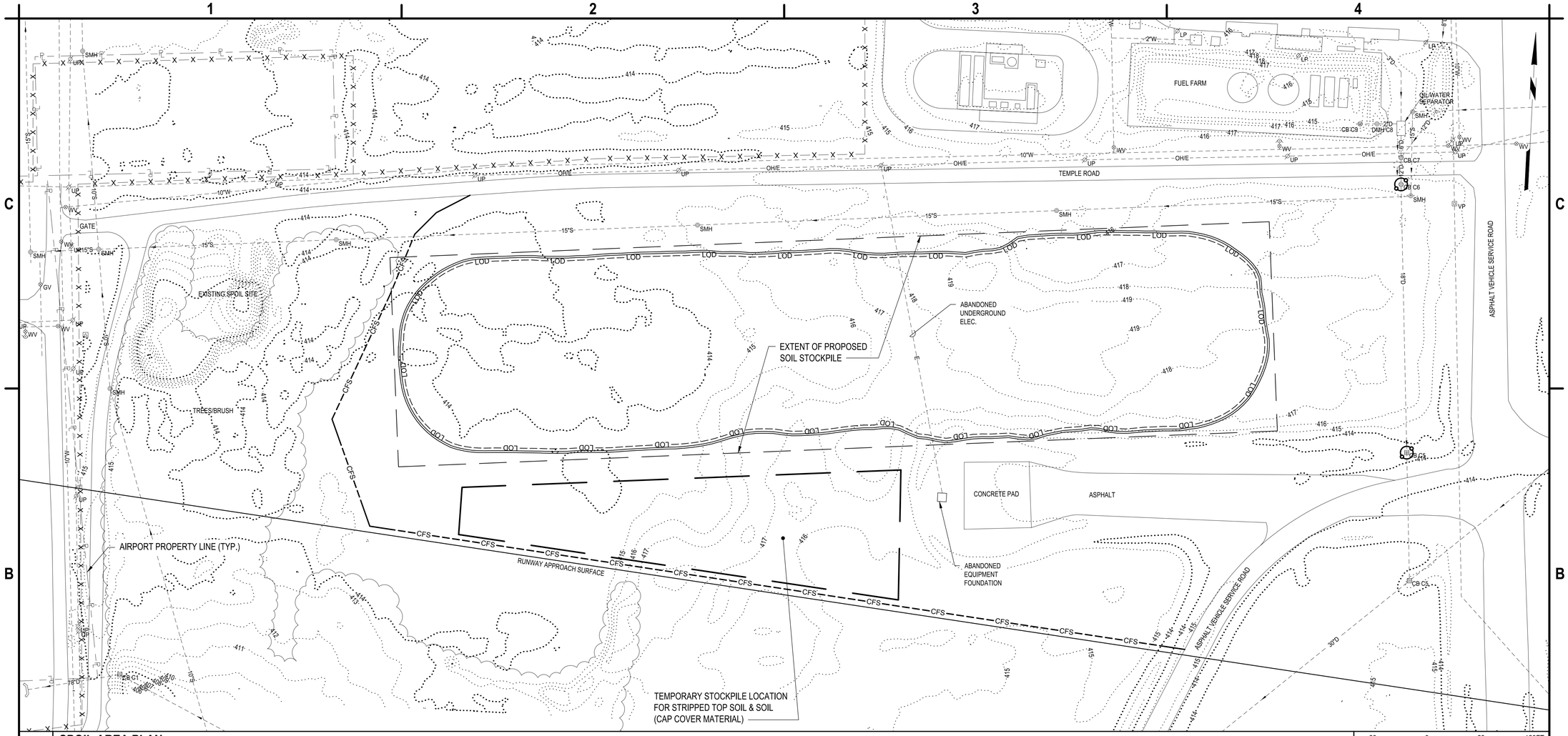
SOIL EROSION AND SEDIMENT CONTROL PLAN

CE104

SHEET NO. 28 OF 113

Copyright ©

Apr 29, 2026 - 9:32pm
F:\Project\O68 - Syracuse Regional Airport Authority\O68069001 - Como Deicing Pad\Design\CADD\Sheet Files\O68069001_CE Series.dwg



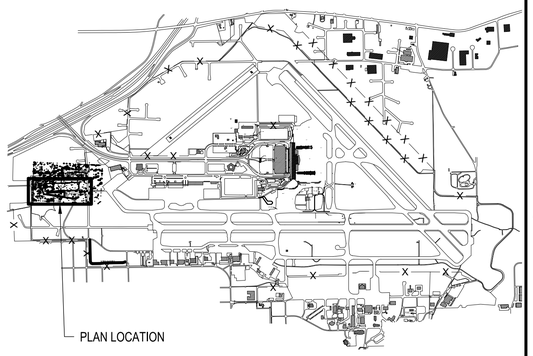
B1 SPOIL AREA PLAN
SCALE: 1" = 60'

60' 60 0 60 120FT.

TEMPORARY INLET PROTECTION, ITEM C-102, SEE DETAIL A2/CE501.

CFS TEMPORARY PROPOSED COMPOST FILTER SOCK, ITEM C-102, SEE DETAIL B3/CE501.

A3 KEYED LEGEND
SCALE: NOT TO SCALE



A4 KEY MAP
SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · LICENSED PROFESSIONAL ENGINEER · NO. 083424

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	J. FRAZEE
CHECKED BY:	C. BRUBACH

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

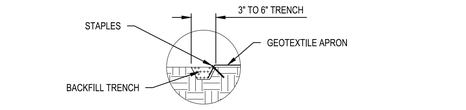
SOIL EROSION AND SEDIMENT CONTROL PLAN

CE105

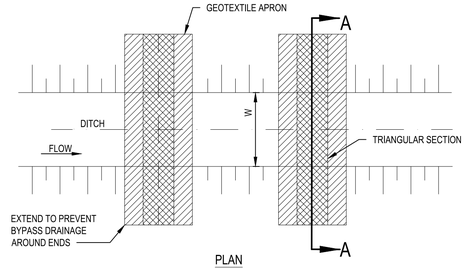
SHEET NO. 29 OF 113

Copyright ©

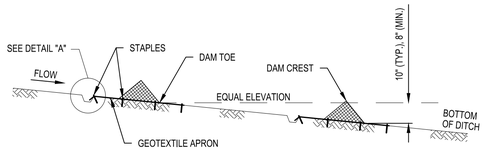
Apr 29, 2026 - 3:32pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_CE105.dwg



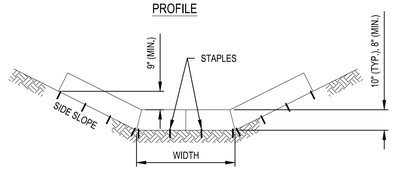
DETAIL A



PLAN



PROFILE



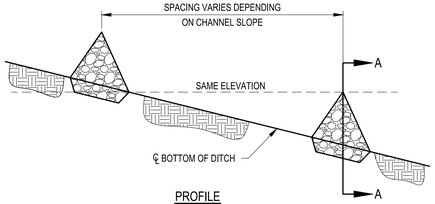
SECTION A-A

CHECK DAM NOTES:

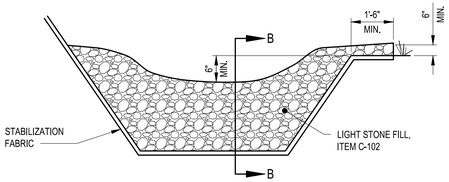
1. SET SPACING OF CHECK DAMS TO ASSURE THAT THE ELEVATIONS OF THE CREST OF THE DOWNSTREAM DAM IS AT THE SAME ELEVATION OF THE TOE OF THE UPSTREAM DAM.
2. EXTEND THE STONE A MINIMUM OF 1'-6" BEYOND THE DITCH BANKS TO PREVENT CUTTING AROUND THE DAM.
3. ALL MATERIALS REQUIRED FOR THIS ITEM SHALL BE PAID FOR UNDER ITEM C-102 BY THE UNIT COST PER C.Y. FOR CHECK DAM.

C1 TEMPORARY PREFORMED CHECK DAM DETAIL

SCALE: NOT TO SCALE



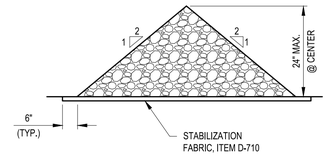
PROFILE



SECTION A-A

NOTE:

FOR DITCH SECTION AND SLOPE SEE GRADING PLANS



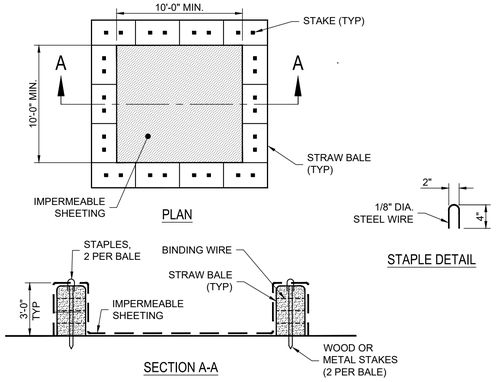
SECTION B-B

CHECK DAM NOTES:

1. STONE WILL BE PLACED ON A STABILIZATION FABRIC FOUNDATION TO THE LINES, GRADES AND LOCATIONS AS SHOWN OR AS DIRECTED BY THE ENGINEER.
2. SET SPACING OF CHECK DAMS TO ASSURE THAT THE ELEVATIONS OF THE CREST OF THE DOWNSTREAM DAM IS AT THE SAME ELEVATION OF THE TOE OF THE UPSTREAM DAM.
3. EXTEND THE STONE A MINIMUM OF 1'-6" BEYOND THE DITCH BANKS TO PREVENT CUTTING AROUND THE DAM.
4. PROTECT THE DITCH DOWNSTREAM OF THE LOWEST CHECK DAM FROM SCOUR AND EROSION WITH STONE OR LINER AS APPROPRIATE.
5. ENSURE THAT DITCH APPURTENANCES SUCH AS CULVERT ENTRANCES BELOW CHECK DAMS ARE NOT SUBJECT TO DAMAGE OR BLOCKAGE FROM DISPLACED STONES.
6. ALL MATERIALS REQUIRED FOR THIS ITEM SHALL BE PAID FOR UNDER ITEM C-102 BY THE UNIT COST PER C.Y. FOR CHECK DAM.

C3 PERMANENT STONE CHECK DAM DETAIL

SCALE: NOT TO SCALE



PLAN

STAPLE DETAIL

SECTION A-A

CONSTRUCTION SPECIFICATIONS

1. LOCATE WASHOUT STRUCTURE A MINIMUM OF 50 FEET AWAY FROM OPEN CHANNELS, UNPROTECTED STORM DRAIN INLETS, SENSITIVE AREAS, WETLANDS, BUFFERS AND WATER COURSES AND AWAY FROM CONSTRUCTION TRAFFIC.
2. SIZE WASHOUT STRUCTURE FOR VOLUME NECESSARY TO CONTAIN WASH WATER AND SOLIDS AND MAINTAIN AT LEAST 4 INCHES OF FREEBOARD. TYPICAL DIMENSIONS ARE 10 FEET X 10 FEET X 3 FEET DEEP.
3. PREPARE SOIL BASE FREE OF ROCKS OR OTHER DEBRIS THAT MAY CAUSE TEARS OR HOLES IN THE LINER. FOR LINER, USE 10 MIL OR THICKER UV RESISTANT, IMPERMEABLE SHEETING, FREE OF HOLES AND TEARS OR OTHER DEFECTS THAT COMPROMISE IMPERMEABILITY OF THE MATERIAL.
4. PROVIDE A SIGN FOR THE WASHOUT IN CLOSE PROXIMITY TO THE FACILITY.
5. KEEP CONCRETE WASHOUT STRUCTURE WATER TIGHT. REPLACE IMPERMEABLE LINER IF DAMAGED (E.G., RIPPED OR PUNCTURED). EMPTY OR REPLACE WASHOUT STRUCTURE THAT IS 75 PERCENT FULL, AND DISPOSE OF ACCUMULATED MATERIAL PROPERLY. DO NOT REUSE PLASTIC LINER. WET-VACUUM STORED LIQUIDS THAT HAVE NOT EVAPORATED AND DISPOSE OF IN AN APPROVED MANNER.
6. PRIOR TO FORECASTED RAINSTORMS, REMOVE LIQUIDS OR COVER STRUCTURE TO PREVENT OVERFLOWS. REMOVE HARDENED SOLIDS, WHOLE OR BROKEN UP, FOR DISPOSAL OR RECYCLING. MAINTAIN RUNOFF DIVERSION AROUND EXCAVATED WASHOUT STRUCTURE UNTIL STRUCTURE IS REMOVED.
7. CONTRACTOR TO COORDINATE FINAL LOCATION OF CONCRETE WASHOUT WITH OWNER'S REPRESENTATIVE.
8. ALL MATERIALS REQUIRED FOR THIS ITEM SHALL BE INCIDENTAL TO ITEM C-102.

B1 TEMPORARY CONCRETE WASHOUT DETAIL

SCALE: NOT TO SCALE

SECTION VIEW

PLAN VIEW

ADAPTED FROM DETAILS PROVIDED BY: FILTREXX

COMPOST STANDARDS TABLE	
ORGANIC MATTER CONTENT	25% - 100% (DRY WEIGHT)
ORGANIC PORTION	FIBROUS AND ELONGATED
PH	6.0 - 8.0
MOISTURE CONTENT	30% - 60%
PARTICLE SIZE	100% PASSING A 1" SCREEN 10-50% PASSING A 3/8" SCREEN
SOLUBLE SALT CONCENTRATION	5.0 ds/M (mmhos/cm) MAX.

COMPOST FILTER SOCK NOTES:

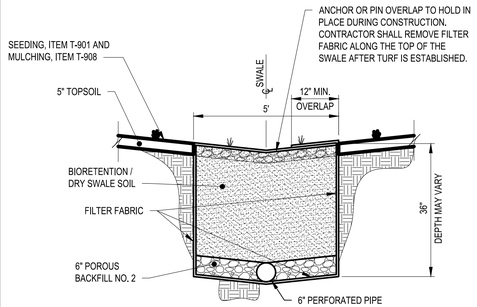
1. ALL MATERIALS REQUIRED FOR THIS ITEM SHALL BE PAID FOR UNDER ITEM C-102, AT THE UNIT COST PER LINEAR FOOT FOR COMPOST FILTER SOCK.
2. SOCK FABRIC SHALL MEET THE STANDARDS OF TABLE 5.1 OF THE NYSDEC STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL - BLUE BOOK.
3. COMPOST FILTER SOCK SHALL BE PLACED AT EXISTING LEVEL GRADE. BOTH ENDS OF THE SOCK SHALL BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45° TO THE MAIN SOCK ALIGNMENT. STAKES MAY BE INSTALLED IMMEDIATELY DOWN SLOPE OF THE SOCK IF SO SPECIFIED BY THE MANUFACTURER.
4. TRAFFIC SHALL NOT BE PERMITTED TO CROSS FILTER SOCKS.
5. ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES HALF THE ABOVE GROUND HEIGHT OF THE SOCK AND DISPOSED IN THE MANNER DESCRIBED ELSEWHERE IN THE PLAN.
6. SOCKS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT. DAMAGED SOCKS SHALL BE REPAIRED ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR REPLACED WITHIN 24 HOURS OF INSPECTION.
7. BIODEGRADABLE FILTER SOCKS SHALL BE REPLACED AFTER 6 MONTHS; PHOTODEGRADABLE SOCKS AFTER 1 YEAR. POLYPROPYLENE SOCKS SHALL BE REPLACED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
8. UPON STABILIZATION OF THE AREA TRIBUTARY TO THE SOCKS, STAKES SHALL BE REMOVED. THE SOCK MAY BE LEFT IN PLACE AND VEGETATED OR REMOVED. IN THE LATTER CASE, THE MESH SHALL BE CUT OPEN AND THE MULCH SPREAD AS A SOIL SUPPLEMENT. NON-BIODEGRADABLE PRODUCTS AND MESH SHALL BE REMOVED.

B3 COMPOST FILTER SOCK DETAIL

SCALE: NOT TO SCALE

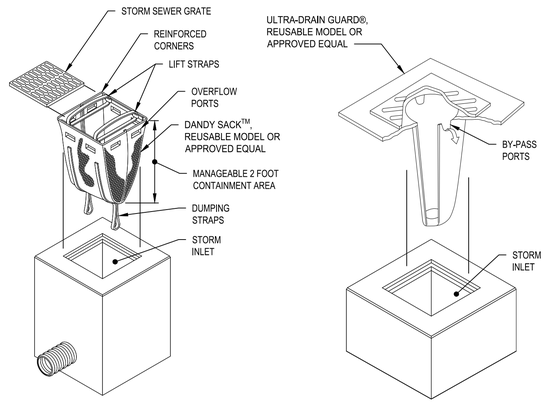
NOTE:

ALL MATERIALS REQUIRED FOR THIS ITEM SHALL BE PAID FOR UNDER ITEM C-102 BY THE UNIT COST PER LINEAR FOOT FOR DRY SWALE.



A1 DRY SWALE DETAIL

SCALE: NOT TO SCALE



A2 STORM DRAIN INLET PROTECTION DETAIL

SCALE: NOT TO SCALE

CATCH BASIN INSERT INLET PROTECTION NOTES:

1. CONTRACTOR SHALL VERIFY DIMENSIONS OF STRUCTURES WITH MANUFACTURER PRIOR TO ORDERING FOR CORRECT SIZING.
2. THE CATCH BASIN INSERT SHALL BE INSTALLED, MAINTAINED AND REMOVED PER MANUFACTURER RECOMMENDATIONS.
3. THE LOCATIONS SHOWN ON THE PLAN FOR PLACEMENT OF THIS DEVICE MAY VARY FROM WHERE THEY ARE ACTUALLY INSTALLED. THE DEVICES SHALL BE PLACED IN CATCH BASINS DURING CONCRETE SAW CUTTING AND DRILLING OPERATIONS, DURING REMOVAL OF CURING COMPOUND, AND AT ALL OTHER TIMES THAT THERE WILL BE WATER FLOWING INTO THE CATCH BASINS WHICH MAY CONTAIN DUST, DIRT OR OTHER FINE MATERIAL WHICH MAY CAUSE SILTATION DOWNSTREAM OF THE CONSTRUCTION SITE.
4. ALL STORM WATER THAT NEEDS TO BE PUMPED FROM THE SITE SHALL BE PUMPED INTO ONE OF THESE DEVICES. THE FLOW RATE PUMPED INTO THIS DEVICE SHALL NOT EXCEED THE MANUFACTURER'S RECOMMENDED TREATMENT FLOW RATE. DURING THE PUMPING PROCESS, THE DEVICE SHALL BE MONITORED IN ORDER TO DETERMINE THAT IT IS TREATING THE WATER. IF THE WATER IS UTILIZING THE OVERFLOW PORT AND IS NOT BEING CLEANED BY THE DEVICE, THE PUMPING SHALL BE STOPPED AND THE DEVICE SHALL BE CLEANED PER MANUFACTURER'S RECOMMENDATIONS AND THEN REINSTALLED.
6. MAINTENANCE SHALL BE PROVIDED BY THE CONTRACTOR WHEN THE CAPACITY IS REDUCED BY APPROXIMATELY 50 PERCENT OR DIRECTED BY THE ENGINEER.
7. THE MEASUREMENT OF THE CATCH BASIN INSERT INLET PROTECTION FOR INSTANCES OF A PROPOSED / MODIFIED STRUCTURE BEING INSTALLED IN THE SAME LOCATION AS AN EXISTING ONE SHALL BE CONSIDERED AS ONE DEVICE AND ANY ADDITIONAL COSTS SHALL BE CONSIDERED INCIDENTAL.
8. THIS DEVICE SHALL BE PAID FOR UNDER ITEM C-102, AT THE UNIT COST PER EACH FOR CATCH BASIN INSERT INLET PROTECTION. THIS COST SHALL INCLUDE ALL THE COSTS FOR MAINTENANCE, INSTALLATION, REPLACEMENT, IF NEEDED, AND ALL LABOR, EQUIPMENT AND TOOLS AND INCIDENTALS TO INSTALL PER THE MANUFACTURER'S RECOMMENDATIONS AND REMOVE.

EROSION CONTROL NOTES:

THE FOLLOWING EROSION CONTROL PROCEDURE SHALL BE ADHERED TO BY THE CONTRACTOR:

1. INSTALL TEMPORARY COMPOST FILTER SOCK AS SHOWN ON THE PLAN AND AT ALL EXISTING STORMWATER CATCH BASINS WITHIN THE WORK AREA TO PREVENT SEDIMENT MIGRATION. ALL SILT FENCE/SOCK BARRIERS SHALL BE INSTALLED IN ACCORDANCE WITH THE DETAILS SHOWN ON THE PLANS.
2. THE TOPSOIL SHALL BE STRIPPED & STOCKPILED ON SITE FOR RE-USE AS DIRECTED BY THE OWNER.
3. ALL SILT FENCES/SOCKS SHALL BE REPLACED WHENEVER THEY BECOME CLOGGED OR INOPERABLE.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTENANCE & REMOVAL OF TEMPORARY SEDIMENTATION CONTROLS.
5. THE CONTRACTOR MUST CONTROL DUST DURING CONSTRUCTION. DURING EARTHWORK OPERATIONS, WATER SPREADING EQUIPMENT SHALL BE PROVIDED BY THE CONTRACTOR AND WATER APPLIED AS NECESSARY AND AS DIRECTED BY THE OWNER IN ORDER TO CONTROL DUST.
6. DIRT OR DEBRIS LEFT ON LOCAL PUBLIC ROADS AS A RESULT OF THIS CONSTRUCTION PROJECT SHALL BE REMOVED & ROAD SURFACES CLEANED BY THE CONTRACTOR ON A DAILY BASIS.
7. ALL DISTURBED AREAS (EXCEPT AREAS TO BE PAVED OR BUILT UPON) SHALL BE TOPSOILED TO A MINIMUM 5" DEPTH & SEEDED IMMEDIATELY AFTER FINE GRADING TAKES PLACE & AS SOON AS PHYSICALLY POSSIBLE.
8. THE CONTRACTOR IS RESPONSIBLE FOR THE MAINTENANCE OF DOWNSTREAM STORM SEWERS, DITCHES & CULVERTS. SILT BUILD-UP FOUND TO BE A RESULT OF THIS SITE CONSTRUCTION WORK SHALL BE REMOVED FROM DOWNSTREAM CULVERTS BY THE CONTRACTOR AT NO ADDITIONAL EXPENSE TO THE OWNER OR THE TOWN.
9. IN ADDITION TO STORM WATER DISCHARGES, THE FOLLOWING NON-STORM WATER DISCHARGES MAY CONTRIBUTE TO THE RUN-OFF FROM THE SITE:
   - WATER FROM WATER SERVICE FLUSHINGS
   - WATER USED TO WASH DOWN CONSTRUCTION VEHICLES (NO DETERGENTS)
   - WATER USED FOR DUST CONTROL
   - UNCONTAMINATED GROUNDWATER
10. THE ABOVE NON-STORM WATER FLOWS SHALL BE TREATED IN THE SAME MANNER AS STORM WATER FLOWS INDICATED HEREIN.

A4 EROSION CONTROL NOTES

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK
CHRISTOPHER D. BRUBACH
LICENSED PROFESSIONAL ENGINEER
NO. 083424

SYR
SYRACUSE
HANCOCK
INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY
(CDF)
SYRACUSE HANCOCK
INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	J. FRAZEE
CHECKED BY:	C. BRUBACH

NO ALTERATION PERMITTED HEREON
EXCEPT AS PROVIDED UNDER SECTION
7209 SUBDIVISION 2 OF THE NEW YORK
EDUCATION LAW

SOIL EROSION AND SEDIMENT CONTROL DETAILS

CE501

SHEET NO. 30 OF 113

Copyright ©

Apr 29, 2026 - 3:22pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CAD\DSheet Files\O68069001_CE Details.dwg

106. REMOVE ASPHALT PAVEMENT FULL DEPTH, ITEM P-101 AND STONE SUBBASE AND SOILS, ITEM P-152 TO PROVIDE A NEW FULL DEPTH PAVEMENT SECTION.

111. LIMIT OF UTILITY ABANDONMENT/REMOVAL.

118. PIPE AND/OR STRUCTURE BULKHEAD, SEE DETAIL B3/CU502, COST INCIDENTAL TO ITEM P-153.

119. SAW CUT EXISTING PAVEMENT FULL DEPTH PRIOR TO REMOVAL, PROVIDE A CLEAN VERTICAL FACE, INCIDENTAL TO ITEM P-101 (TYP.).

C4 KEYED NOTES

SCALE: NOT TO SCALE

NOTES:

A. IN GENERAL, EXISTING UTILITIES MAY BE ABANDONED IN PLACE AND PIPES SHALL BE FILLED WITH CONTROLLED LOW STRENGTH MATERIAL (CLSM), ITEM P-153. IF ABANDONED UTILITIES CONFLICT WITH THE PROPOSED INFRASTRUCTURE, THE AFFECTED SECTIONS SHALL BE REMOVED. NO SEPARATE PAYMENT SHALL BE MADE. RATHER THE COST SHALL BE INCIDENTAL TO THE CONSTRUCTION OF THE PROPOSED PROJECT ELEMENT.

B. SEE ED SERIES DRAWINGS FOR ELECTRICAL AND COMMUNICATION DEMOLITION. SEE XM SERIES DRAWINGS FOR AIRFIELD PAVEMENT MARKING DEMOLITION.

C. MAINTAIN AND PROTECT EXISTING UTILITIES THAT MUST REMAIN ACTIVE. IN GENERAL, INSTALL NEW UTILITIES PRIOR TO DEMOLISHING EXISTING. TRANSITION OF THE NATURAL GAS PIPE SHALL BE SEAMLESS AS IT SUPPLIES GAS TO THE ENTIRE AIRPORT TERMINAL COMPLEX.

D. THE CONTRACTOR SHALL PROVIDE TEMPORARY STORM WATER PIPES, PUMPS AND/OR DRAINAGE PATHWAYS AS NECESSARY TO FACILITATE CONSTRUCTION ON NEW UTILITY INFRASTRUCTURE AND TO ACCOMMODATE CONSTRUCTION WORK PHASING. ALL TEMPORARY INFRASTRUCTURE SHALL BE DESIGNED BY THE CONTRACTOR AND APPROVED BY THE RPR. THE COST ASSOCIATED WITH THESE TASKS SHALL BE INCLUDED IN MAINTENANCE AND PROTECTION OF TRAFFIC, NO SEPARATE PAYMENT SHALL BE MADE.

B4 SHEET NOTES

SCALE: NOT TO SCALE

REMOVE ASPHALT PAVEMENT, PAVEMENT EXCAVATION, ITEM P-101, DEPTH VARIES 5" (ROADS) - 16.25"± (APRON). EXCAVATE SUBBASE AND SOIL AS NECESSARY TO ACCOMMODATE PROPOSED PAVEMENT SECTION, ITEM P-152, SEE DETAIL B1/CG501.

PROFILE COLD MILL ASPHALT PAVEMENT, DEPTH VARIES (4"±), ITEM P-101.

ABANDON STORM PIPE IN PLACE (TYP.).

ABANDON WATER PIPE IN PLACE (TYP.).

ABANDON NATURAL GAS PIPE IN PLACE (TYP.).

ABANDON GLYCOL PIPE IN PLACE (TYP.).

ABANDON UNDERDRAIN PIPE IN PLACE (TYP.).

WV REMOVE WATER VALVE (TYP.), INCIDENTAL TO ITEM P-152

DMH REMOVE DRAINAGE MANHOLE (TYP.), ITEM D-751.

CB REMOVE DRAINAGE CATCH BASIN (TYP.), ITEM D-751.

CO REMOVE UNDERDRAIN CLEAN OUT (TYP.), ITEM D-751.

REMOVE FIRE HYDRANT (TYP.), INCIDENTAL TO ITEM P-152.

REMOVE SIGN (TYP.), INCIDENTAL TO ITEM C-106.

REMOVE BOLLARD (TYP.), INCIDENTAL TO ITEM C-106.

A1 DEMOLITION PLAN

SCALE: 1" = 40'

40 0 40 80FT.

40'

A4 KEYED LEGEND

SCALE: NOT TO SCALE

C&S COMPANIES®

C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK
CHRISTOPHER D. BRUBACH
LICENSED PROFESSIONAL ENGINEER
NO. 083424

SYR
SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	J. CONESE
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

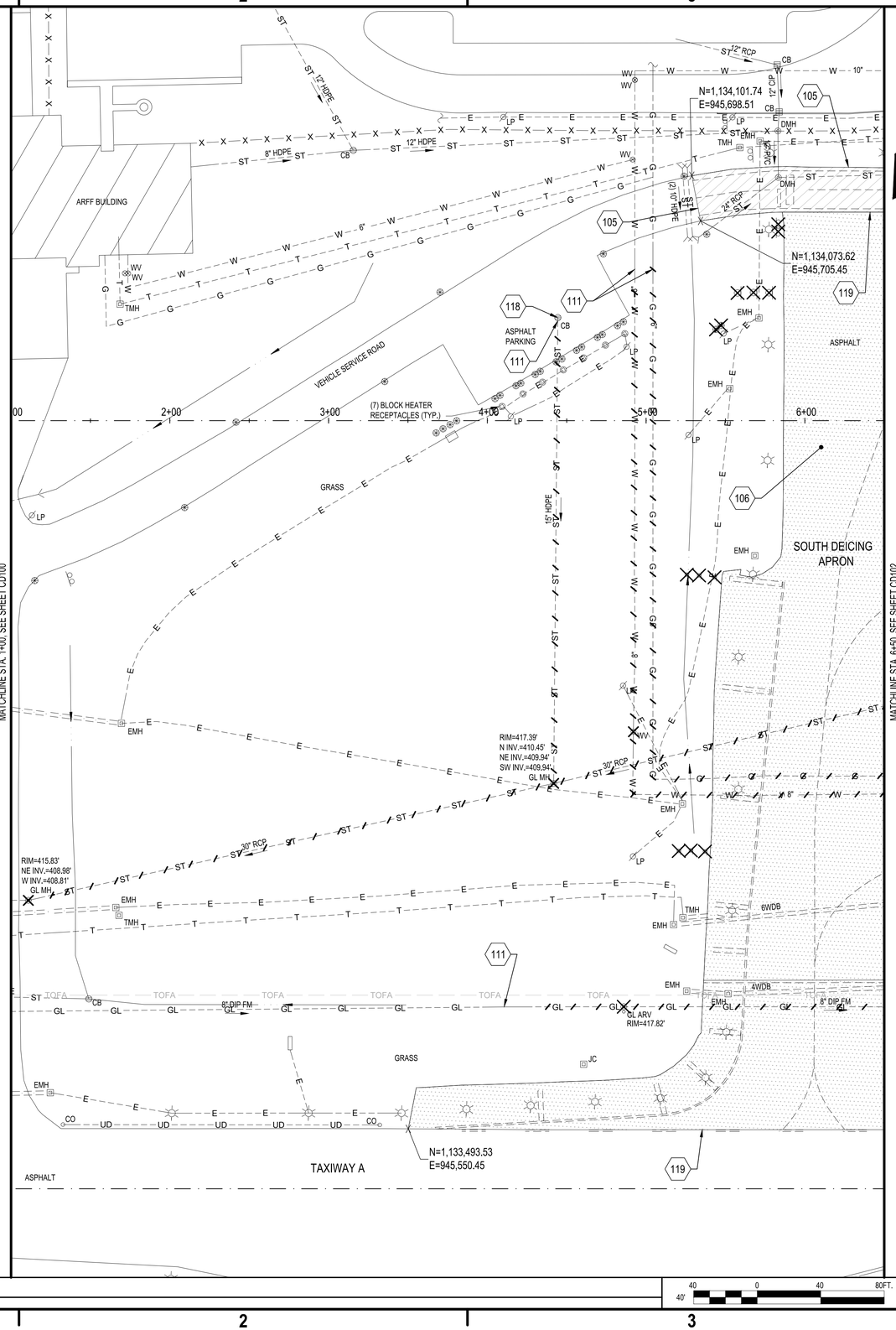
DEMOLITION PLAN

CD100

SHEET NO. 31 OF 113

Copyright ©

Apr 29, 2026 - 3:32pm
P:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Devlopg Pwd\Design\CADD\Sheet Files\O68069001_CD Series.dwg



105. SAW CUT EXISTING PAVEMENT AFTER MILLING AND CHIP AWAY EXCESS MATERIAL TO PROVIDE A CLEAN VERTICAL FACE, INCIDENTAL TO ITEM P-101
106. REMOVE ASPHALT PAVEMENT FULL DEPTH, ITEM P-101 AND STONE SUBBASE AND SOILS, ITEM P-152 TO PROVIDE A NEW FULL DEPTH PAVEMENT SECTION.
111. LIMIT OF UTILITY ABANDONMENT/REMOVAL.
118. PIPE AND/OR STRUCTURE BULKHEAD, SEE DETAIL B3/CU502, COST INCIDENTAL TO ITEM P-153.
119. SAW CUT EXISTING PAVEMENT FULL DEPTH PRIOR TO REMOVAL, PROVIDE A CLEAN VERTICAL FACE, INCIDENTAL TO ITEM P-101 (TYP.).

C4 KEYED NOTES

SCALE: NOT TO SCALE

NOTES:

A. IN GENERAL, EXISTING UTILITIES MAY BE ABANDONED IN PLACE AND PIPES SHALL BE FILLED WITH CONTROLLED LOW STRENGTH MATERIAL (CLSM), ITEM P-153. IF ABANDONED UTILITIES CONFLICT WITH THE PROPOSED INFRASTRUCTURE, THE AFFECTED SECTIONS SHALL BE REMOVED. NO SEPARATE PAYMENT SHALL BE MADE. RATHER THE COST SHALL BE INCIDENTAL TO THE CONSTRUCTION OF THE PROPOSED PROJECT ELEMENT.

B. SEE ED SERIES DRAWINGS FOR ELECTRICAL AND COMMUNICATION DEMOLITION. SEE XM SERIES DRAWINGS FOR AIRFIELD PAVEMENT MARKING DEMOLITION.

C. MAINTAIN AND PROTECT EXISTING UTILITIES THAT MUST REMAIN ACTIVE. IN GENERAL, INSTALL NEW UTILITIES PRIOR TO DEMOLISHING EXISTING. TRANSITION OF THE NATURAL GAS PIPE SHALL BE SEAMLESS AS IT SUPPLIES GAS TO THE ENTIRE AIRPORT TERMINAL COMPLEX. THE UTILITY CUT OVER DURATION SHALL BE LIMITED AND SHALL BE CLOSELY COORDINATED WITH THE SRAA AND ALL AIRPORT TENANTS.

D. THE CONTRACTOR SHALL PROVIDE TEMPORARY STORM WATER PIPES, PUMPS AND/OR DRAINAGE PATHWAYS AS NECESSARY TO FACILITATE CONSTRUCTION ON NEW UTILITY INFRASTRUCTURE AND TO ACCOMMODATE CONSTRUCTION WORK PHASING. ALL TEMPORARY INFRASTRUCTURE SHALL BE DESIGNED BY THE CONTRACTOR AND APPROVED BY THE RPR. THE COST ASSOCIATED WITH THESE TASKS SHALL BE INCLUDED IN MAINTENANCE AND PROTECTION OF TRAFFIC, NO SEPARATE PAYMENT SHALL BE MADE.

B4 SHEET NOTES

SCALE: NOT TO SCALE

- REMOVE ASPHALT PAVEMENT, PAVEMENT EXCAVATION, ITEM P-101, DEPTH VARIES 5" (ROADS) - 16.25"± (APRON). EXCAVATE SUBBASE AND SOIL AS NECESSARY TO ACCOMMODATE PROPOSED PAVEMENT SECTION, ITEM P-152, SEE DETAIL B1/CG501.
- PROFILE COLD MILL ASPHALT PAVEMENT, DEPTH VARIES (4"±), ITEM P-101.
- ST — ABANDON STORM PIPE IN PLACE (TYP.).
- W — ABANDON WATER PIPE IN PLACE (TYP.).
- G — ABANDON NATURAL GAS PIPE IN PLACE (TYP.).
- GL — ABANDON GLYCOL PIPE IN PLACE (TYP.).
- UD — ABANDON UNDERDRAIN PIPE IN PLACE (TYP.).
- WV — REMOVE WATER VALVE (TYP.), INCIDENTAL TO ITEM P-152
- DMH — REMOVE DRAINAGE MANHOLE (TYP.), ITEM D-751.
- CB — REMOVE DRAINAGE CATCH BASIN (TYP.), ITEM D-751.
- CO — REMOVE UNDERDRAIN CLEAN OUT (TYP.), ITEM D-751.
- REMOVE FIRE HYDRANT (TYP.), INCIDENTAL TO ITEM P-152.
- REMOVE SIGN (TYP.), INCIDENTAL TO ITEM C-106.
- REMOVE BOLLARD (TYP.), INCIDENTAL TO ITEM C-106.

A1 DEMOLITION PLAN

SCALE: 1" = 40'

40 0 40 80FT.
40"

A4 KEYED LEGEND

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · NO. 083424 · LICENSED PROFESSIONAL ENGINEER

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	068.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

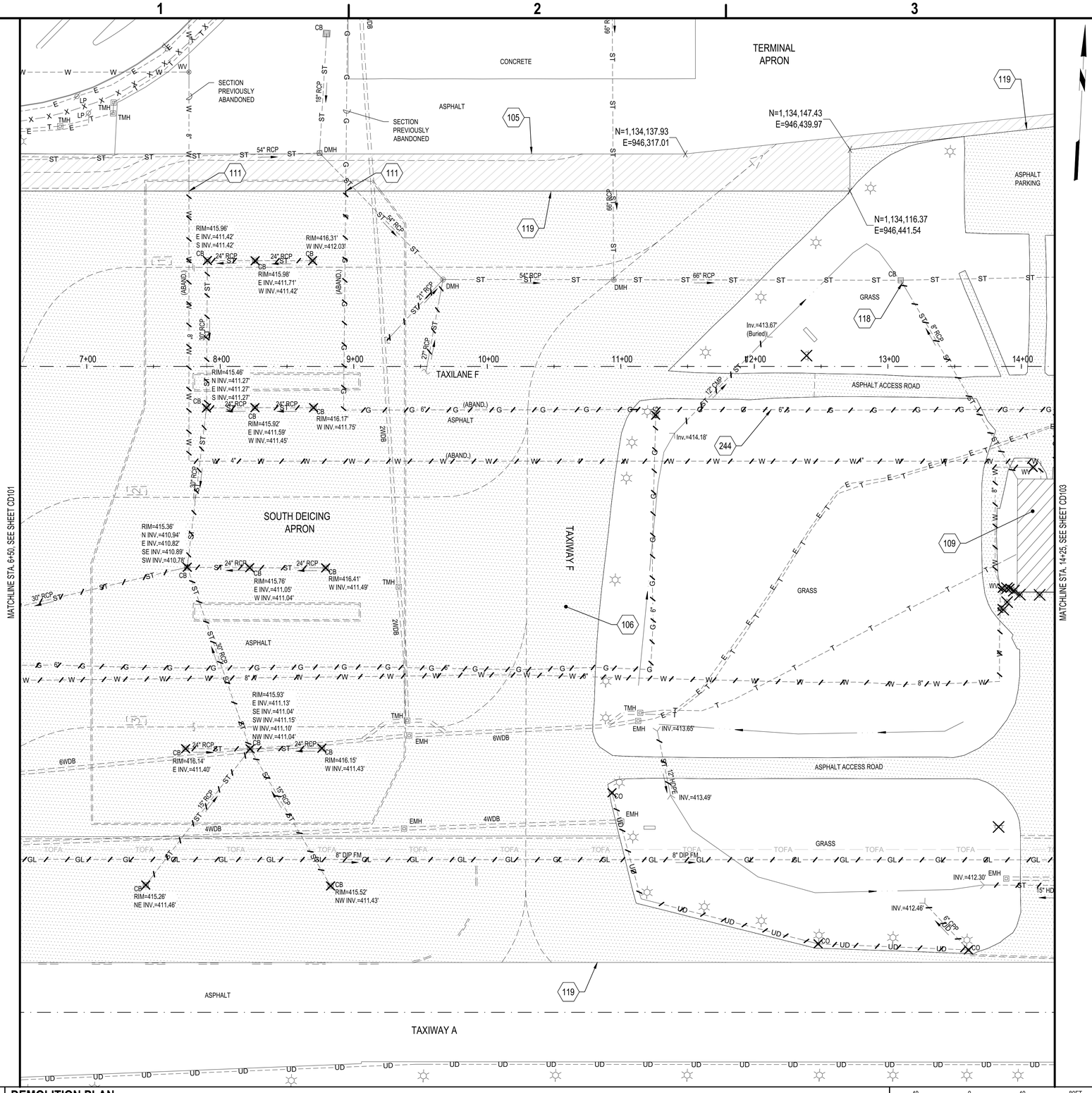
DEMOLITION PLAN

CD101

SHEET NO. 32 OF 113

Copyright ©

Apr 29, 2026 - 3:32pm
F:\Projects\CDR - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_CD Series.dwg



A1 DEMOLITION PLAN

SCALE: 1" = 40'

40 0 40 80FT.
40'

105. SAW CUT EXISTING PAVEMENT AFTER MILLING AND CHIP AWAY EXCESS MATERIAL TO PROVIDE A CLEAN VERTICAL FACE, INCIDENTAL TO ITEM P-101

106. REMOVE ASPHALT PAVEMENT FULL DEPTH, ITEM P-101 AND STONE SUBBASE AND SOILS, ITEM P-152 TO PROVIDE A NEW FULL DEPTH PAVEMENT SECTION.

109. BUILDING TO BE DEMOLISHED AND DISPOSED OF OFF SITE, INCLUDING ALL APPURTENANCES, ITEM P-640.

111. LIMIT OF UTILITY ABANDONMENT/REMOVAL.

118. PIPE AND/OR STRUCTURE BULKHEAD, SEE DETAIL B3/CU502, COST INCIDENTAL TO ITEM P-153.

119. SAW CUT EXISTING PAVEMENT FULL DEPTH PRIOR TO REMOVAL, PROVIDE A CLEAN VERTICAL FACE, INCIDENTAL TO ITEM P-101 (TYP.).

244. PRESERVE EXISTING GAS LINE DURING CONSTRUCTION. UNTIL THE REPLACEMENT GAS LINE IS COMPLETE AND TRANSITIONED OVER, NOT SHOWN ON THIS PLAN FOR CLARITY. PROVIDE A MINIMUM 5-FEET OF CLEARANCE FROM THE WIDEST PORTION OF DRAINAGE ASPECTS DURING TRENCH DRAIN AND CATCH BASIN CONSTRUCTION. FIELD ADJUST TRENCH DRAIN LOCATION AS NECESSARY. COORDINATE WITH RPR.

C4 KEYED NOTES

SCALE: NOT TO SCALE

NOTES:

A. IN GENERAL, EXISTING UTILITIES MAY BE ABANDONED IN PLACE AND PIPES SHALL BE FILLED WITH CONTROLLED LOW STRENGTH MATERIAL (CLSM), ITEM P-153. IF ABANDONED UTILITIES CONFLICT WITH THE PROPOSED INFRASTRUCTURE, THE AFFECTED SECTIONS SHALL BE REMOVED. NO SEPARATE PAYMENT SHALL BE MADE. RATHER THE COST SHALL BE INCIDENTAL TO THE CONSTRUCTION OF THE PROPOSED PROJECT ELEMENT.

B. SEE ED SERIES DRAWINGS FOR ELECTRICAL AND COMMUNICATION DEMOLITION. SEE XM SERIES DRAWINGS FOR AIRFIELD PAVEMENT MARKING DEMOLITION.

C. MAINTAIN AND PROTECT EXISTING UTILITIES THAT MUST REMAIN ACTIVE. IN GENERAL, INSTALL NEW UTILITIES PRIOR TO DEMOLISHING EXISTING. TRANSITION OF THE NATURAL GAS PIPE SHALL BE SEAMLESS AS IT SUPPLIES GAS TO THE ENTIRE AIRPORT TERMINAL COMPLEX.

D. THE CONTRACTOR SHALL PROVIDE TEMPORARY STORM WATER PIPES, PUMPS AND/OR DRAINAGE PATHWAYS AS NECESSARY TO FACILITATE CONSTRUCTION ON NEW UTILITY INFRASTRUCTURE AND TO ACCOMMODATE CONSTRUCTION WORK PHASING. ALL TEMPORARY INFRASTRUCTURE SHALL BE DESIGNED BY THE CONTRACTOR AND APPROVED BY THE RPR. THE COST ASSOCIATED WITH THESE TASKS SHALL BE INCLUDED IN MAINTENANCE AND PROTECTION OF TRAFFIC, NO SEPARATE PAYMENT SHALL BE MADE.

B4 SHEET NOTES

SCALE: NOT TO SCALE

REMOVE ASPHALT PAVEMENT, PAVEMENT EXCAVATION, ITEM P-101, DEPTH VARIES 5" (ROADS) - 16.25"± (APRON). EXCAVATE SUBBASE AND SOIL AS NECESSARY TO ACCOMMODATE PROPOSED PAVEMENT SECTION, ITEM P-152, SEE DETAIL B1/CG501.

PROFILE COLD MILL ASPHALT PAVEMENT, DEPTH VARIES (4"±), ITEM P-101.

ABANDON STORM PIPE IN PLACE (TYP.).

ABANDON WATER PIPE IN PLACE (TYP.).

ABANDON NATURAL GAS PIPE IN PLACE (TYP.).

ABANDON GLYCOL PIPE IN PLACE (TYP.).

ABANDON UNDERDRAIN PIPE IN PLACE (TYP.).

REMOVE WATER VALVE (TYP.), INCIDENTAL TO ITEM P-152

REMOVE DRAINAGE MANHOLE (TYP.), ITEM D-751.

REMOVE DRAINAGE CATCH BASIN (TYP.), ITEM D-751.

REMOVE UNDERDRAIN CLEAN OUT (TYP.), ITEM D-751.

REMOVE FIRE HYDRANT (TYP.), INCIDENTAL TO ITEM P-152.

REMOVE SIGN (TYP.), INCIDENTAL TO ITEM C-106.

REMOVE BOLLARD (TYP.), INCIDENTAL TO ITEM C-106.

A4 KEYED LEGEND

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK
CHRISTOPHER D. BRUBACH
NO. 083424
LICENSED PROFESSIONAL ENGINEER

SYR
SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	068.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

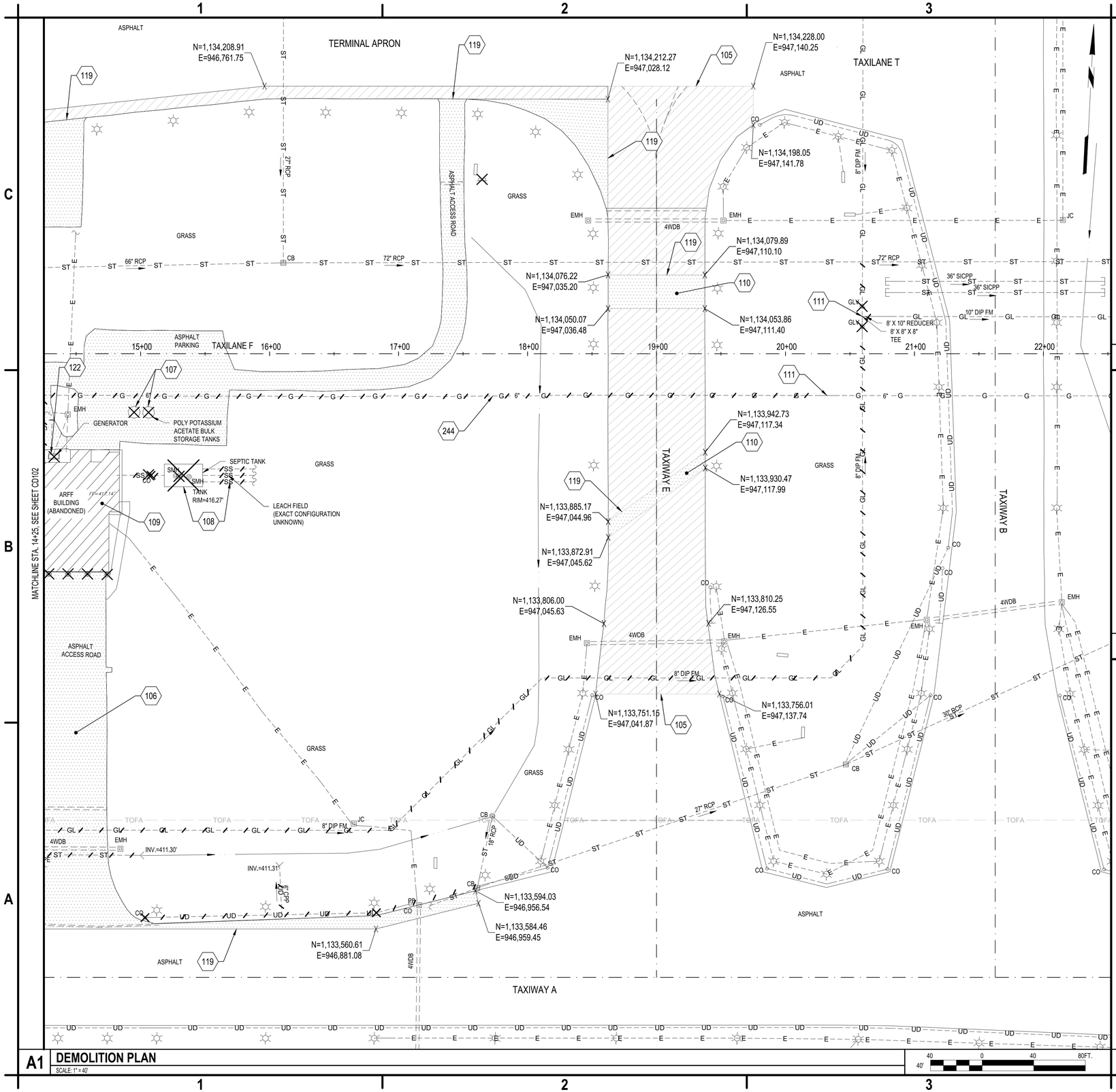
DEMOLITION PLAN

CD102

SHEET NO. 33 OF 113

Copyright ©

Apr 29, 2026 - 9:32pm
F:\Projects\CDB - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_CD Series.dwg



A1 DEMOLITION PLAN

SCALE: 1" = 40'

40' 40 0 40 80FT.

105. SAW CUT EXISTING PAVEMENT AFTER MILLING AND CHIP AWAY EXCESS MATERIAL TO PROVIDE A CLEAN VERTICAL FACE, INCIDENTAL TO ITEM P-101

106. REMOVE ASPHALT PAVEMENT FULL DEPTH, ITEM P-101 AND STONE SUBBASE AND SOILS, ITEM P-152 TO PROVIDE A NEW FULL DEPTH PAVEMENT SECTION.

107. POLYETHYLENE POTASSIUM ACETATE TANKS AND PLUMBING TO BE REMOVED AND DISPOSED OF OFF SITE. CHECK WITH SRAA FOR SALVAGE. INCIDENTAL TO ITEM P-640.

108. SEPTIC TANK AND LEACH FIELD TO BE REMOVED AND DISPOSED OF OFF SITE, ITEM D-751. PUMP/CLEAN TANK(S) WITH OFFSITE DISPOSAL PRIOR TO REMOVAL.

109. BUILDING TO BE DEMOLISHED AND DISPOSED OF OFF SITE, INCLUDING ALL APPURTENANCES, ITEM P-640.

110. REMOVE ASPHALT PAVEMENT FULL DEPTH, ITEM P-101 AND STONE SUBBASE, ITEM P-152 TO PROVIDE A NEW FULL DEPTH PAVEMENT SECTION. PAVEMENT SECTION REMOVAL AND REPLACEMENT IS REQUIRED FOR UTILITY INSTALLATION. ADJUST LOCATION AND CORRIDOR WIDTH AS REQUIRED.

111. LIMIT OF UTILITY ABANDONMENT/REMOVAL.

119. SAW CUT EXISTING PAVEMENT FULL DEPTH PRIOR TO REMOVAL, PROVIDE A CLEAN VERTICAL FACE, INCIDENTAL TO ITEM P-101 (TYP.).

122. ELECTRIC GENERATOR TO BE DEMOLISHED AND DISPOSED OF OFF SITE, INCIDENTAL TO ITEM P-640. CHECK WITH SRAA FOR SALVAGE.

244. PRESERVE EXISTING GAS LINE DURING CONSTRUCTION, UNTIL THE REPLACEMENT GAS LINE IS COMPLETE AND TRANSITIONED OVER, NOT SHOWN ON THIS PLAN FOR CLARITY. PROVIDE A MINIMUM 5-FEET OF CLEARANCE FROM THE WIDEST PORTION OF DRAINAGE ASPECTS DURING TRENCH DRAIN AND CATCH BASIN CONSTRUCTION. FIELD ADJUST TRENCH DRAIN LOCATION AS NECESSARY. COORDINATE WITH RPR.

C4 KEYED NOTES

SCALE: NOT TO SCALE

NOTES:

A. IN GENERAL, EXISTING UTILITIES MAY BE ABANDONED IN PLACE AND PIPES SHALL BE FILLED WITH CONTROLLED LOW STRENGTH MATERIAL (CLSM), ITEM P-153. IF ABANDONED UTILITIES CONFLICT WITH THE PROPOSED INFRASTRUCTURE, THE AFFECTED SECTIONS SHALL BE REMOVED. NO SEPARATE PAYMENT SHALL BE MADE. RATHER THE COST SHALL BE INCIDENTAL TO THE CONSTRUCTION OF THE PROPOSED PROJECT ELEMENT.

B. SEE ED SERIES DRAWINGS FOR ELECTRICAL AND COMMUNICATION DEMOLITION. SEE XM SERIES DRAWINGS FOR AIRFIELD PAVEMENT MARKING DEMOLITION.

C. MAINTAIN AND PROTECT EXISTING UTILITIES THAT MUST REMAIN ACTIVE. IN GENERAL, INSTALL NEW UTILITIES PRIOR TO DEMOLISHING EXISTING. TRANSITION OF THE NATURAL GAS PIPE SHALL BE SEAMLESS AS IT SUPPLIES GAS TO THE ENTIRE AIRPORT TERMINAL COMPLEX.

D. THE CONTRACTOR SHALL PROVIDE TEMPORARY STORM WATER PIPES, PUMPS AND/OR DRAINAGE PATHWAYS AS NECESSARY TO FACILITATE CONSTRUCTION ON NEW UTILITY INFRASTRUCTURE AND TO ACCOMMODATE CONSTRUCTION WORK PHASING. ALL TEMPORARY INFRASTRUCTURE SHALL BE DESIGNED BY THE CONTRACTOR AND APPROVED BY THE RPR. THE COST ASSOCIATED WITH THESE TASKS SHALL BE INCLUDED IN MAINTENANCE AND PROTECTION OF TRAFFIC, NO SEPARATE PAYMENT SHALL BE MADE.

B4 SHEET NOTES

SCALE: NOT TO SCALE

- REMOVE ASPHALT PAVEMENT, PAVEMENT EXCAVATION, ITEM P-101, DEPTH VARIES 5" (ROADS) - 16.25"± (APRON). EXCAVATE SUBBASE AND SOIL AS NECESSARY TO ACCOMMODATE PROPOSED PAVEMENT SECTION, ITEM P-152, SEE DETAIL B1/CG501.
- PROFILE COLD MILL ASPHALT PAVEMENT, DEPTH VARIES (4"±), ITEM P-101.
- ABANDON STORM PIPE IN PLACE (TYP.).
- ABANDON WATER PIPE IN PLACE (TYP.).
- ABANDON NATURAL GAS PIPE IN PLACE (TYP.).
- ABANDON GLYCOL PIPE IN PLACE (TYP.).
- ABANDON UNDERDRAIN PIPE IN PLACE (TYP.).
- REMOVE WATER VALVE (TYP.), INCIDENTAL TO ITEM P-152
- REMOVE DRAINAGE MANHOLE (TYP.), ITEM D-751.
- REMOVE DRAINAGE CATCH BASIN (TYP.), ITEM D-751.
- REMOVE UNDERDRAIN CLEAN OUT (TYP.), ITEM D-751.
- REMOVE FIRE HYDRANT (TYP.), INCIDENTAL TO ITEM P-152.
- REMOVE SIGN (TYP.), INCIDENTAL TO ITEM C-106.
- REMOVE BOLLARD (TYP.), INCIDENTAL TO ITEM C-106.

A4 KEYED LEGEND

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · LICENSED PROFESSIONAL ENGINEER · NO. 083424

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	068.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

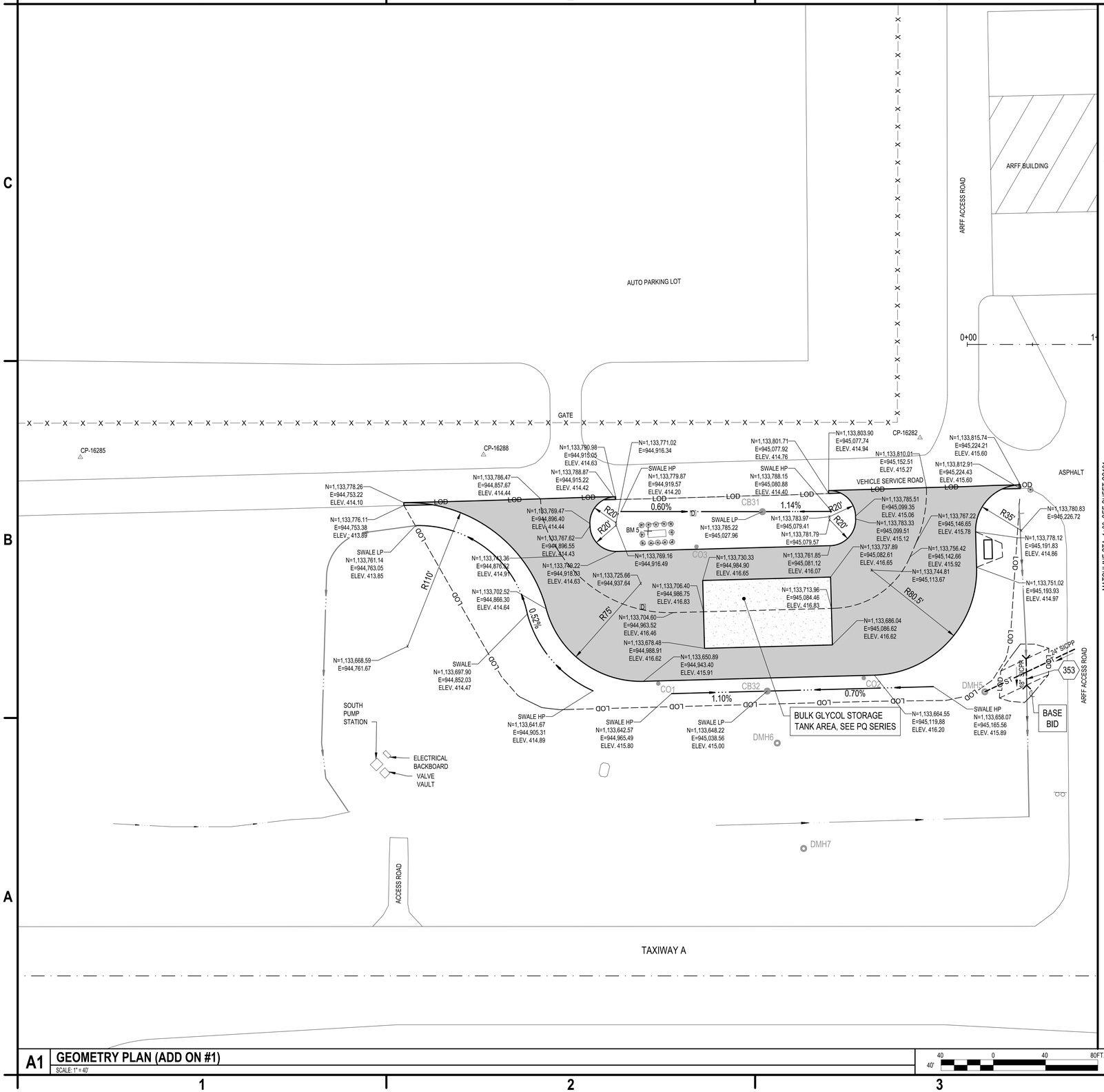
DEMOLITION PLAN

CD103

SHEET NO. 34 OF 113

Copyright ©

Apr 29, 2026 - 9:33pm
F:\Project\C08 - Syracuse Regional Airport Authority\068069001 - Comp Deicing Pad\Design\CADD\Sheet Files\068069001_CD Series.dwg



A1 GEOMETRY PLAN (ADD ON #1)
SCALE: 1" = 40'

353. PIPE WITH END SECTIONS PLACED ALONG CENTERLINE OF REGRADED SWALE. MATCH EXISTING INVERTS AND MAINTAIN POSITIVE DRAINAGE. BACKFILL SWALE TO TOP OF BANKS WITH SUITABLE ON-SITE MATERIAL AND 5" OF TOPSOIL. SLOPE MAXIMUM 25% TO MEET EXISTING GRADE. INCLUDE ALL WORK AND MATERIALS IN ITEM D-701.

CENTERLINE OF DRAINAGE SWALE
GRADE BREAK LINE
LOD — LIMIT OF DISTURBANCE
CP-16029 — SURVEY CONTROL POINT
BM 1 — BENCHMARK LOCATION

A4 KEYED LEGEND
SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · NO. 083424 · LICENSED PROFESSIONAL ENGINEER

SYR
SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	J. CONESE
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

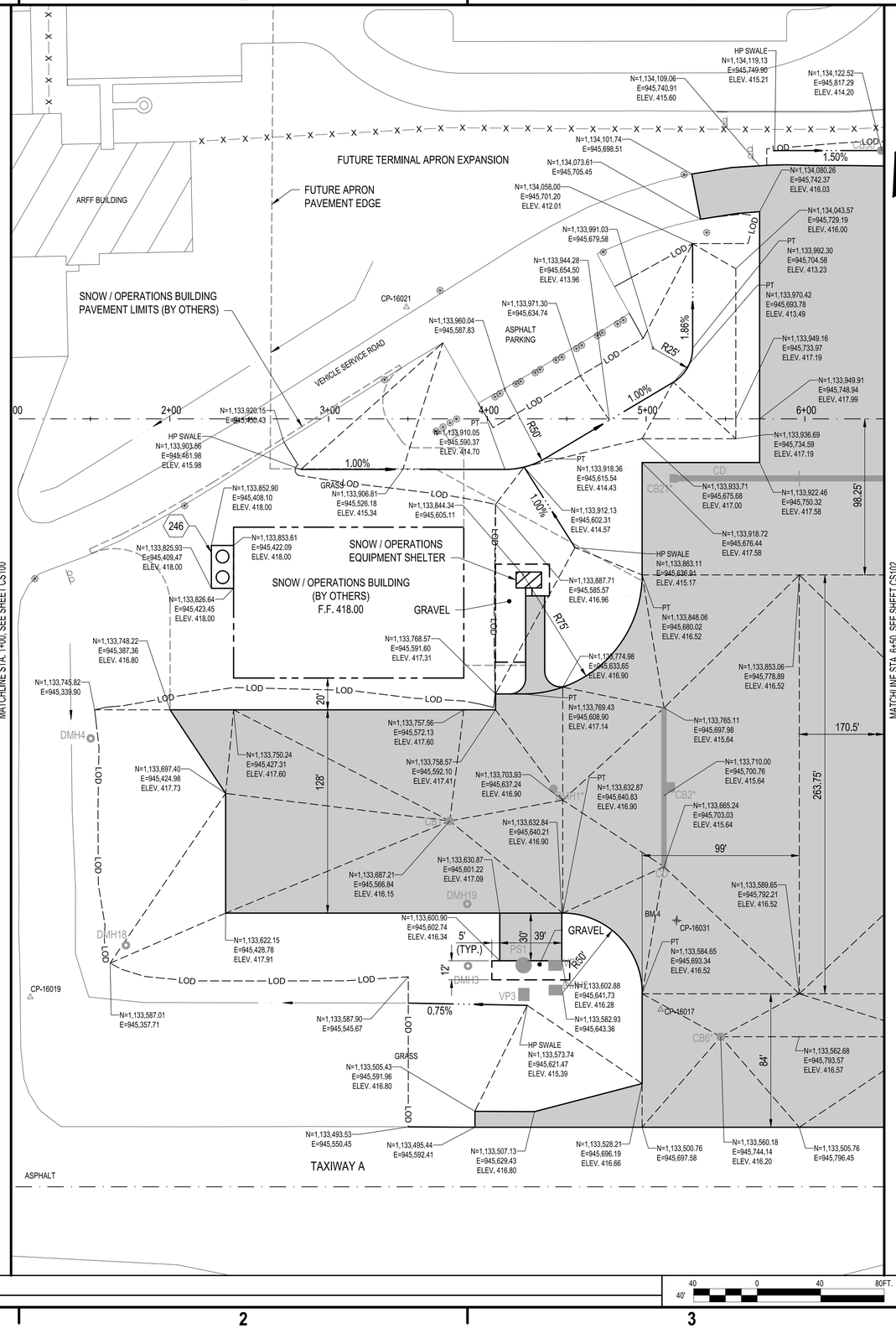
NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

GEOMETRY PLAN (ADD ON #1)

CS100

SHEET NO. 35 OF 113

Copyright ©



SURVEY CONTROL POINTS

POINT ID	NORTHING	EASTING	ELEVATION	DESCRIPTION
CP-1 (HANCOCK NE BASE)	1,137,869.990	944,220.350	410,83'	PRIMARY AIRPORT CONTROL STATION (PACS)
CP-2 (HANCOCK BASE CENTER)	1,135,879.250	941,975.230	414,86'	SECONDARY AIRPORT CONTROL STATION (SACS)
CP-3 (SYR C)	1,133,848.950	950,180.640	405,39'	SECONDARY AIRPORT CONTROL STATION (SACS)
BM 2	1,133,726.280	947,461.730	413,86'	"X" CUT ON SIGN BASE
BM 3	1,133,631.496	946,310.009	415,18'	NAIL SET IN SIGN BASE
BM 4	1,133,631.933	945,712.744	415,81'	NAIL SET IN CONC RIM
BM 5	1,133,766.010	944,941.120	415,18'	NAIL SET IN CONC PAD
CP-10008	1,134,266.767	947,510.165	415.51'	5/8" REBAR WITH CAP SET
CP-10010	1,133,777.685	947,525.103	413.62'	5/8" REBAR WITH CAP SET
CP-10012	1,133,458.833	947,654.491	410,91'	5/8" REBAR WITH CAP SET
CP-10014	1,133,460.715	946,946.935	414,02'	5/8" REBAR WITH CAP SET
CP-10016	1,134,022.783	947,162.209	413,33'	5/8" REBAR WITH CAP SET
CP-16013	1,133,569.262	946,446.840	415,10'	5/8" REBAR WITH CAP SET
CP-16015	1,133,407.520	945,973.135	415,84'	5/8" REBAR WITH CAP SET
CP-16017	1,133,575.348	945,705.438	417,18'	5/8" REBAR WITH CAP SET
CP-16019	1,133,563.123	945,308.556	415,94'	5/8" REBAR WITH CAP SET
CP-16021	1,134,009.005	945,523.194	416,87'	5/8" REBAR WITH CAP SET
CP-16023	1,134,143.758	945,913.370	416,11'	5/8" REBAR WITH CAP SET
CP-16025	1,133,994.900	946,394.130	416.67'	5/8" REBAR WITH CAP SET
CP-16027	1,134,150.852	946,733.230	414,51'	5/8" REBAR WITH CAP SET
CP-16029	1,133,631.496	946,310.009	415,18'	5/8" REBAR WITH CAP SET
CP-16031	1,133,631.933	945,712.744	415,81'	5/8" REBAR WITH CAP SET
CP-16282	1,133,847.892	945,145,706	414,90'	5/8" REBAR WITH CAP SET
CP-16285	1,133,800.514	944,503.992	414,08'	5/8" REBAR WITH CAP SET
CP-16288	1,133,817.962	944,812.363	413,98'	5/8" REBAR WITH CAP SET

1. THE HORIZONTAL DATUM FOR THIS SURVEY IS BASED ON NYS CENTRAL ZONE NAD83(2011) (NORTH AMERICAN DATUM 1983/2011).
2. THE VERTICAL DATUM FOR THIS SURVEY IS BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
3. ALL HORIZONTAL AND VERTICAL CONTROL IS REFERENCED TO PRIMARY AIRPORT CONTROL STATION (PACS) "HANCOCK NE BASE", WITH AN ELEVATION OF 410.83'.

TAXILANE "F"

BEGINNING STA. 0+00.00 N 1,133,931.05 E 945,177.68
TANGENT DIRECTION: 2.8950°
TANGENT LENGTH: 1900.00'
END STA. 19+00.00 N 1,134,027.01 E 947,075.26

B4 SURVEY CONTROL AND HORIZONTAL ALIGNMENT

SCALE: NOT TO SCALE

- CENTERLINE OF DRAINAGE SWALE
- GRADE BREAK LINE
- LOD — LIMIT OF DISTURBANCE
- CP-16029 — SURVEY CONTROL POINT
- BM 1 — BENCHMARK LOCATION

246. POTASSIUM ACETATE STORAGE TANKS (ADD ON #1). COORDINATE EXACT LOCATION AND ELEVATION WITH BUILDING CONTRACTOR, ITEM PQ-101, SEE DETAIL B1/PQ202.

A1 GEOMETRY PLAN

SCALE: 1" = 40'

A4 KEYED LEGEND AND KEYED NOTES

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · NO. 083424 · LICENSED PROFESSIONAL ENGINEER

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

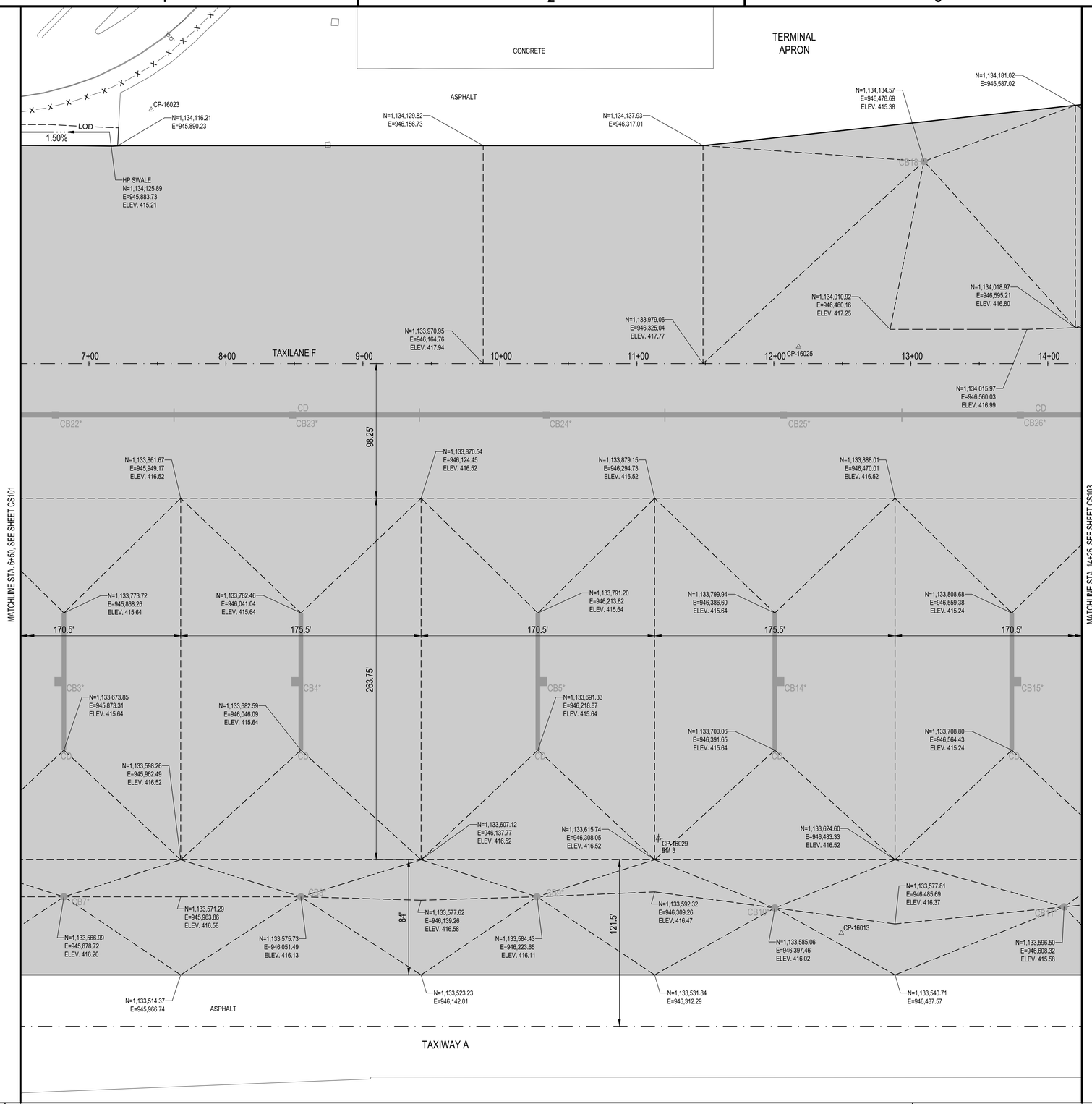
GEOMETRY PLAN

CS101

SHEET NO. 36 OF 113

Copyright ©

Apr 29, 2026 - 9:33pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CAD\Sheet Files\O68069001_CS Series.dwg



A1 GEOMETRY PLAN
SCALE: 1" = 40'

40' 40 0 40 80FT.

CENTERLINE OF DRAINAGE SWALE
GRADE BREAK LINE
LOD — LIMIT OF DISTURBANCE
CP-16029 — SURVEY CONTROL POINT
BM 1 — BENCHMARK LOCATION

A4 KEYED LEGEND
SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · NO. 083424 · LICENSED PROFESSIONAL ENGINEER

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

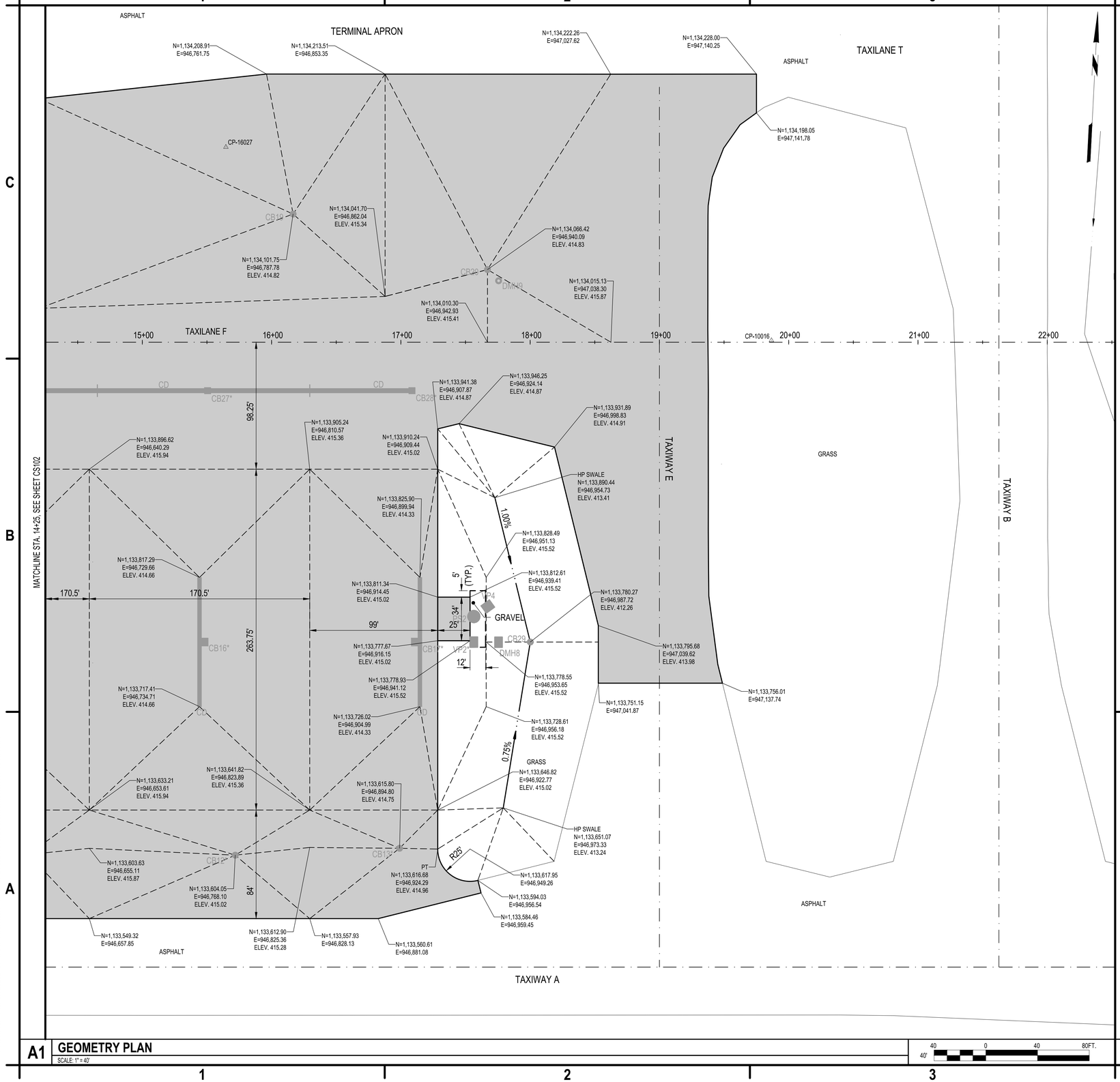
GEOMETRY PLAN

CS102

SHEET NO. 37 OF 113

Copyright ©

Apr 29, 2026 - 3:39pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Como Deicing Pad\Design\CADD\Sheet Files\O68069001_CS Series.dwg



A1 GEOMETRY PLAN
SCALE: 1" = 40'

40' 40 0 40 80FT.

CENTERLINE OF DRAINAGE SWALE
GRADE BREAK LINE
LOD — LIMIT OF DISTURBANCE
CP-16029 — SURVEY CONTROL POINT
BM 1 — BENCHMARK LOCATION

A4 KEYED LEGEND
SCALE: NOT TO SCALE

Apr 29, 2026 - 3:33pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_CS Series.dwg

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK
CHRISTOPHER D. BRUBACH
NO. 083424
LICENSED PROFESSIONAL ENGINEER

SYR
SYRACUSE HANCOCK
INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

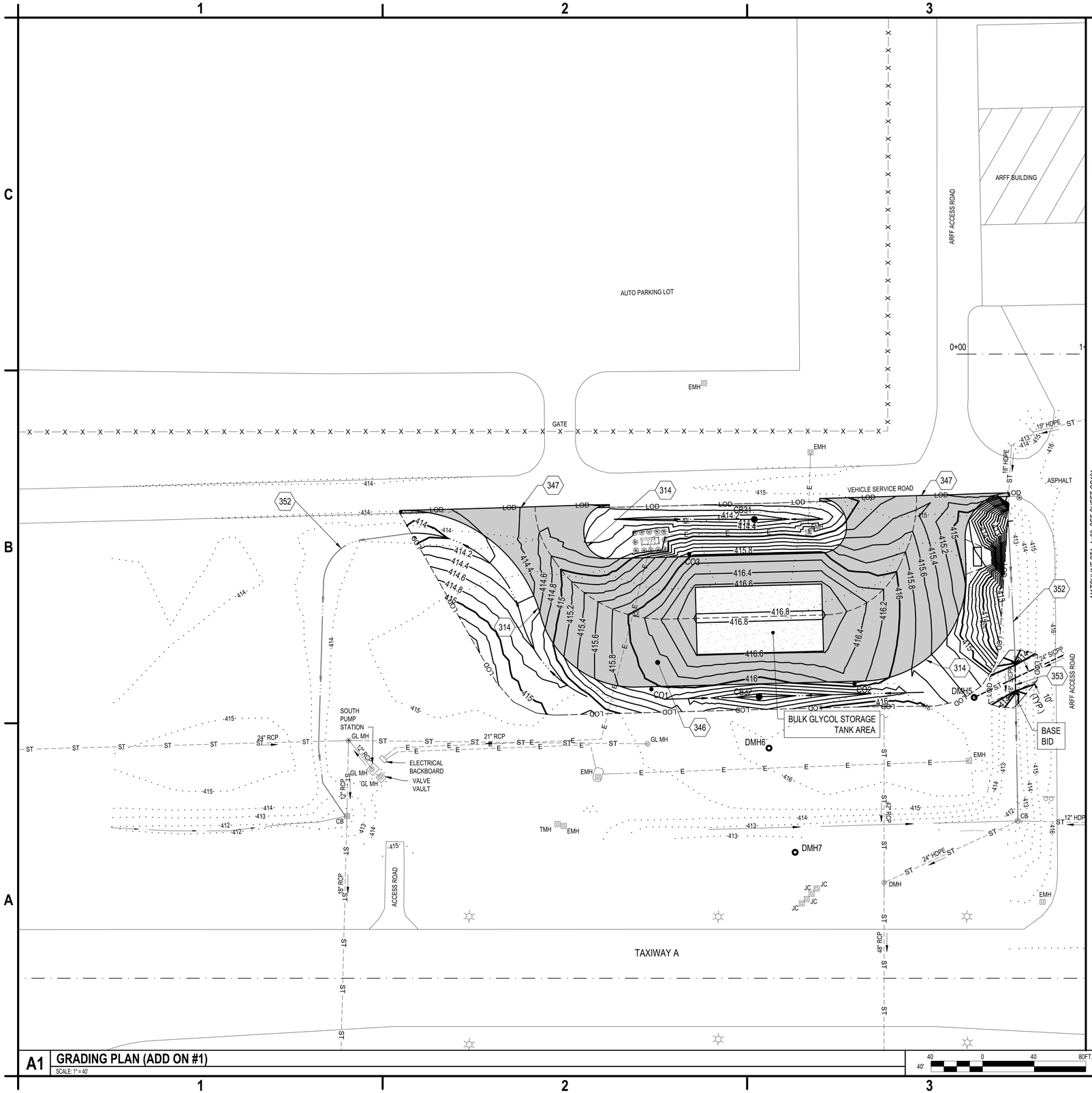
PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

GEOMETRY PLAN

CS103
SHEET NO. 38 OF 113

Copyright ©



314. SEE EDGE OF PAVEMENT DETAIL A2/CG502.

346. CONSTRUCT NEW FULL DEPTH PAVEMENT. FOR TYPICAL SECTION, SEE DETAIL B1/CG501.

347. MEET EXISTING PAVEMENT, SEE DETAIL B4/CG501.

352. REGRADE/CLEAN OUT SEDIMENT FROM EXISTING SWALE LINE.

353. PIPE WITH END SECTIONS PLACED ALONG CENTERLINE OF REGRADED SWALE. MATCH EXISTING INVERTS AND MAINTAIN POSITIVE DRAINAGE. BACKFILL SWALE TO TOP OF BANKS WITH SUITABLE ON-SITE MATERIAL AND 5" OF TOPSOIL. SLOPE MAXIMUM 25% TO MEET EXISTING GRADE. INCLUDE ALL WORK AND MATERIALS IN ITEM D-701.

B4 KEYED NOTES

SCALE: NOT TO SCALE

- CENTERLINE OF DRAINAGE SWALE
- GRADE BREAK LINE
- LOD — LIMIT OF DISTURBANCE
- 1.00% — SLOPE VECTOR

A1 GRADING PLAN (ADD ON #1)

SCALE: 1" = 40'

40' 40 0 40 80FT.

A4 KEYED LEGEND

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · LICENSED PROFESSIONAL ENGINEER · NO. 083424

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	068.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	J. CONESE
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

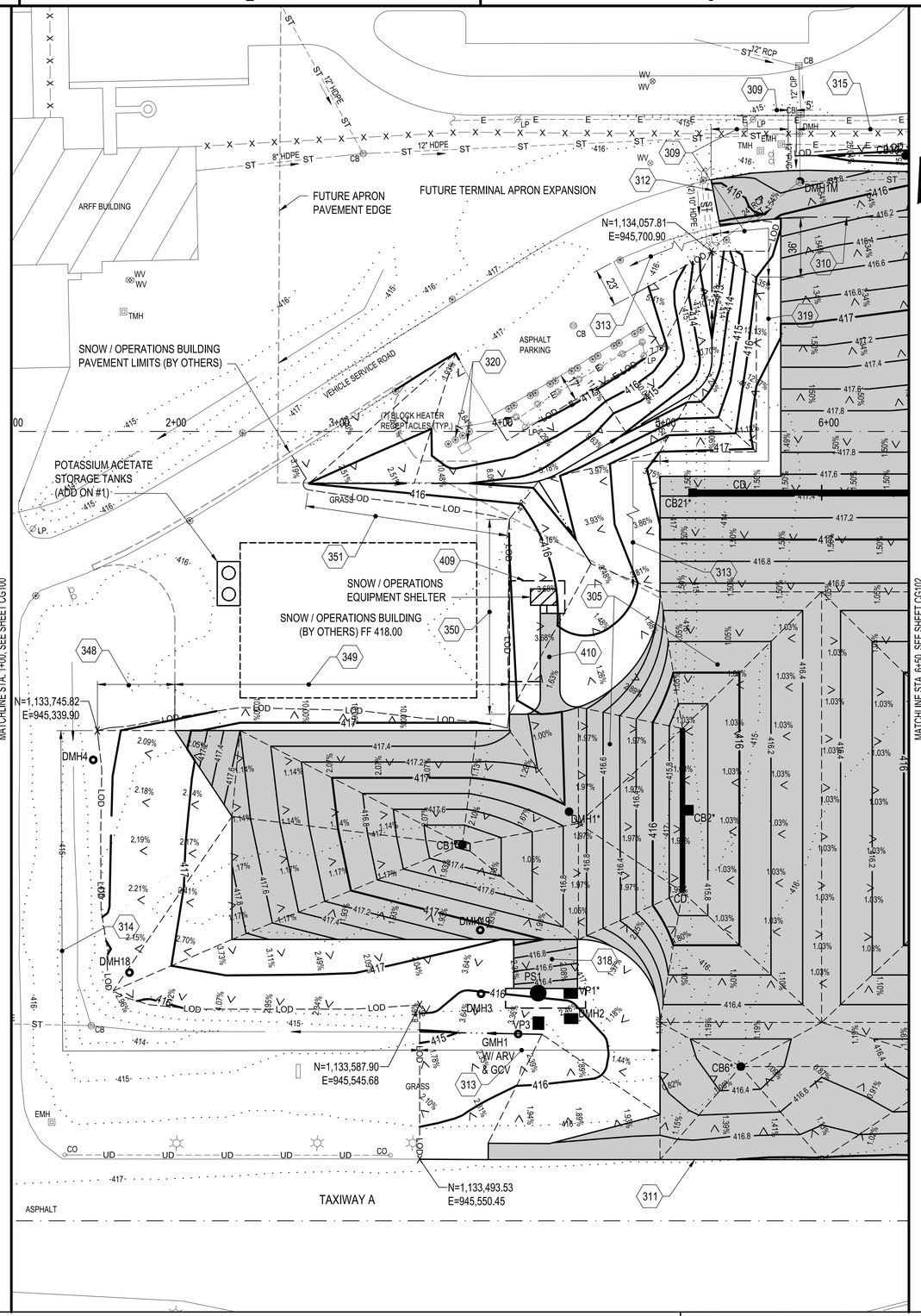
GRADING PLAN (ADD ON #1)

CG100

SHEET NO. 39 OF 113

Copyright ©

Apr 29, 2026 - 3:33pm
F:\Project\O68 - Syracuse Regional Airport Authority\O68069001 - Como Deicing Part\Design\CADD\Sheet Files\O68069001_CG Series.dwg



B4 KEYED NOTES

SCALE: NOT TO SCALE

305. CONSTRUCT NEW FULL DEPTH PAVEMENT. FOR TYPICAL SECTION, SEE DETAIL B1/CG501.
309. EDGE OF PAVEMENT GRADES VARY.
310. SEE KEYING DETAIL A2/CG501
311. MEET EXISTING PAVEMENT. SEE KEYING DETAIL A3/CG501.
312. MEET EXISTING PAVEMENT. SEE KEYING DETAIL A4/CG501.
313. SEE EDGE OF PAVEMENT DETAIL A1/CG502.
314. SEE EDGE OF PAVEMENT DETAIL A2/CG502.
315. SEE EDGE OF PAVEMENT DETAIL A3/CG502.
318. ASPHALT MAINTENANCE PAD, SEE DETAIL C1/CG501.
319. SEE EDGE OF PAVEMENT DETAIL B1/CG502.
320. THE GRADE AT EXISTING SIGNS BASES, JUNCTION CANS, LIGHT BASES, MANHOLES, CONCRETE PADS, ETC. WITHIN THE LIMITS OF TURF GRADING THAT REMAIN (NOT SCHEDULED FOR GRADE ADJUSTMENT), SHALL BE MET WITHOUT CREATING VERTICAL DROPS IN GRADE. PROVIDE POSITIVE DRAINAGE AWAY FROM BASES, STRUCTURES, PADS, ETC., 3% MAX. (TYP.).
348. SEE EDGE OF PAVEMENT DETAIL B2/CG502.
349. SEE EDGE OF PAVEMENT DETAIL B3/CG502.
350. SEE EDGE OF PAVEMENT DETAIL B4/CG502.
351. SEE EDGE OF PAVEMENT DETAIL C1/CG502.
409. LIMITS OF CRUSHED STONE MAINTENANCE AREA, 6-INCH DEPTH WITH GEOTEXTILE SEPARATION FABRIC, INCIDENTAL TO ITEM L-109.
410. ELECTRICAL EQUIPMENT SHELTER ACCESS ROAD, SEE DETAIL C1/CG501.

A4 KEYED LEGEND

SCALE: NOT TO SCALE

- CENTERLINE OF DRAINAGE SWALE
- GRADE BREAK LINE
- LOD — LIMIT OF DISTURBANCE
- 1.00% — SLOPE VECTOR

A1 GRADING PLAN

SCALE: 1" = 40'

40 0 40 80FT.

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · LICENSED PROFESSIONAL ENGINEER · NO. 083424

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

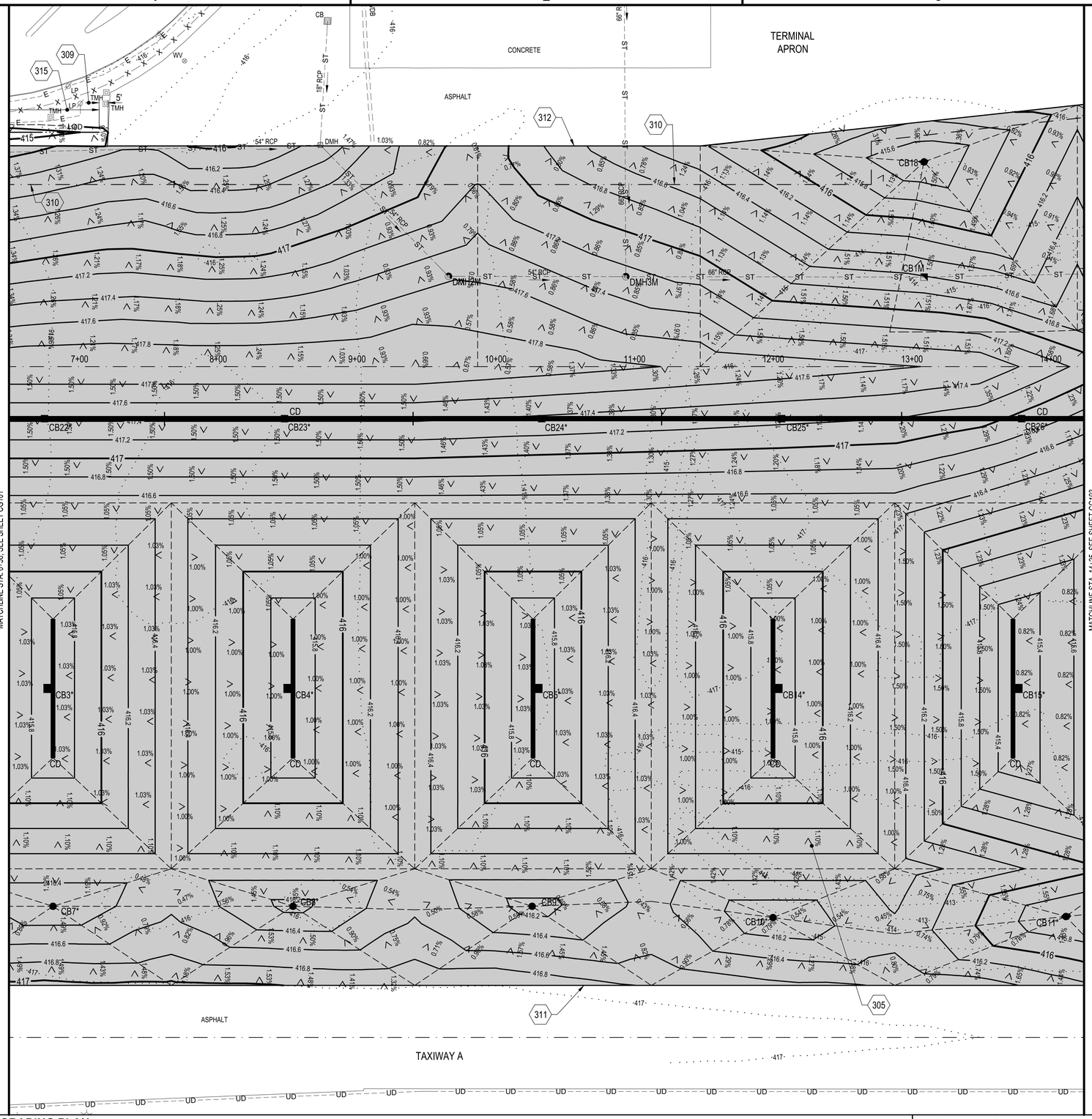
GRADING PLAN

CG101

SHEET NO. 40 OF 113

Copyright ©

Apr 29, 2026 - 3:33pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_GS Series.dwg



B4 KEYED NOTES

SCALE: NOT TO SCALE

305. CONSTRUCT NEW FULL DEPTH PAVEMENT. FOR TYPICAL SECTION, SEE DETAIL B1/CG501.
309. EDGE OF PAVEMENT GRADES VARY.
310. SEE KEYING DETAIL A2/CG501
311. MEET EXISTING PAVEMENT. SEE KEYING DETAIL A3/CG501.
312. MEET EXISTING PAVEMENT. SEE KEYING DETAIL A4/CG501.
315. SEE EDGE OF PAVEMENT DETAIL A3/CG502.

A4 KEYED LEGEND

SCALE: NOT TO SCALE

- CENTERLINE OF DRAINAGE SWALE
- GRADE BREAK LINE
- LOD — LIMIT OF DISTURBANCE
- 1.00% — SLOPE VECTOR

A1 GRADING PLAN

SCALE: 1" = 40'

40' 0 40 80FT.

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK
CHRISTOPHER D. BRUBACH
LICENSED PROFESSIONAL ENGINEER
NO. 083424

SYR
SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

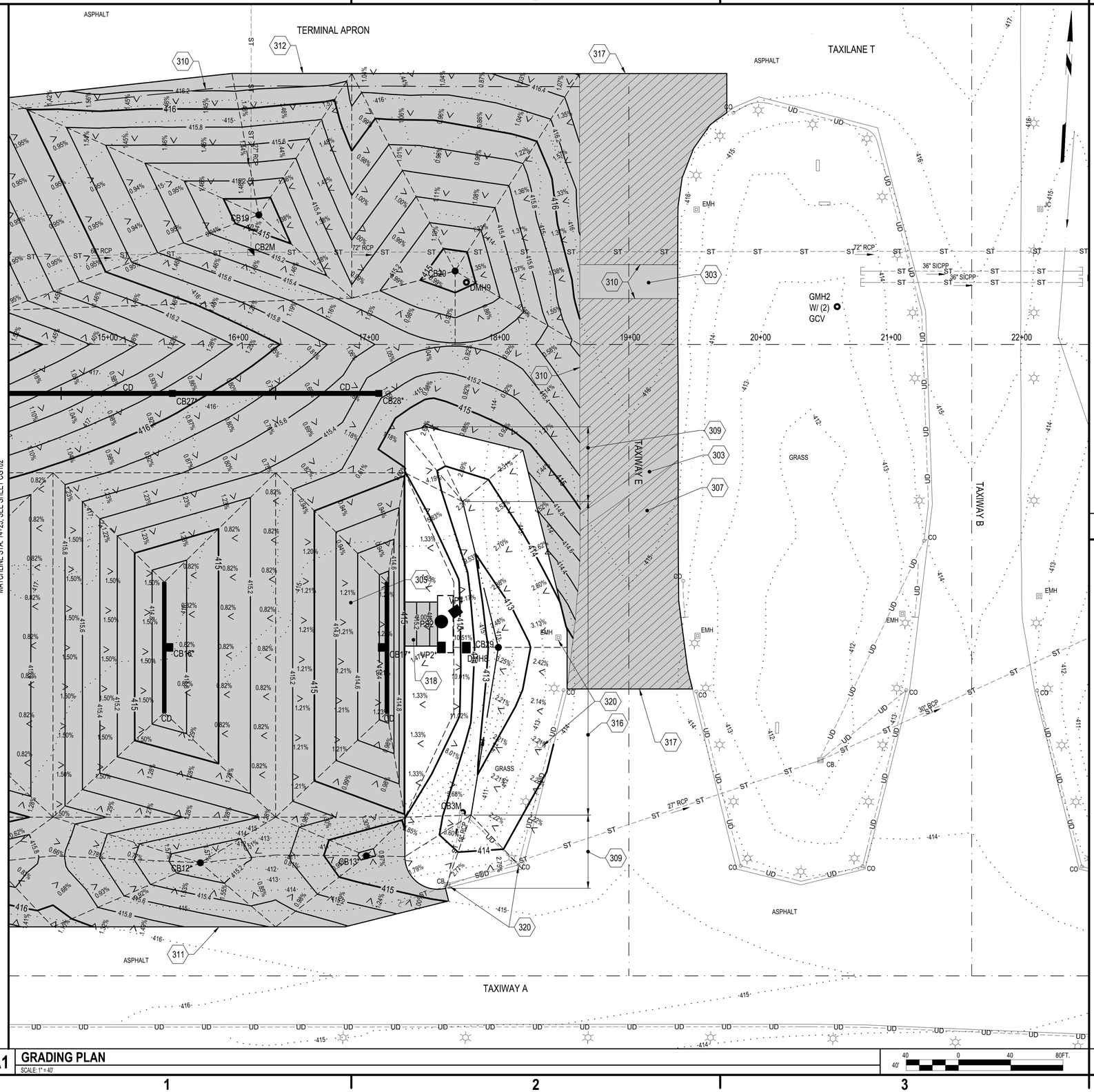
GRADING PLAN

CG102

SHEET NO. 41 OF 113

Copyright ©

Apr 29, 2026 - 9:33pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_CG Series.dwg



305. CONSTRUCT NEW FULL DEPTH PAVEMENT. FOR TYPICAL SECTION, SEE DETAIL B1/CG501.
303. 12" CEMENT TREATED SUBGRADE NOT REQUIRED FOR FULL DEPTH PAVEMENT RECONSTRUCTION IN MILLED AREAS.
307. PARTIAL DEPTH MILLING AND OVERLAY. GENERALLY MATCH EXISTING GRADE. FOR TYPICAL SECTION, SEE DETAIL C2/CG501.
309. EDGE OF PAVEMENT GRADES VARY.
310. SEE KEYING DETAIL A2/CG501
311. MEET EXISTING PAVEMENT. SEE KEYING DETAIL A3/CG501.
312. MEET EXISTING PAVEMENT. SEE KEYING DETAIL A4/CG501.
316. SEE EDGE OF PAVEMENT DETAIL A4/CG502.
317. MEET EXISTING PAVEMENT. SEE KEYING DETAIL C2/CG501.
318. ASPHALT MAINTENANCE PAD, SEE DETAIL C1/CG501.
320. THE GRADE AT EXISTING SIGNS BASES, JUNCTION CANS, LIGHT BASES, MANHOLES, CONCRETE PADS, ETC. WITHIN THE LIMITS OF TURF GRADING THAT REMAIN (NOT SCHEDULED FOR GRADE ADJUSTMENT), SHALL BE MET WITHOUT CREATING VERTICAL DROPS IN GRADE. PROVIDE POSITIVE DRAINAGE AWAY FROM BASES, STRUCTURES, PADS, ETC., 3% MAX. (TYP.).

B4 KEYED NOTES
SCALE: NOT TO SCALE

CENTERLINE OF DRAINAGE SWALE
GRADE BREAK LINE
LOD — LIMIT OF DISTURBANCE
1.00% — SLOPE VECTOR

A1 GRADING PLAN
SCALE: 1" = 40'

40' 40 0 40 80FT.

A4 KEYED LEGEND
SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · NO. 083424 · LICENSED PROFESSIONAL ENGINEER

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	068.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

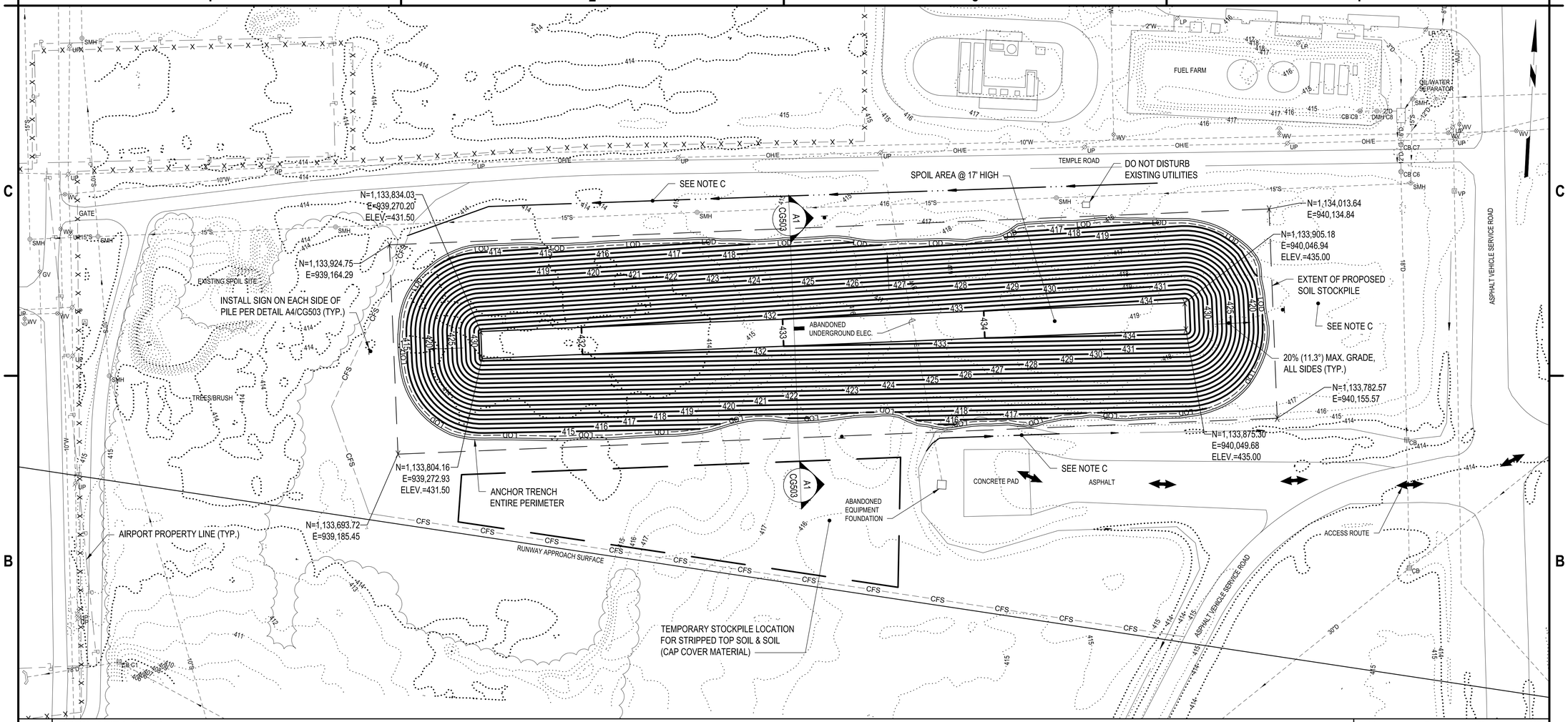
GRADING PLAN

CG103

SHEET NO. 42 OF 113

Copyright ©

Apr 29, 2026 - 3:33pm
F:\Project\O68 - Syracuse Regional Airport Authority\O68069001 - Corro Deicing Pad\Design\CADD\Sheet Files\O68069001_CG Series.dwg



B1 SPOIL AREA PLAN

SCALE: 1" = 60'

60 0 60 120FT.

60"

A. EXISTING SITE TOPOGRAPHY WAS NOT FIELD SURVEYED DURING DESIGN. SURFACE CONTOURS SHOWN ARE FROM AERIAL LIDAR DATA OBTAINED FROM ONLINE DATABASES. EXISTING GRADES WILL VARY FROM THOSE SHOWN AND IS PROVIDED FOR REFERENCE PURPOSES ONLY.

B. 5.2± ACRE AREA STORAGE CAPACITY AT 17' DEPTH EQUALS APPROXIMATELY 64,350 CY FILL CAPACITY. EXPAND FILL/LINER TO THE EAST IF NECESSARY TO OBTAIN MORE STORAGE CAPACITY. OBTAIN RPR APPROVAL.

C. MAINTAIN EXISTING DRAINAGE PATTERNS. ENSURE THAT THE SITE DRAINS FREELY AFTER FILLING OPERATIONS ARE COMPLETE. INCREMENTAL SITE GRADING MAY BE REQUIRED AROUND THE SITE TO FACILITATE WATER CONVEYANCE TO OUTFALLS. SITE GRADING SHALL BE INCIDENTAL TO C-102.

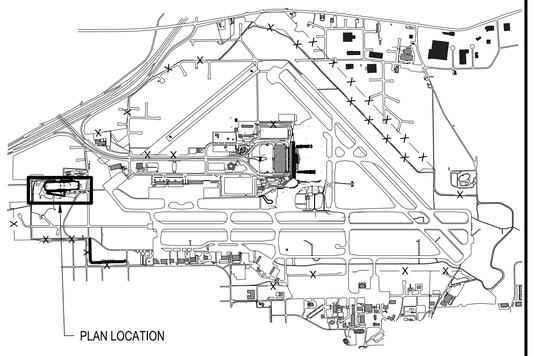
D. THIS LINED SPOIL SITE APPLIES TO EXCESS MATERIALS OBTAINED EAST OF THE ARFF ACCESS ROAD ONLY (BASE BID). ALL EXCESS MATERIALS OBTAINED WEST OF THE ARFF ACCESS ROAD (ADD ON #1) SHALL BE SPOILED AT THE NORTHERN ON-SITE SPOIL AREA (NOT LINED).

E. ALL COSTS ASSOCIATED WITH THE SPOIL SITE SHOWN ON THIS SHEET SHALL BE INCLUDED IN ITEM PQ-102 UNLESS OTHERWISE NOTED. SPECIFICATION PQ-102 "SPOIL AREA LINER SYSTEM" SERVES AS THE AVENUE FOR MEASUREMENT AND PAYMENT, WHILE THE CSI STYLE TECHNICAL SPECIFICATIONS LISTED IN PQ-102 GOVERN THE WORK TASKS.

WORK ITEMS THAT ARE PAID FOR SEPARATELY UNDER OTHER UNIT PRICED ITEMS SHALL INCLUDE:

- P-152 "UNCLASSIFIED EXCAVATION"
- T-901 "SEEDING - WET APPLIED"
- T-905 "TOPSOIL"
- T-908 "MULCHING"

NO SEPARATE PAYMENT SHALL BE MADE FOR SPOIL OR COVER MATERIAL HAULING, GRADING, PLACEMENT AND COMPACTION. THE COSTS ASSOCIATED THEREFORE SHALL BE INCLUDED IN ITEM P-152, UNCLASSIFIED EXCAVATION, AND PAID FOR ONCE.



A1 KEYED NOTES

SCALE: NOT TO SCALE

A2 SHEET NOTES

SCALE: NOT TO SCALE

A4 KEY MAP

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · LICENSED PROFESSIONAL ENGINEER · NO. 083424

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	068.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	C. BRUBACH/ M. WALKER
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

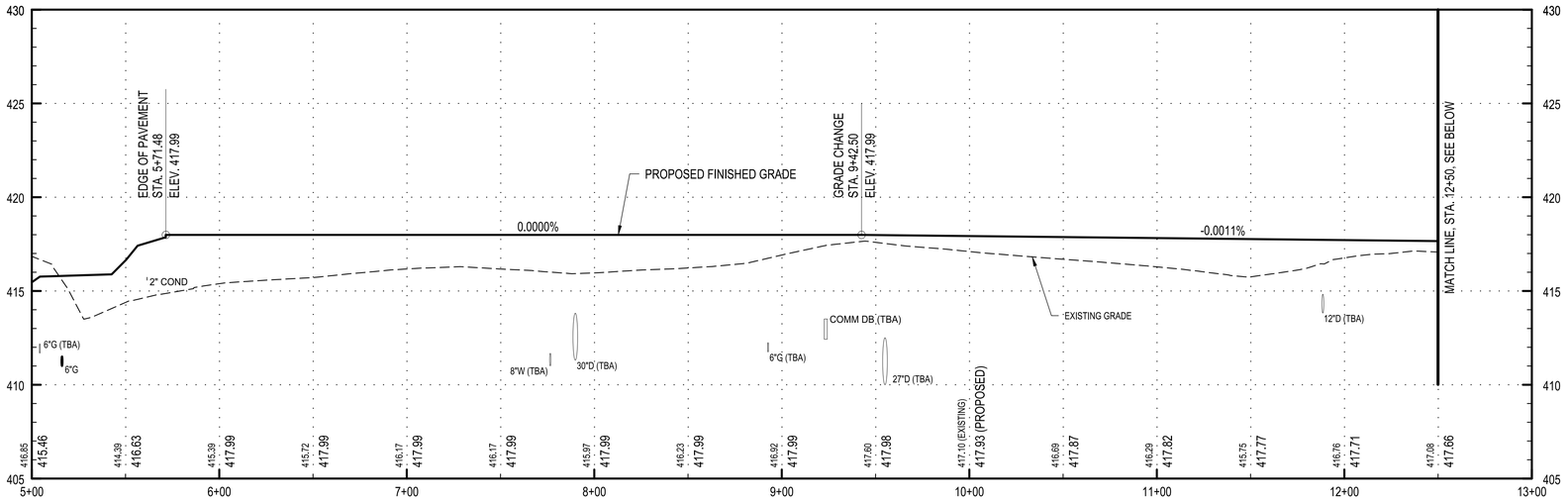
SPOIL AREA PLAN

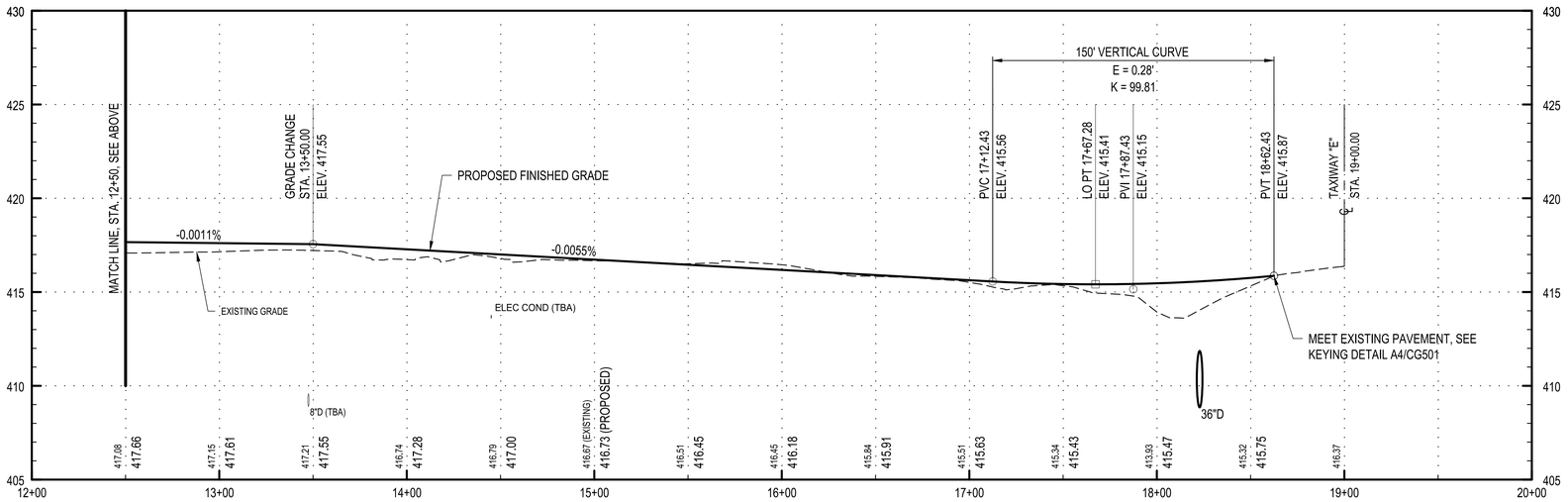
CG104

SHEET NO. 43 OF 113

Copyright ©

Apr 29, 2026 - 3:34pm
F:\Projects\C68 - Syracuse Regional Airport Authority\068069001 - Comp Deicing Pad\Design\CADD\Sheet Files\068069001_CG104.dwg





NOTE:
TBA - TO BE ABANDONED. IN GENERAL, EXISTING UTILITIES MAY BE ABANDONED IN PLACE AND PIPES SHALL BE FILLED WITH CONTROLLED LOW STRENGTH MATERIAL (CLSM), ITEM P-153. IF ABANDONED UTILITIES CONFLICT WITH THE PROPOSED INFRASTRUCTURE, THE AFFECTED SECTIONS SHALL BE REMOVED.

A1 TAXILANE "F" CENTERLINE PROFILE
SCALE: 1" = 40' HORIZONTAL, 1" = 5' VERTICAL

HORIZ. 40' 40 0 40 80FT.
VERT. 5' 5 0 5 10FT.

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · LICENSED PROFESSIONAL ENGINEER · NO. 083424

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

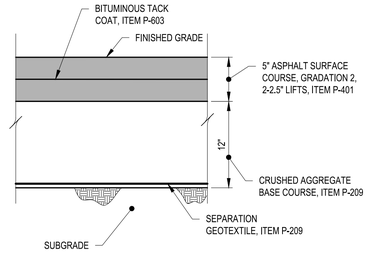
TAXILANE "F" CENTERLINE PROFILE

CG201

SHEET NO. 44 OF 113

Copyright ©

Apr 29, 2026 - 2:34pm
F:\Project\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_CG Series.dwg

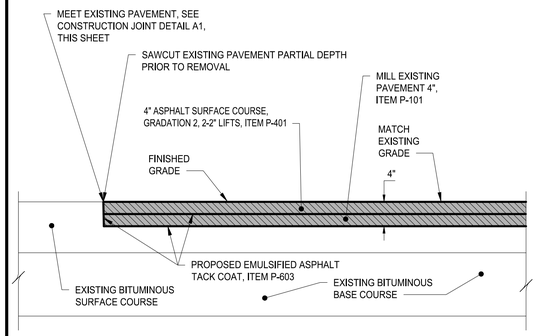


NOTE:

P-401 USED IN THE CONSTRUCTION OF THE ACCESS ROAD SHALL BE SUBJECT TO THE TESTING REQUIREMENTS OF P-401, LEVELING COURSE

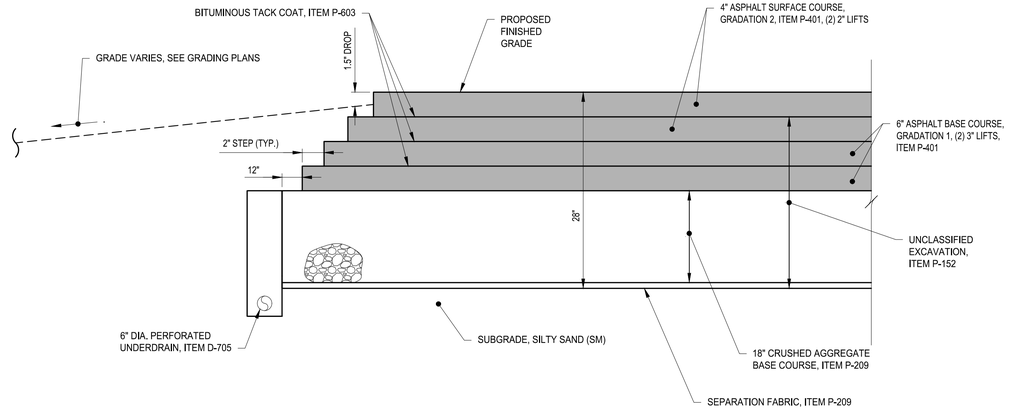
C1 ACCESS ROAD PAVEMENT SECTION

SCALE: NOT TO SCALE



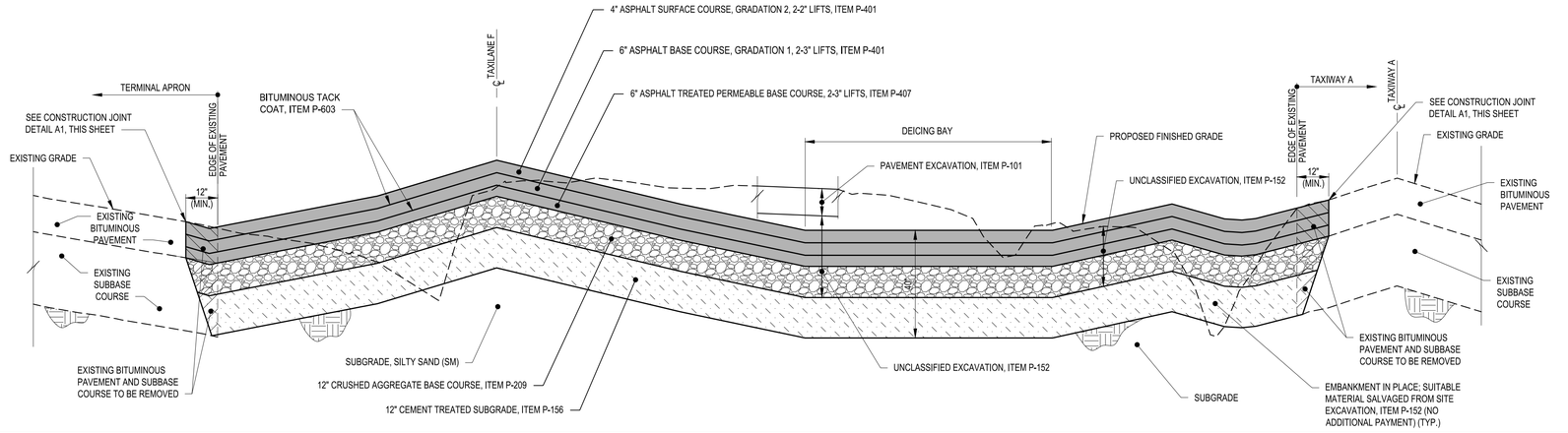
C2 KEYING DETAIL

SCALE: NOT TO SCALE



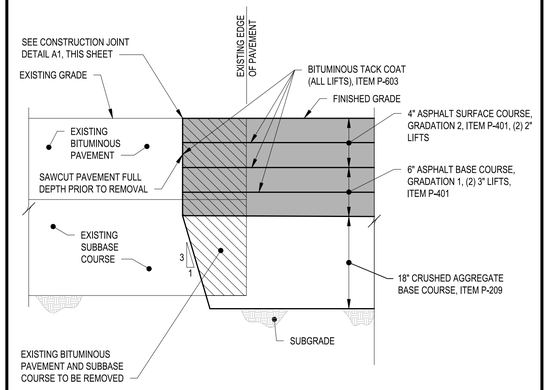
C3 TYPICAL GLYCOL STORAGE TANK FACILITY PAVEMENT SECTION (ADD ON #1)

SCALE: NOT TO SCALE



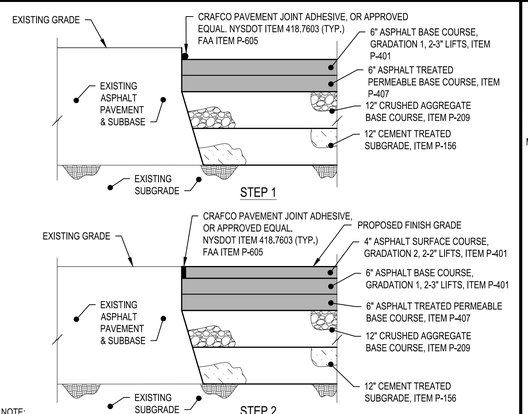
B1 TYPICAL APRON PAVEMENT SECTION

SCALE: NOT TO SCALE



B4 KEYING DETAIL (ADD ON NO. 1)

SCALE: NOT TO SCALE

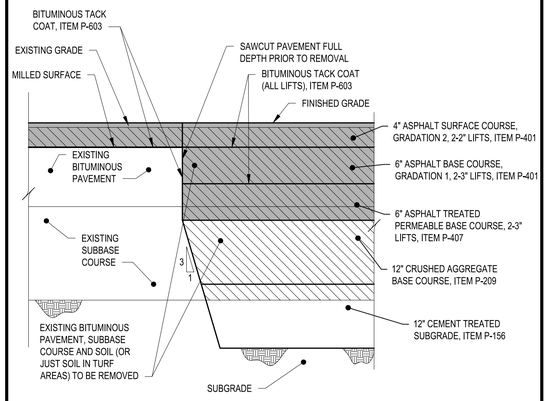


NOTE:

1. PRIOR TO PLACING PAVEMENT JOINT ADHESIVE, ALL VERTICAL AND HORIZONTAL SURFACES SHALL BE CLEAN, DRY, AND FREE OF DUST AND DEBRIS.
2. NOT ALL LAYERS SHOWN APPLY TO THE VARIOUS PAVEMENT SECTIONS ON THIS PROJECT, JOINT ADHESIVE IS ONLY USED ON THE FINAL SURFACE COURSE.

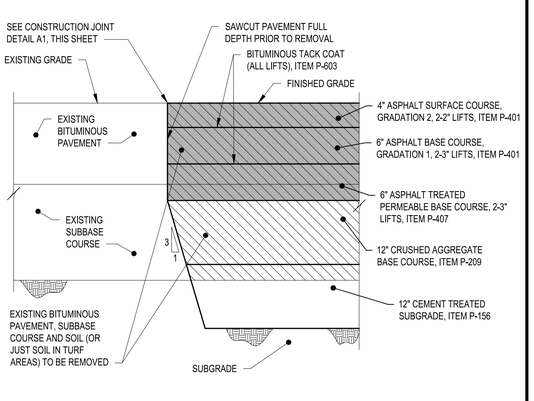
A1 CONSTRUCTION JOINT DETAIL

SCALE: NOT TO SCALE



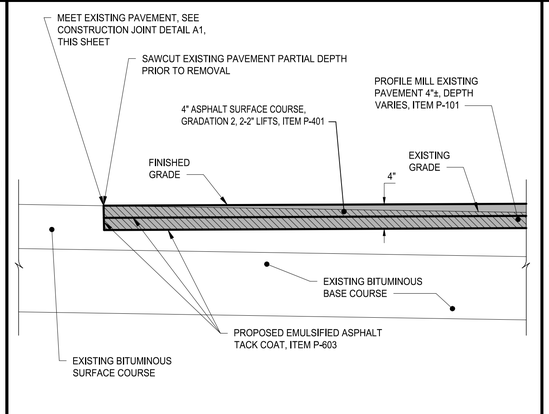
A2 KEYING DETAIL

SCALE: NOT TO SCALE



A3 KEYING DETAIL

SCALE: NOT TO SCALE



A4 KEYING DETAIL

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · NO. 083424 · LICENSED PROFESSIONAL ENGINEER

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	068.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

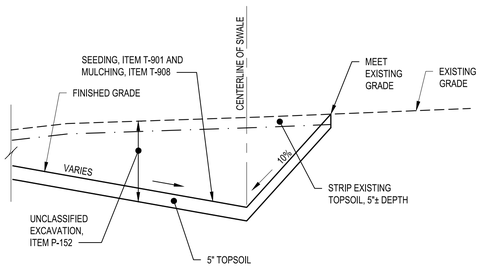
TYPICAL SECTIONS AND DETAILS

CG501

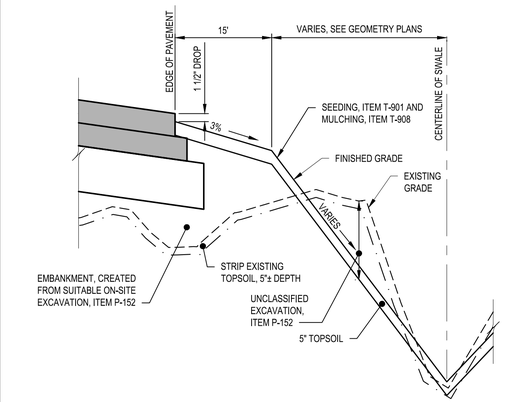
SHEET NO. 45 OF 113

Copyright ©

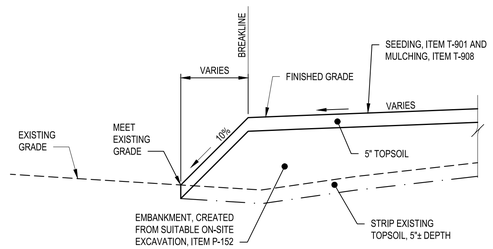
Apr 29, 2026 - 9:34pm
F:\Project\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Part\Design\CADD\Sheet Files\O68069001_CG Details.dwg



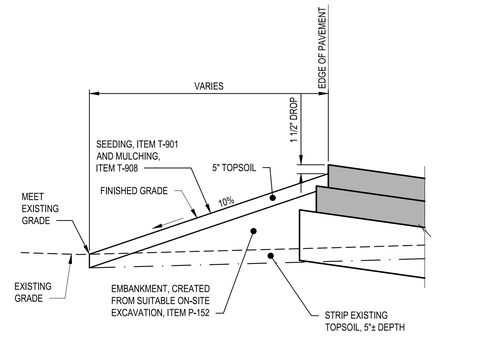
C1 EDGE OF PAVEMENT DETAIL



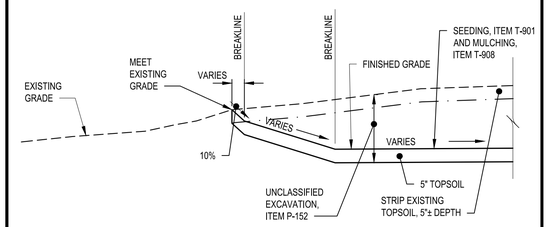
B1 EDGE OF PAVEMENT DETAIL
SCALE: NOT TO SCALE



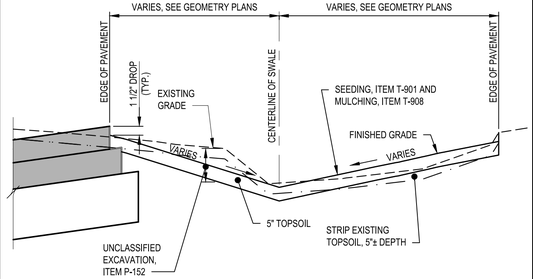
B2 EDGE OF PAVEMENT DETAIL
SCALE: NOT TO SCALE



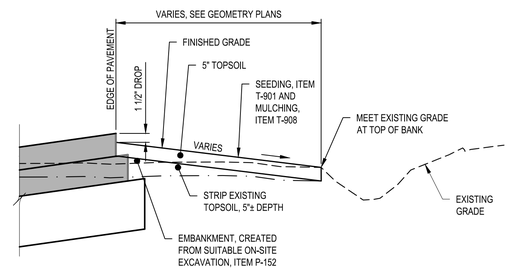
B3 EDGE OF PAVEMENT DETAIL
SCALE: NOT TO SCALE



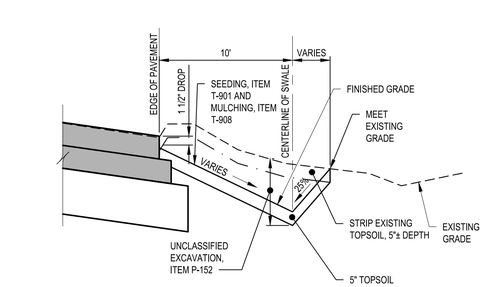
B4 EDGE OF PAVEMENT DETAIL



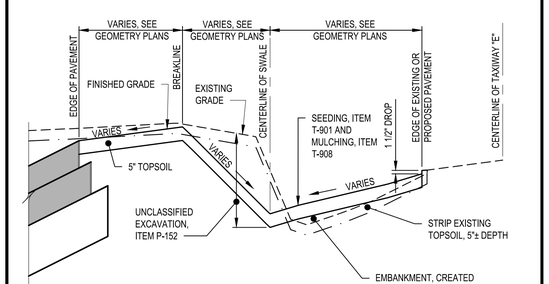
A1 EDGE OF PAVEMENT DETAIL
SCALE: NOT TO SCALE



A2 EDGE OF PAVEMENT DETAIL
SCALE: NOT TO SCALE



A3 EDGE OF PAVEMENT DETAIL
SCALE: NOT TO SCALE



A4 EDGE OF PAVEMENT DETAIL
SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · NO. 083424 · LICENSED PROFESSIONAL ENGINEER

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO: 068.069.001
DATE: APRIL 29, 2026
DRAWN BY: D. MASTROPAOLO
DESIGNED BY: C. BRUBACH
CHECKED BY: D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

PAVEMENT AND GRADING DETAILS

CG502

SHEET NO. 46 OF 113

Copyright ©

Apr 29, 2026 - 3:34pm
F:\Projects\CDR - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_CG Details.dwg

1. CONSTRUCT THE STOCKPILE IN A MANNER THAT RESTRICTS CONTACT OF THE EXPOSED SUBGRADE AND STOCKPILED SOIL WITH STORMWATER RUN-ON/RUN-OFF, TO THE MAXIMUM EXTENT PRACTICABLE. IMPLEMENT APPROPRIATE CONTROLS (E.G., STAGED SOIL STRIPPING, PERIMETER BERMS, SILT FENCE, OR OTHER MEASURES) TO LIMIT EXPOSURE. METHODS MAY BE ADJUSTED BASED ON FIELD CONDITIONS, AT DIRECTION OF THE ENGINEER.

2. DON'T ALLOW WATER TO POND IN THE WORK AREA. IF NECESSARY, CONSTRUCT A LOW POINT SUMP TO COLLECT STORMWATER THAT ACCUMULATES IN THE WORK AREA. WATER CAN BE DISCHARGED OUTSIDE OF THE WORK AREA AT A LOCATION APPROVED BY THE ENGINEER, AFTER IT HAS BEEN TREATED THROUGH A FILTER BAG, OR EQUIVALENT. DO NOT DISCHARGE DIRECTLY TO A STORMWATER CONVEYANCE SUCH AS A SWALE OR INLET.

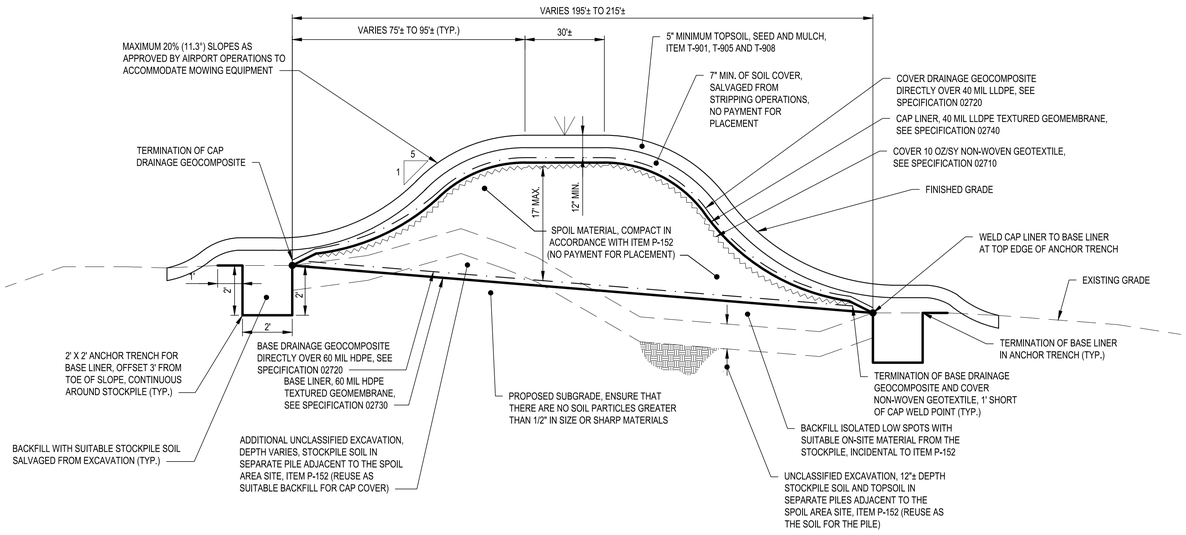
3. TO THE MAXIMUM EXTENT PRACTICABLE, MANAGE THE STOCKPILE TO MINIMIZE CONTACT OF PRECIPITATION ONTO STOCKPILED SOIL. WHEN NOT ACTIVELY ADDING MATERIAL, COVER THE PILE WITH REINFORCED POLYETHYLENE SHEETING (10-MIL MIN.), WITH SEAMS OVERLAPPED A MINIMUM OF TWO FEET AND SECURED WITH SANDBAGS AT 5-10 FOOT INTERVALS. DURING ACTIVE PLACEMENT, IMPLEMENT REASONABLE MEASURES (E.G., TEMPORARY COVERING, SEQUENCING) TO LIMIT EXPOSURE. DAMAGED SHEETING SHALL BE REPAIRED OR REPLACED PROMPTLY. ADDITIONAL OR MODIFIED CONTROLS MAY BE REQUIRED BASED ON FIELD CONDITIONS, AT THE DIRECTION OF THE ENGINEER.

4. TRUCKS HAULING SOIL TO THE STOCKPILE SHALL NOT DRIVE OVER SOIL PLACED IN THE LINED AREA.

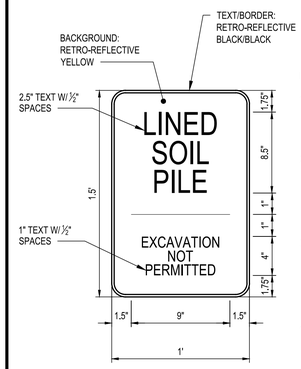
5. ONLY TOPSOIL AND SOIL STRIPPED FROM THE SPOIL SITE SHOWN ON THIS PLAN SHALL BE USED FOR CAP COVER MATERIAL. TOPSOIL AND OR SOIL STRIPPED FROM OTHER AREAS ON THE AIRFIELD SHALL NOT BE USED FOR CAP COVER MATERIAL.

6. ALL COSTS ASSOCIATED WITH THE SPOIL SITE SHOWN ON THIS SHEET SHALL BE INCLUDED IN ITEM PQ-102 UNLESS OTHERWISE NOTED. SPECIFICATION PQ-102 "SPOIL AREA LINER SYSTEM" SERVES AS THE AVENUE FOR MEASUREMENT AND PAYMENT, WHILE THE LISTED CSI STYLE TECHNICAL SPECIFICATIONS GOVERN THE WORK TASKS.

B4 NOTES
SCALE: NOT TO SCALE



A1 SPOIL SITE STOCKPILE SECTION A-A
SCALE: NOT TO SCALE



NOTES:

1. SIGN SHALL BE INSTALLED ON 4' HIGH HOT DIPPED GALVANIZED STEEL POSTS, FACING OUTBOUND FROM THE SPOIL SITE AT AN INTERVAL NOT EXCEEDING 500', AND AS DIRECTED BY THE RPR.
2. THE SIGNS SHALL BE IN ACCORDANCE WITH THE NEW YORK STATE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS, LATEST ISSUE, PLUS ALL REVISIONS AND ADDENDA PERTAINING THERETO, SECTION 645-2 GUIDE SIGNS, TRAFFIC SIGNS, AND SPECIAL DEVICES.
3. THE SIGNS SHALL BE CONSTRUCTED OF DURABLE 0.060" MINIMUM THICKNESS, ALUMINUM METAL. INK SHALL BE UV PROTECTED. THE SIGNS SHALL BE SECURELY ATTACHED TO STEEL POSTS USING CORROSION RESISTANT HARDWARE TO WITHSTAND WIND DAMAGE.
4. THE COST FOR SIGNS SHALL BE INCIDENTAL TO ITEM PQ-102

BORDER:
CORNER RADIUS = 1"
WIDTH = 0.25"

A4 SIGN DETAIL
SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · NO. 083424 · LICENSED PROFESSIONAL ENGINEER

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	068.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	C. BRUBACH/ M. WALKER
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

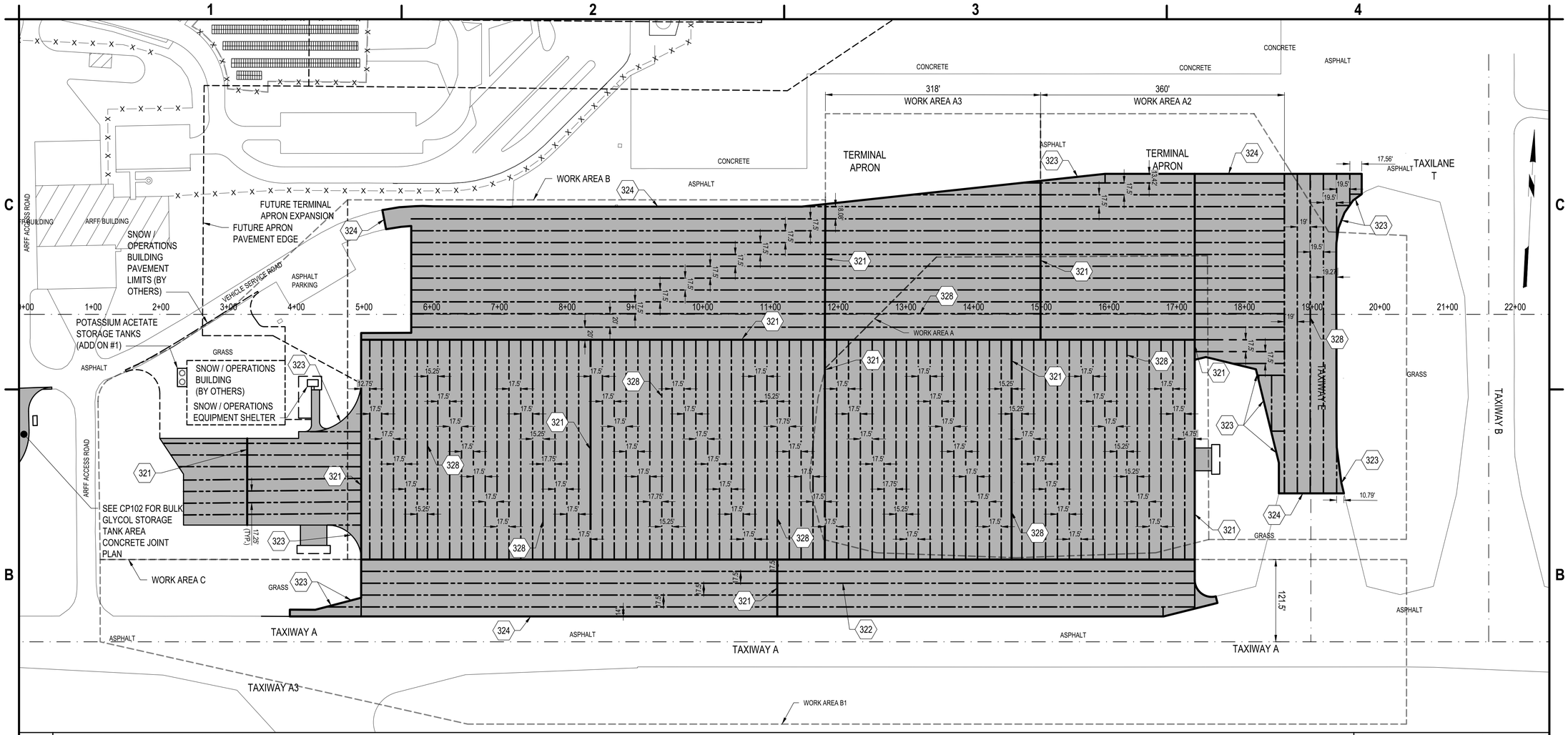
ON-SITE SPOIL AREA DETAILS

CG503

SHEET NO. 47 OF 113

Copyright ©

Apr 29, 2026 - 3:34pm
F:\Projects\068 - Syracuse Regional Airport Authority\068069001 - Como Deicing Pad\Design\CADD\Sheet Files\068069001_CG Details.dwg



B1 JOINT SEALING AND PAVING PLAN

SCALE: 1" = 80'

80' 0 80 160FT.

321. TRANSVERSE JOINT LOCATIONS ARE APPROXIMATE AND THE EXACT LOCATION SHALL BE DETERMINED BY THE CONTRACTORS ASPHALT LAYDOWN PLAN.
322. ESTIMATED PAVING LANE, FINAL LAYOUT BY CONTRACTOR AND APPROVED BY THE ENGINEER (TYP.).
323. RADIUS OR IRREGULAR AREA "HANDWORK", CONTRACTOR TO PROPOSE PAVING APPROACH FOR APPROVAL. (TYP.)
324. CONSTRUCTION JOINT, SEE DETAIL C4/CG501.
328. THE CENTERLINE JOINT SHALL BE OFFSET ONE FOOT FROM THE TRUE CENTERLINE PROFILE (TYP.).

A3 KEYED NOTES

SCALE: NOT TO SCALE

ESTIMATED PAVING JOINT LOCATION

PAVING LANE JOINT (NOT SEALED); MAINTAIN HOT JOINTS

SHEET NOTES:

A. THE CONTRACTOR SHALL MAINTAIN THE FOLLOWING SEQUENCE OF CONSTRUCTION OPERATIONS UPON COMPLETION OF PAVING OPERATIONS.
   i. SEALING OF JOINTS (WHILE PAVING).
   ii. APPLY TEMPORARY/ INTERIM PAVEMENT MARKINGS. OPEN PAVEMENT TO TRAFFIC.
   iii. ALLOW FOR MINIMUM 30 DAY ASPHALT CURING PERIOD.
   iv. GROOVING.
   v. FINAL MARKINGS.
B. JOINTS SHALL BE SEALED IN THE FINISHED SURFACE COURSE AT THE LOCATIONS SHOWN IN ACCORDANCE WITH THE CONSTRUCTION JOINT DETAIL A4/CG501, UNLESS OTHERWISE APPROVED BY THE ENGINEER.
C. JOINTS SHOWN SHALL BE MEASURED FOR PAYMENT IN ACCORDANCE WITH ITEM P-605.
D. ADDITIONAL CONSTRUCTION JOINTS BEYOND THOSE INDICATED ON THE PLANS REQUIRED DUE TO THE CONTRACTOR'S MEANS AND METHODS SHALL NOT BE MEASURED FOR PAYMENT.
E. JOINT LAYOUT IS DESIGNED BASED ON MAINTAINING A HOT JOINT BETWEEN ALL LONGITUDINAL PAVING LANES. TRANSVERSE JOINTS SHALL BE ADJUSTED TO CORRESPOND WITH THE CONTRACTOR'S SUBMITTED AND APPROVED PAVING PLAN.
F. THE JOINT PATTERN SHOWN IS REPRESENTATIVE OF THE SURFACE COURSE. THE JOINT PATTERN OF BASE COURSES WILL DIFFER TO ACHIEVE REQUIRED JOINT OFFSETS.

A4 SHEET NOTES AND LEGEND

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · LICENSED PROFESSIONAL ENGINEER · NO. 083424

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

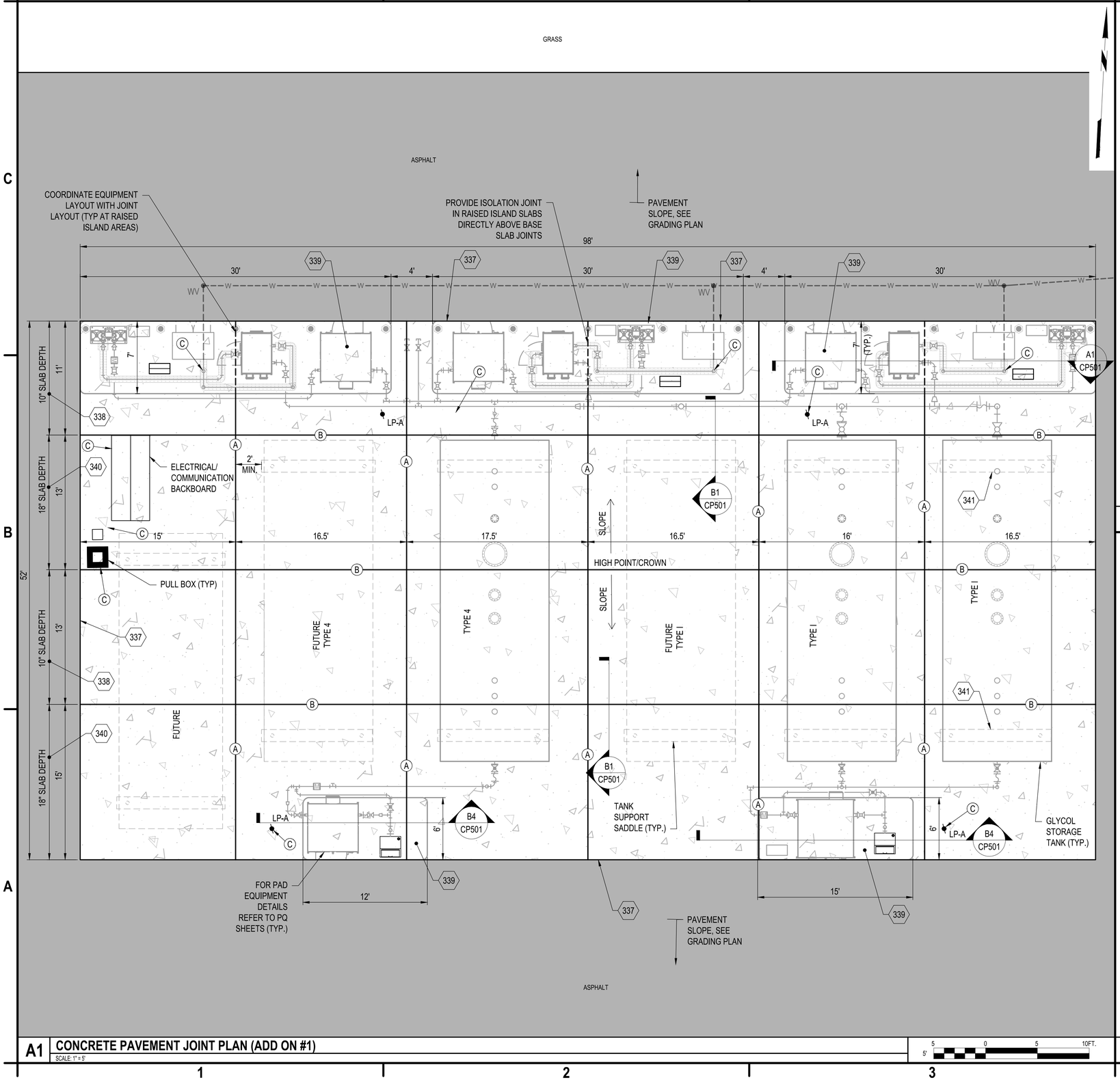
JOINT SEALING AND PAVING PLAN

CP101

SHEET NO. 48 OF 113

Copyright ©

Apr 29, 2026 - 9:34am
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_CP Series.dwg



A1 CONCRETE PAVEMENT JOINT PLAN (ADD ON #1)
SCALE: 1" = 5'

5' 5 0 5 10FT.

337. MEET PROPOSED ASPHALT PAVEMENT, SEE JOINT SEALING DETAIL B4/CG501
338. REINFORCED 10" CONCRETE PAVEMENT, ITEM P-610. SEE PAVEMENT SECTION A4/CP501
339. RAISED CONCRETE ISLAND PLACED ON TOP OF SLAB, LEVEL SURFACE, COORDINATE WITH PQ101, REFER TO DETAIL A1/CP501 OR B4/CP501
340. REINFORCED 18" CONCRETE PAVEMENT, ITEM P-610. SEE PAVEMENT SECTION A4/CP501
341. ELEVATION AT BOTH TANK SADDLE LOCATIONS SHALL BE NEARLY EQUAL TO ALLOW FOR LEVEL TANK INSTALLATION (TYP.)

B4 KEYED NOTES
SCALE: NOT TO SCALE

Ⓐ CONTRACTION JOINT WITH DOWEL BAR, SEE DETAIL B2/CP501

Ⓑ CONSTRUCTION JOINT WITH DOWEL BAR, SEE DETAIL B3/CP501

Ⓒ ISOLATION JOINT WITHOUT DOWEL BAR FOR LIGHT POLES, PULL BOXES, CONDUIT PENETRATIONS AND WATER PIPES, SEE DETAIL C4/CP501

NOTES:

1. AT END OF WORK DAY, TYPE B JOINT SHALL BE USED AS HEADER, AS NEEDED.
2. ELECTRICAL AND COMMUNICATION CONDUITS BELOW SLAB ARE NOT SHOWN FOR CLARITY, COORDINATE WITH ES SERIES PLANS.
3. THE EQUIPMENT/PIPING LAYOUT IS SCHEMATIC ONLY AND MAY NOT NECESSARILY BE DRAWN TO SCALE. LAYOUT SHALL BE ADJUSTED BASED ON THE ACTUAL EQUIPMENT AND PLUMBING SIZES PROVIDED. THE OVERALL PAD SIZE AND RAISED CONCRETE ISLANDS MAY HAVE TO BE ENLARGED AS NECESSARY TO PROVIDE PROPER POSITIONING AND MAINTENANCE/OPERATIONS SPACING. THE CONTRACTOR SHALL LAYOUT ALL EQUIPMENT PRIOR TO INSTALLATION FOR FIELD VERIFICATION BY THE RPR AND SRAA.

A4 SHEET NOTES
SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · NO. 083424 · LICENSED PROFESSIONAL ENGINEER

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
REVISIONS		

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	B. ZUHRIC
CHECKED BY:	C. BRUBACH

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

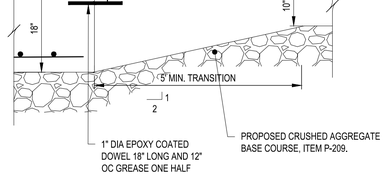
CONCRETE PAVEMENT JOINT PLAN (ADD ON #1)

CP102

SHEET NO. 49 OF 113

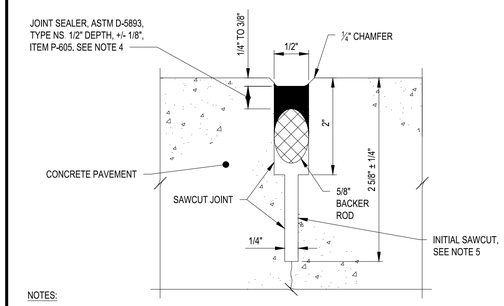
Copyright ©

Apr 29, 2026 - 9:34pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_CP Series.dwg



B1 KEYING DETAIL BETWEEN 18" AND 10" SLABS

SCALE: NOT TO SCALE

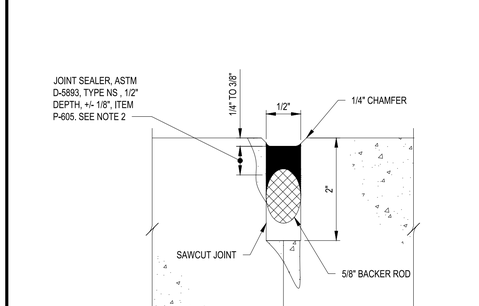


NOTES:

1. JOINT SEAL SHALL BE JET FUEL AND GLYCOL RESISTANT.
2. JOINT SEAL SHALL NOT BE HIGHER THAN BOTTOM OF CHAMFER.
3. JOINT CONSTRUCTION IS CONSIDERED INCIDENTAL TO THIS CONTRACT AND NO DIRECT PAYMENT SHALL BE MADE.
4. SEALANT DEPTH SHALL BE INSTALLED PER MANUFACTURER REQUIREMENTS FOR PROPER SHAPE FACTOR (DEPTH (D): WIDTH (W)).
5. INITIAL CONTRACTION JOINTS SAWCUTS SHALL BE MADE AS SOON AS IS PRACTICABLE WITHOUT DAMAGING THE PAVEMENT SURFACE PER THE REQUIREMENTS OF ACI. CURING COMPOUND SHALL BE APPLIED IN THE INITIAL SAWCUT.

C2 CONTRACTION JOINT SEALING DETAIL

SCALE: NOT TO SCALE

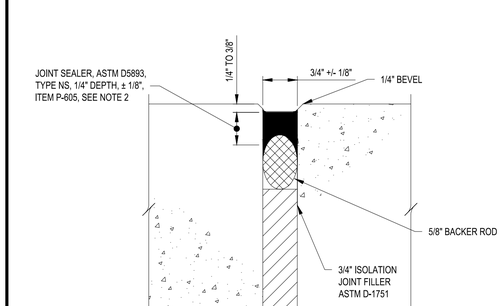


NOTES:

1. JOINT CONSTRUCTION IS CONSIDERED INCIDENTAL TO THIS CONTRACT AND NO DIRECT PAYMENT SHALL BE MADE.
2. SEALANT DEPTH SHALL BE INSTALLED PER MANUFACTURER REQUIREMENTS FOR PROPER SHAPE FACTOR (DEPTH (D): WIDTH (W)).

C3 CONSTRUCTION JOINT SEALING DETAIL

SCALE: NOT TO SCALE

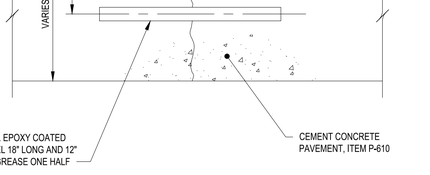


NOTES:

1. JOINT CONSTRUCTION IS CONSIDERED INCIDENTAL TO THIS CONTRACT AND NO DIRECT PAYMENT SHALL BE MADE.
2. SEALANT DEPTH SHALL BE INSTALLED PER MANUFACTURER REQUIREMENTS FOR PROPER SHAPE FACTOR (DEPTH (D): WIDTH (W)).

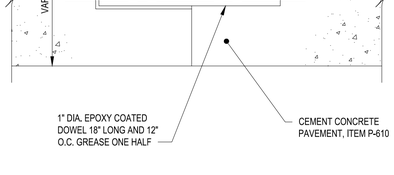
C4 ISOLATION JOINT SEALING DETAIL

SCALE: NOT TO SCALE



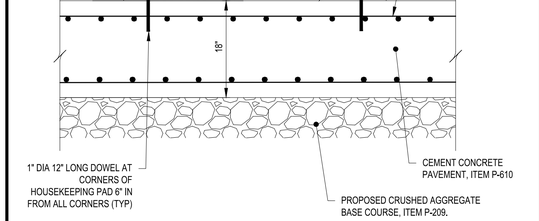
B2 CONTRACTION JOINT WITH DOWEL BAR DETAIL (TYPE A)

SCALE: NOT TO SCALE



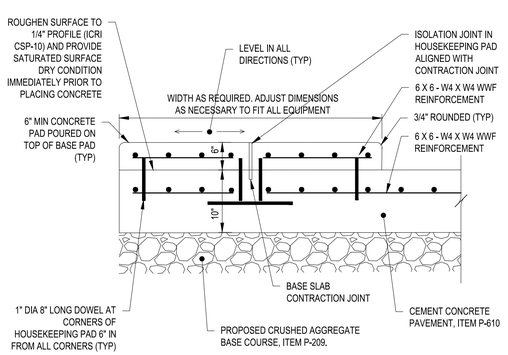
B3 CONSTRUCTION JOINT WITH DOWEL BAR DETAIL (TYPE B)

SCALE: NOT TO SCALE



B4 EQUIPMENT PAD DETAIL

SCALE: NOT TO SCALE

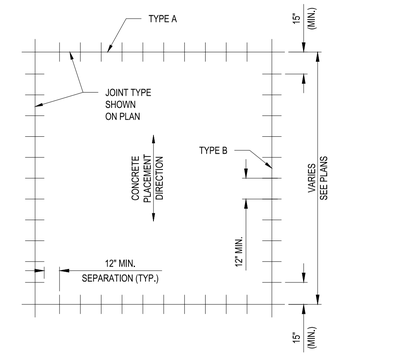


NOTE:

1. SEE PLAN AND PAVEMENT SECTIONS FOR PAVEMENT REINFORCEMENT DETAILS

A1 HOUSEKEEPING/EQUIPMENT PAD DETAIL

SCALE: NOT TO SCALE

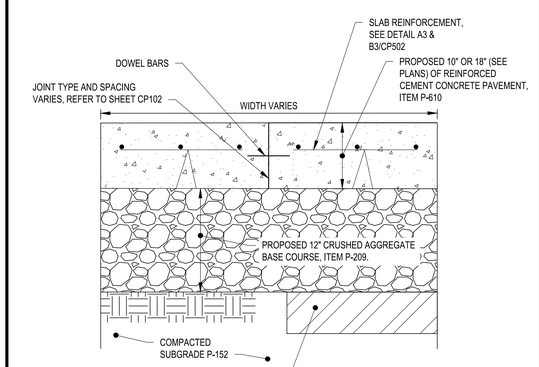


NOTE:

1. FOR SLAB SIZES NOT CONFORMING TO THE DETAILS SHOWN DOWEL BARS SHALL BE SPACED AT LEAST 15" FROM ANY SLAB CORNER.

A3 DOWEL POSITION AT JOINT EDGE DETAIL

SCALE: NOT TO SCALE



A4 TYPICAL REINFORCED CONCRETE PAVEMENT SECTION

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · NO. 083424 · LICENSED PROFESSIONAL ENGINEER

SYR. SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	068.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	B. ZUHRIC
CHECKED BY:	C. BRUBACH

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

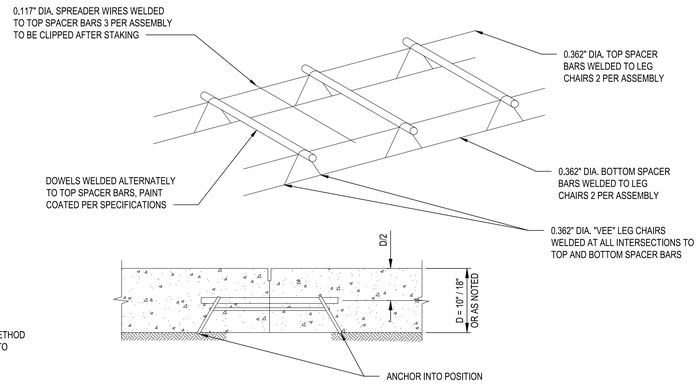
CONCRETE PAD PAVEMENT DETAILS (ADD ON #1)

CP501

SHEET NO. 50 OF 113

Copyright ©

Apr 29, 2026 - 3:34pm
F:\Projects\068 - Syracuse Regional Airport Authority\068069001 - Comp Deicing Pad\Design\CADD\Sheet Files\068069001_CP Details.dwg



NOTES:

1. BASKET MUST BE FIRMLY ANCHORED TO EXISTING OR NEW BASE. METHOD SHALL BE SUBMITTED TO AND APPROVED BY THE ENGINEER PRIOR TO CONSTRUCTION.
2. ALL WIRE SIZES SHOWN ARE MINIMUM SIZE.
3. DOWELS SHALL BE HELD FIRMLY IN THE ABOVE WELDED ASSEMBLY.
4. NO STEEL WITHIN 0.5' OF EDGE OF PAVED LANE

C1 TYPICAL DOWEL AND TIE BAR BASKET DETAIL

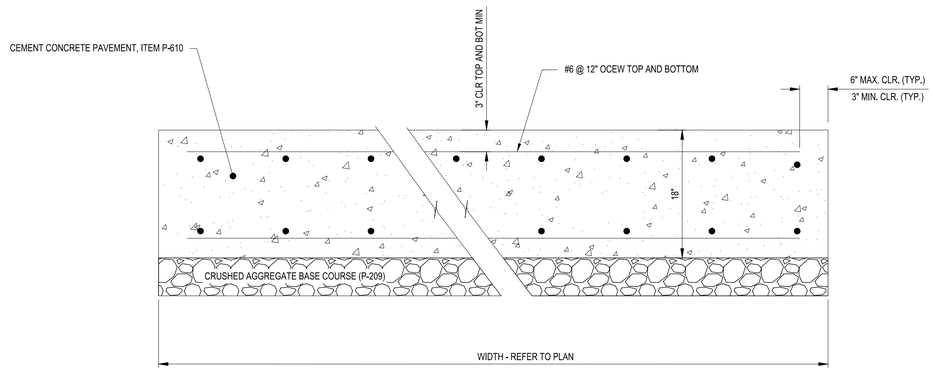
SCALE: NOT TO SCALE

NOTES:

1. DOWELS SHALL BE EPOXY COATED PER ASTM 1078 IN ACCORDANCE WITH TECHNICAL SPECIFICATION P-610 PRIOR TO DELIVERY TO THE SITE.
2. DOWELS SHALL BE SOLID SMOOTH STEEL BARS, 1" Ø, 18" IN LENGTH FOR FULL STRENGTH , SPACED EVENLY AT 12" O.C.
3. DOWELS SHALL BE LIGHTLY GREASED WITH A THIN COAT OF HIGH MELTING POINT GREASE OR AN APPROVED EQUIVALENT FROM MANUFACTURER PRIOR TO INSTALLATION ALONG CONTRACTION JOINTS.
4. AFTER INSERTION AND GROUTING IN PLACE OF DOWELS ALONG CONSTRUCTION JOINTS, FREE END SHALL BE GREASED AS DESCRIBED IN NOTE 3 ABOVE.
5. ALL CONSTRUCTION JOINT DOWELS SHALL BE GANG-DRILLED AND EPOXY GROUTED. INSERTION EQUIPMENT WILL NOT BE PERMITTED.
6. DRILLING METHOD FOR DOWELS SHALL BE CAPABLE OF MAINTAINING DRILL HOLES PARALLEL TO THE CONCRETE SURFACE AND PERPENDICULAR TO THE JOINT DIRECTION. DRILL HOLES SHALL BE ACCURATELY LAID OUT SO THAT THE MAXIMUM DEVIATION DOES NOT EXCEED 3/8"/FT HORIZONTALLY. DRILL 1-1/4" HOLE DIAMETER TO BE OF SUFFICIENT SIZE TO ACCEPT THE TYPE AND SIZE OF REQUIRED DOWEL.
7. AFTER DRILLING IS COMPLETE AND PRIOR TO THE INSTALLATION OF THE DOWELS, THE DRILLED HOLES SHALL BE THOROUGHLY CLEANED TO REMOVE DRILLING DUST, CONCRETE CHIPS AND ANY OTHER MATERIAL THAT MAY HINDER PROPER BONDING.
8. CONTRACTOR WILL NOT BE PERMITTED TO DIP DOWEL IN EPOXY BEFORE INSERTING DOWEL. EPOXY GROUT SHALL BE INJECTED UNIFORMLY INTO THE BACK OF THE HOLE TO FILL THE ENTIRE CIRCUMFERENCE OF THE DRILLED DOWEL HOLE. CONTRACTOR TO INJECT SUFFICIENT AMOUNT OF EPOXY MATERIAL IN THE HOLE SO THAT A SLIGHT AMOUNT WILL BE FORCED OUT WHEN THE DOWEL IS INSERTED AND TAPPED IN PLACE. THE CONTRACTOR IS PERMITTED TO USE SMALL WEDGES TO PROVIDE SUPPORT TO THE DOWELS TO KEEP THEM IN THEIR PROPER LOCATION UNTIL THE EPOXY MATERIAL HARDENS. THE TOLERANCE FOR DOWEL ALIGNMENT IN EITHER THE HORIZONTAL OR VERTICAL PLANE IS 1/4" PER FOOT OF DOWEL BAR.
9. ALL LONGITUDINAL AND TRANSVERSE CONTRACTION JOINT DOWELS SHALL BE INSTALLED USING A DESIGNER APPROVED WELDED BASKET ASSEMBLY ANCHORED TO EXISTING OR NEW BASE WITH A MINIMUM OF 4 GALVANIZED STRAPS AND NAILS PER ASSEMBLY. THE CONTRACTOR MUST POSITION ANCHOR STRAPS ON ALTERNATING SIDES OF THE BASKET ASSEMBLY WITHOUT CUTTING OR CRIMPING THE DOWEL BASKET TIE WIRES.
10. A TRANSVERSE CONSTRUCTION JOINT SHALL BE INSTALLED AT A PLANNED JOINT WHEN PAVING OPERATIONS ARE INTERRUPTED FOR MORE THAN A HALF AN HOUR (30 MINUTES). IF AN INTERRUPTION OCCURS BETWEEN PLANNED JOINTS, THE FRESH CONCRETE SHALL BE REMOVED BACK TO THE PREVIOUSLY INSTALLED JOINT. NO ADDITIONAL JOINTS WILL BE ALLOWED BETWEEN THE JOINTS SHOWN WITHIN THESE CONSTRUCTION DOCUMENTS.
11. EDGES OF CONCRETE SLABS SHALL BE COVERED WITH AN APPROVED CURING MATERIAL AT THE SAME TIME AS THE SURFACE IS CURED. AT FORMED LOCATIONS, SLAB SIDES SHALL BE CURED WHEN FORMS ARE REMOVED.
12. IN THICKENED EDGE AREAS WHERE DOWELS OR REINFORCING STEEL ARE REQUIRED, PROVIDE ADDITIONAL SUPPORT AS APPROVED BY THE ENGINEER TO MAINTAIN THE SAME DEPTH FROM THE SURFACE AS FOR FULL STRENGTH OR REDUCED STRENGTH THICK CONCRETE PAVEMENT.
13. CONCRETE IN REINFORCED PANELS SHALL BE PLACED IN ONE COURSE. ALL WELDED WIRE FABRIC SHALL BE INSTALLED USING DESIGNER APPROVED HI-CHAIRS ANCHORED TO THE BITUMINOUS BASE COURSE AT A MAXIMUM OF 3' ON CENTER. THE WELDED WIRE FABRIC MUST RETAIN ITS SPECIFIED POSITION DURING THE PLACEMENT OF THE CONCRETE.
14. THE CONTRACTOR WILL NOT BE PERMITTED TO VIBRATE THE WELDED WIRE FABRIC DOWN FROM THE TOP AFTER THE CONCRETE IS POURED.
15. ALL JOINT SEALANT RESERVOIRS SHALL BE VERIFIED BY THE SEALANT MANUFACTURER PRIOR TO CONSTRUCTION. REFER TO SPECIFICATIONS FOR FURTHER INFORMATION
16. ALL JOINTS MUST BE ADEQUATELY CLEANED AFTER SAWCUTTING, IMMEDIATELY PRIOR TO THE INSTALLATION OF THE JOINT SEALANT.
17. INITIAL CONTRACTION JOINTS SAWCUTS SHALL BE MADE AS SOON AS IS PRACTICABLE WITHOUT DAMAGING THE PAVEMENT SURFACE PER THE REQUIREMENTS OF ACI. CURING COMPOUND SHALL BE APPLIED IN THE INITIAL SAWCUT.
18. ALL JOINT CONSTRUCTION, MATERIALS AND JOINT SEALER SHALL BE IN ACCORDANCE WITH FAA SPECIFICATIONS P-610 AND P-605 UNLESS OTHERWISE NOTED.
19. SEALANT RESERVOIR SHAPE FACTOR, W/D, SHALL BE PER THE MANUFACTURER'S RECOMMENDATIONS.
20. ALL WORK AND MATERIALS REQUIRED FOR JOINTS ARE INCIDENTAL TO PCC PAVEMENT PAY ITEMS.
21. JOINT CLEANING SHALL BE ACCOMPLISHED BY COMPRESSED AIR OR OTHER APPROVED METHOD. OTHER CLEANING METHODS SHALL BE SUBMITTED IN WRITING TO THE DESIGNER FOR APPROVAL.
22. CONTRACTOR SHALL THOROUGHLY CLEAN ALL JOINTS, REMOVING ALL LOOSE MATERIAL AND SHALL THOROUGHLY SWEEP (VACUUM) PAVEMENT SURFACE TO THE SATISFACTION OF THE ENGINEER PRIOR TO ACCEPTANCE.
23. SAWCUT WIDTH SHALL BE 1/2" WIDE OR THE WIDTH OF THE EXISTING CONTRACTION OR CONSTRUCTION JOINTS AND 3/4" WIDE FOR EXPANSION JOINTS. NO EXTRA PAYMENT WILL BE MADE FOR CLEANING OF SAWCUTS, BACKER ROD OR SEALANT IN JOINTS EXCEEDING DETAILED WIDTHS.
24. SAWCUT DEPTH SHALL BE TO THE DEPTHS SHOWN IN THE DETAILS. NO EXTRA PAYMENT WILL BE MADE FOR SAWCUTS IN EXCESS OF DETAILED DEPTHS.
25. DOWELS SHALL BE PROPERLY POSITIONED BY USE OF AN ACCEPTABLE SUPPORT ASSEMBLY.
26. SAWED EDGES OF PAVING SHALL BE STRAIGHT, VERTICAL AND SMOOTH.
27. JOINTS SHALL BE THOROUGHLY CLEANED BY COMPRESSED WATER OR AIR AND SAND BLASTED PRIOR TO APPLICATION OF THE JOINT SEALANT. CONTRACTOR MUST DEMONSTRATE SAND BLASTING EQUIPMENT IN THE PRESENCE OF THE RPR PRIOR TO APPROVAL PER P-605.
28. JOINT FACES SHALL BE DRY PRIOR TO PLACING SEALANT MATERIALS.
29. DOWELS BARS SHALL BE CENTERED ON THE JOINT, AND PLACED AT MID-SLAB UNLESS OTHERWISE SHOWN.

A1 CONCRETE JOINT CONSTRUCTION NOTES

SCALE: NOT TO SCALE

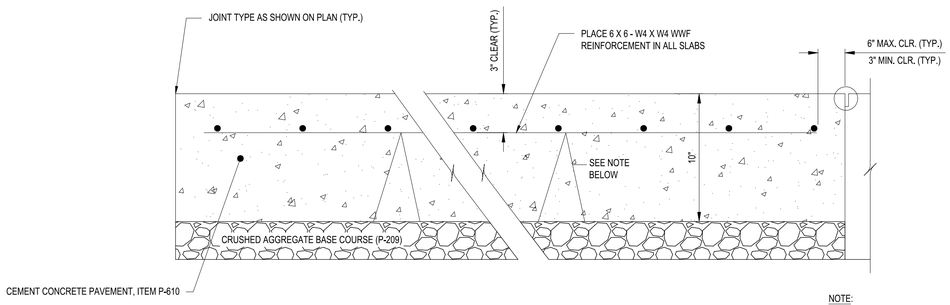


NOTE:

BAR MATS SHALL BE SUPPORTED WITH CHAIRS NO MORE THAN 3' APART.

B3 CONCRETE SLAB REINFORCING DETAIL (18" SECTION)

SCALE: NOT TO SCALE



NOTE:

BAR MATS SHALL BE SUPPORTED WITH CHAIRS NO MORE THAN 3' APART.

A3 CONCRETE SLAB REINFORCING DETAIL (10" SECTION)

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · LICENSED PROFESSIONAL ENGINEER · NO. 083424

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	068.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	B. ZUHRIC
CHECKED BY:	C. BRUBACH

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

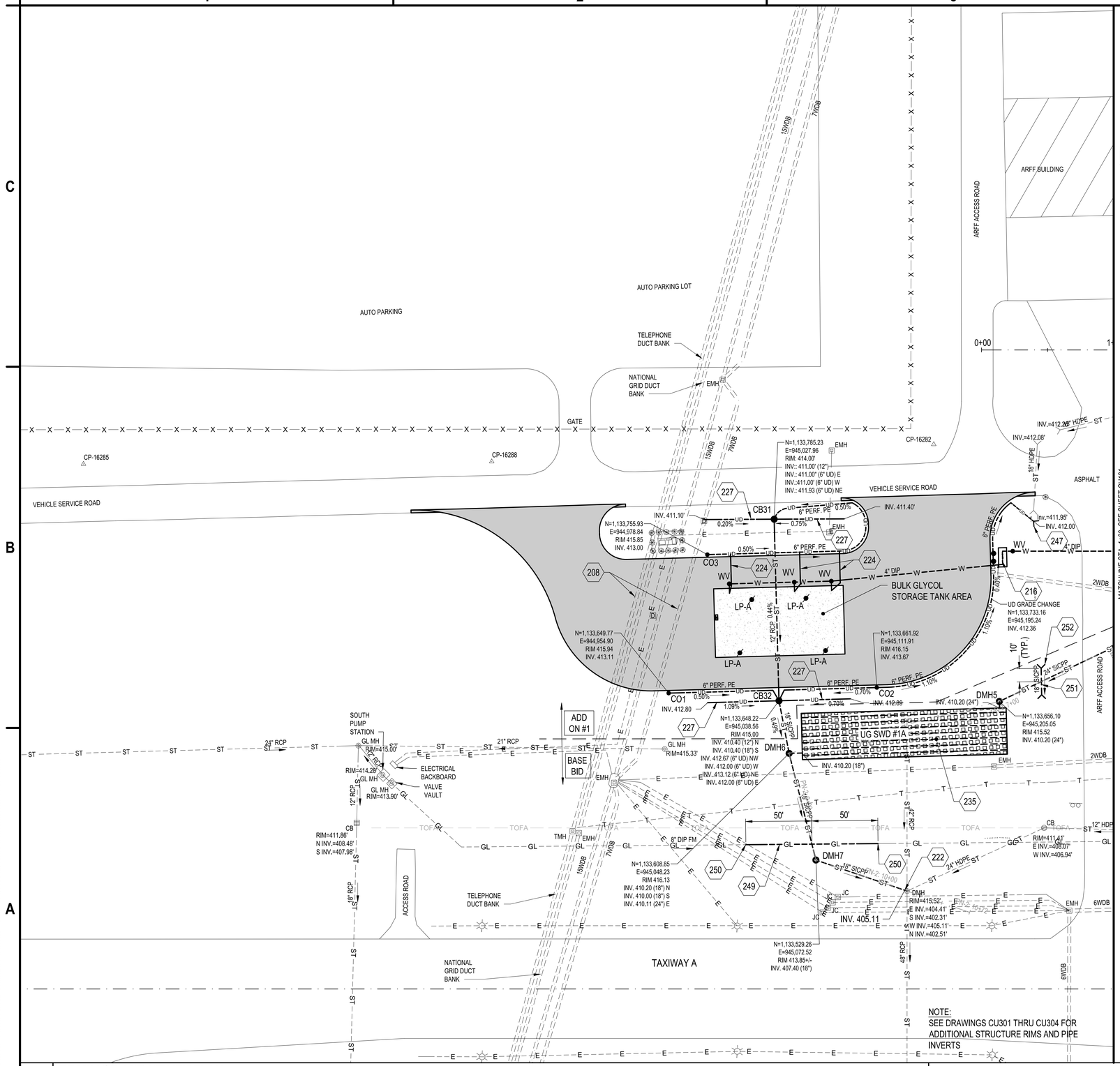
CONCRETE PAD PAVEMENT DETAILS (ADD ON #1)

CP502

SHEET NO. 51 OF 113

Copyright ©

Apr 29, 2026 - 3:45pm
F:\Project\C068 - Syracuse Regional Airport Authority\C068069001 - Comp Deicing Pad\Design\CADD\Sheet Files\C068069001_CP Details.dwg



A1 DRAINAGE AND UTILITY PLAN

SCALE: 1" = 40'

40 0 40 80FT.
40'

B4 KEYED NOTES

SCALE: NOT TO SCALE

208. CONTRACTOR TO POT-HOLE ALL EXISTING ACTIVE UTILITIES AND NOTIFY THE ENGINEER IF A CONFLICT WITH PROPOSED UTILITIES WILL OCCUR. ALLOW A MINIMUM OF 2 WEEKS PRIOR TO WORK FOR DESIGN ADJUSTMENTS BY THE ENGINEER IF REQUIRED.

216. HEATED ENCLOSURE FOR RPZ AND WATER METER, ITEM D-707, SEE DETAIL A1/CU512.

222. CONNECT PROPOSED PIPE TO EXISTING DRAINAGE STRUCTURE UTILIZING EXISTING OPENING, EPOXY GROUT PIPE INTO PLACE, SEAL WATERTIGHT, COST INCIDENTAL TO ITEM D-701.

224. 2" DIA. PVC DRAINS, CONNECT TO UNDERDRAIN PIPE TO DRAIN WATER LINE SLEEVE STRUCTURES ASSOCIATED WITH THE VERTICAL ENTRY THRU THE CONCRETE PAD. INCIDENTAL TO ITEM PQ-101.

227. 6-INCH PERFORATED CORRUGATED PE UNDERDRAIN PIPE INSTALLED IN DRY SWALE, ITEM D-705. SEE DETAIL A1/CE501. PROVIDE END CAP.

235. UNDERGROUND STORMWATER MANAGEMENT SYSTEM INFILTRATION CHAMBERS, SEE DETAILS ON SHEETS CU503 & CU504.

247. UNDERDRAIN HEADWALL, ITEM D-705, SEE DETAIL C1/CU502.

249. REROUTE GLYCOL FORCE MAIN BENEATH PROPOSED DRAINAGE LINE USING 8" DUCTILE IRON PIPE, WITH 22.5° MAXIMUM ELBOWS. MAINTAIN 12" MINIMUM SEPARATION BETWEEN PIPES, ITEM D-707.

250. CONNECT PROPOSED PIPE TO EXISTING PIPE USING APPROPRIATE COUPLING, SEAL WATERTIGHT, COST INCIDENTAL TO ITEM D-707.

251. PIPE PLACED ALONG CENTERLINE OF REGRADED SWALE. MATCH EXISTING INVERTS AND MAINTAIN POSITIVE DRAINAGE, ITEM D-701.

252. 18-INCH DIA. GALVANIZED STEEL END SECTION EACH END, COST INCIDENTAL TO ITEM D-701.

A4 KEYED LEGEND

SCALE: NOT TO SCALE

- ST — SMOOTH INTERIOR CORRUGATED POLYETHYLENE OR REINFORCED CONCRETE DRAINAGE PIPE AS NOTED ON PLAN, ITEM D-701. SEE TRENCHING DETAILS ON SHEET CU501.
- CB2 CB5 — STORMWATER CATCH BASIN, ITEM D-751. SEE DETAIL B3/CU501
- DMH5 — STORMWATER DRAINAGE MANHOLE, ITEM D-751. SEE DETAIL B3/CU501.
- UD — 6-INCH PERFORATED CORRUGATED PE DRAINAGE PIPE INSTALLED IN PAVEMENT OR TURF, ITEM D-705. SEE DETAILS ON SHEET CU502.
- CO — UNDERDRAIN CLEANOUT, ITEM D-705. SEE DETAIL B3/CU502.
- WV — WATER VALVE, ITEM D-707. SEE DETAIL B2/CU511.
- HYD — FIRE WATER HYDRANT, ITEM D-707. SEE DETAIL B1/CU511.
- W — DUCTILE IRON WATER PIPE, ITEM D-707. SEE TRENCHING DETAIL A1/CU511.
- COLLISION PROTECTION BOLLARD (TYP.), ITEM F-170, SEE DETAIL C4/CU510.

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUNCK · NO. 083424 · LICENSED PROFESSIONAL ENGINEER

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	O68,069.001
DATE:	APRIL 29, 2026
DRAWN BY:	J. CONESE
DESIGNED BY:	J. FRAZEE
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

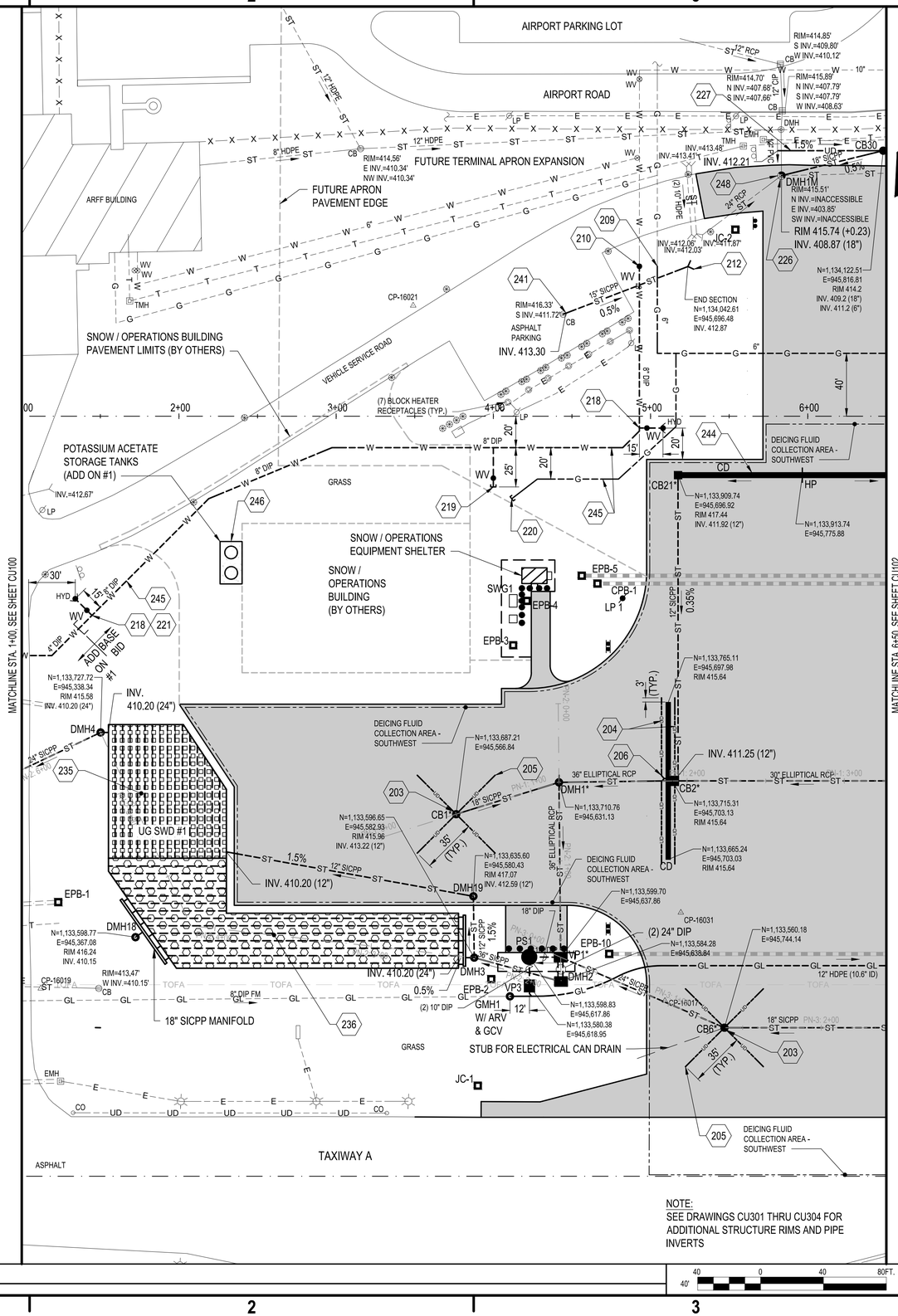
DRAINAGE AND UTILITY PLAN

CU100

SHEET NO. 52 OF 113

Copyright ©

Apr 29, 2026 - 9:35pm
P:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CAD\Sheet Files\O68069001_CU Series.dwg



A1 DRAINAGE AND UTILITY PLAN

SCALE: 1" = 40'

40 0 40 80FT.

40'

B4 KEYED NOTES

SCALE: NOT TO SCALE

203. "V" STYLE UNDERDRAIN CONNECTION (TYP.) SEE DETAIL A1/CU502.
204. UNDERDRAIN PIPE SHALL BE PLACED AT THE HIGH END INVERT 12" BELOW THE PAVEMENT SECTION, THEN SLOPE AT 0.5% TO STRUCTURE INVERT (TYP.). SEE DETAIL A2/CU502. PROVIDE END CAP.
205. UNDERDRAIN PIPE SHALL BE PLACED AT A 40" UNIFORM DEPTH BELOW THE PAVEMENT SECTION, SLOPE VARIES, MATCH PAVEMENT SLOPE (TYP.). SEE DETAIL A2/CU502. PROVIDE END CAP.
206. "T" STYLE UNDERDRAIN PIPE CONNECTION, SEE UNDERDRAIN LAYOUT DETAIL B1/CU502.
208. CONTRACTOR TO POT-HOLE ALL EXISTING ACTIVE UTILITIES AND NOTIFY THE ENGINEER IF A CONFLICT WITH PROPOSED UTILITIES WILL OCCUR. ALLOW A MINIMUM OF 2 WEEKS PRIOR TO WORK FOR DESIGN ADJUSTMENTS BY THE ENGINEER IF REQUIRED.
209. CONNECTION TO EXISTING NATURAL GAS MAIN, BY NATIONAL GRID.
210. CONNECTION TO EXISTING WATER MAIN.
212. 15-INCH DIA. GALVANIZED STEEL END SECTION, COST INCIDENTAL TO ITEM D-701.
218. 6" X 8" TEE
219. PROVIDE PIPE CAP AND MARKER.
220. GAS MAIN CAPPED FOR FUTURE CONNECTION (BY NATIONAL GRID).
221. 8" TO 4" REDUCER.
226. MODIFY EXISTING DRAINAGE MANHOLE/CATCH BASIN, ADJUST TO PROPOSED GRADE, ITEM D-751. SEE DETAIL B1/CU501. DISTANCE SHOWN IN PARENTHESIS ON PLANS
227. 6-INCH PERFORATED CORRUGATED PE UNDERDRAIN PIPE INSTALLED IN DRY SWALE, ITEM D-705. SEE DETAIL A1/CE501. PROVIDE END CAP.
235. UNDERGROUND STORMWATER MANAGEMENT SYSTEM INFILTRATION CHAMBERS, SEE DETAILS ON SHEETS CU503 & CU504.
236. UNDERGROUND STORMWATER MANAGEMENT SYSTEM SEPARATOR ROWS, SEE DETAILS ON SHEETS CU503 & CU504.
241. CONNECT PROPOSED PIPE TO EXISTING STRUCTURE, CORE DRILL EXISTING CONCRETE STRUCTURE AND EPOXY GROUT PIPE IN PLACE, WATERTIGHT. CONCRETE INFILL TO CREATE A MAXIMUM 12" SUMP, COST INCIDENTAL TO ITEM D-701 (TYP.).
244. PRESERVE EXISTING GAS LINE, NOT SHOWN ON THIS PLAN FOR CLARITY. PROVIDE A MINIMUM 5-FEET OF CLEARANCE FROM THE WIDEST PORTION OF DRAINAGE ASPECTS DURING TRENCH DRAIN AND CATCH BASIN CONSTRUCTION. FIELD ADJUST TRENCH DRAIN LOCATION AS NECESSARY. COORDINATE WITH RPR.
245. NATIONAL GRID AND OCWA TO COORDINATE WITH GRADING OPERATIONS TO ENSURE UTILITY DEPTHS HAVE ADEQUATE COVER.
246. POTASSIUM ACETATE STORAGE TANKS (ADD ON #1). COORDINATE EXACT LOCATION AND ELEVATION WITH BUILDING CONTRACTOR, ITEM PQ-101, SEE DETAIL B1/PQ202.
248. CONNECT PROPOSED PIPE TO EXISTING STRUCTURE, CORE DRILL EXISTING CONCRETE STRUCTURE AND EPOXY GROUT PIPE IN PLACE, WATERTIGHT, COST INCIDENTAL TO ITEM D-701.

A4 KEYED LEGEND

SCALE: NOT TO SCALE

ST	SMOOTH INTERIOR CORRUGATED POLYETHYLENE OR REINFORCED CONCRETE DRAINAGE PIPE AS NOTED ON PLAN, ITEM D-701. SEE TRENCHING DETAILS ON SHEET CU501.
CB2 CB5	STORMWATER CATCH BASIN, ITEM D-751. SEE DETAIL B3/CU501.
DMH9 DMH15	STORMWATER DRAINAGE MANHOLE, ITEM D-751. SEE DETAIL B3/CU501.
CB34M DMH1M	STORMWATER DRAINAGE STRUCTURE TO BE MODIFIED, ITEM D-751. SEE DETAIL B1/CU501.
DMH7* CB5*	* - DENOTES STRUCTURES WITH BENCHWALLS.
VP1	STORMWATER VALVE PIT MANHOLE, ITEM D-751. SEE SHEET CU510.
PS1	STORMWATER PUMP STATION ITEM D-751. SEE SHEET CU508.
UD	6-INCH PERFORATED CORRUGATED PE DRAINAGE PIPE INSTALLED IN PAVEMENT UNLESS OTHERWISE NOTED, ITEM D-705. SEE DETAIL A2/CU502.
GL	HDPE GLYCOL FORCE MAIN, DR 11 (200PSI), ITEM D-701.
CD	STORMWATER CHANNEL DRAIN, ITEM D-751. SEE SHEETS CU506 AND CU507.
WV	WATER VALVE, ITEM D-707. SEE DETAIL B2/CU511.
HYD	FIRE WATER HYDRANT, ITEM D-707. SEE DETAIL B1/CU511.
GMH1 W/ ARV & GCV	GLYCOL MANHOLE WITH GLYCOL AIR RELEASE VALVE AND GLYCOL CHECK VALVE, ITEM D-751. SEE DETAIL C1/CU512.
W	DUCTILE IRON WATER PIPE, ITEM D-707. SEE TRENCHING DETAIL A1/CU511.
G	NATURAL GAS LINE, BY NATIONAL GRID.
	COLLISION PROTECTION BOLLARD (TYP.), ITEM F-170, SEE DETAIL C4/CU510.

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BAUER · LICENSED PROFESSIONAL ENGINEER · NO. 083424

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	068.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	J. FRAZEE
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

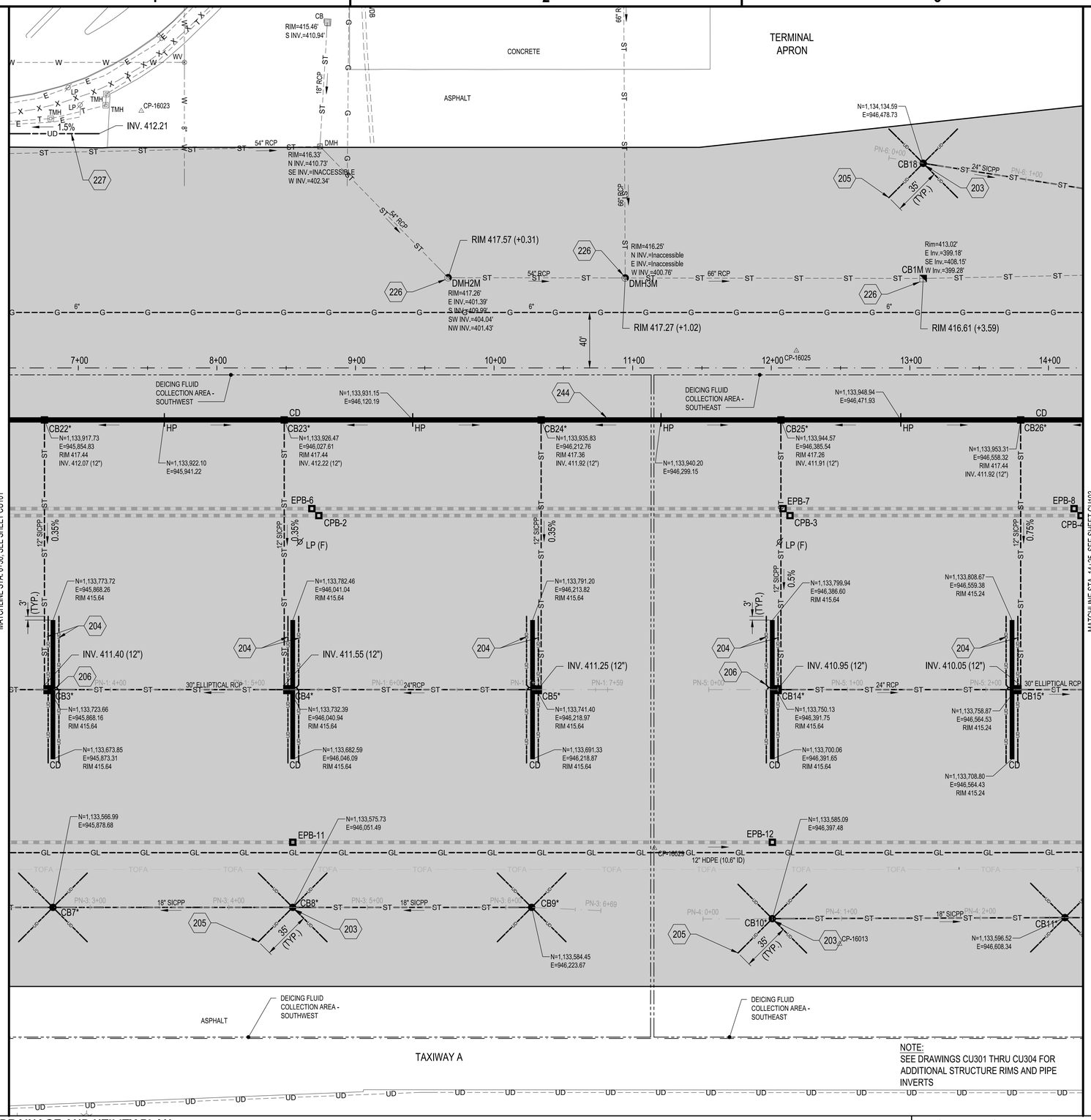
DRAINAGE AND UTILITY PLAN

CU101

SHEET NO. 53 OF 113

Copyright ©

Apr 29, 2026 - 3:35pm
F:\Project\C68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_CU_Series.dwg



A1 DRAINAGE AND UTILITY PLAN
SCALE: 1" = 40'

40' 0 40 80FT.

203. "V" STYLE UNDERDRAIN CONNECTION (TYP.) SEE DETAIL A1/CU502.
204. UNDERDRAIN PIPE SHALL BE PLACED AT THE HIGH END INVERT 12" BELOW THE PAVEMENT SECTION, THEN SLOPE AT 0.5% TO STRUCTURE INVERT (TYP.). SEE DETAIL A2/CU502. PROVIDE END CAP.
205. UNDERDRAIN PIPE SHALL BE PLACED AT A 40" UNIFORM DEPTH BELOW THE PAVEMENT SECTION, SLOPE VARIES, MATCH PAVEMENT SLOPE (TYP.). SEE DETAIL A2/CU502. PROVIDE END CAP.
206. "T" STYLE UNDERDRAIN PIPE CONNECTION, SEE UNDERDRAIN LAYOUT DETAIL B1/CU502.
226. MODIFY EXISTING DRAINAGE MANHOLE/CATCH BASIN, ADJUST TO PROPOSED GRADE, ITEM D-751. SEE DETAIL B1/CU501. DISTANCE SHOWN IN PARENTHESIS ON PLANS
227. 6-INCH PERFORATED CORRUGATED PE UNDERDRAIN PIPE INSTALLED IN DRY SWALE, ITEM D-705. SEE DETAIL A1/CE501. PROVIDE END CAP.
244. PRESERVE EXISTING GAS LINE, NOT SHOWN ON THIS PLAN FOR CLARITY. PROVIDE A MINIMUM 5-FEET OF CLEARANCE FROM THE WIDEST PORTION OF DRAINAGE ASPECTS DURING TRENCH DRAIN AND CATCH BASIN CONSTRUCTION. FIELD ADJUST TRENCH DRAIN LOCATION AS NECESSARY. COORDINATE WITH RPR.

B4 KEYED NOTES
SCALE: NOT TO SCALE

ST	SMOOTH INTERIOR CORRUGATED POLYETHYLENE OR REINFORCED CONCRETE DRAINAGE PIPE AS NOTED ON PLAN, ITEM D-701. SEE TRENCHING DETAILS ON SHEET CU501.
CB8 CB2	STORMWATER CATCH BASIN, ITEM D-751. SEE DETAIL B3/CU501.
CB1M DMH3M	STORMWATER DRAINAGE STRUCTURE TO BE MODIFIED, ITEM D-751. SEE DETAIL B1/CU501.
DMH7* CB5*	*- DENOTES STRUCTURES WITH BENCHWALLS.
UD	6-INCH PERFORATED CORRUGATED PE DRAINAGE PIPE INSTALLED IN PAVEMENT UNLESS OTHERWISE NOTED, ITEM D-705. SEE DETAIL A2/CU502.
CD	STORMWATER CHANNEL DRAIN, ITEM D-751. SEE SHEETS CU506 AND CU507.
GL	HDPE GLYCOL FORCE MAIN, DR 11 (200PSI), ITEM D-701.
G	NATURAL GAS LINE, BY NATIONAL GRID.

A4 KEYED LEGEND
SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BAUER · NO. 083424 · LICENSED PROFESSIONAL ENGINEER

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	068.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	J. FRAZEE
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

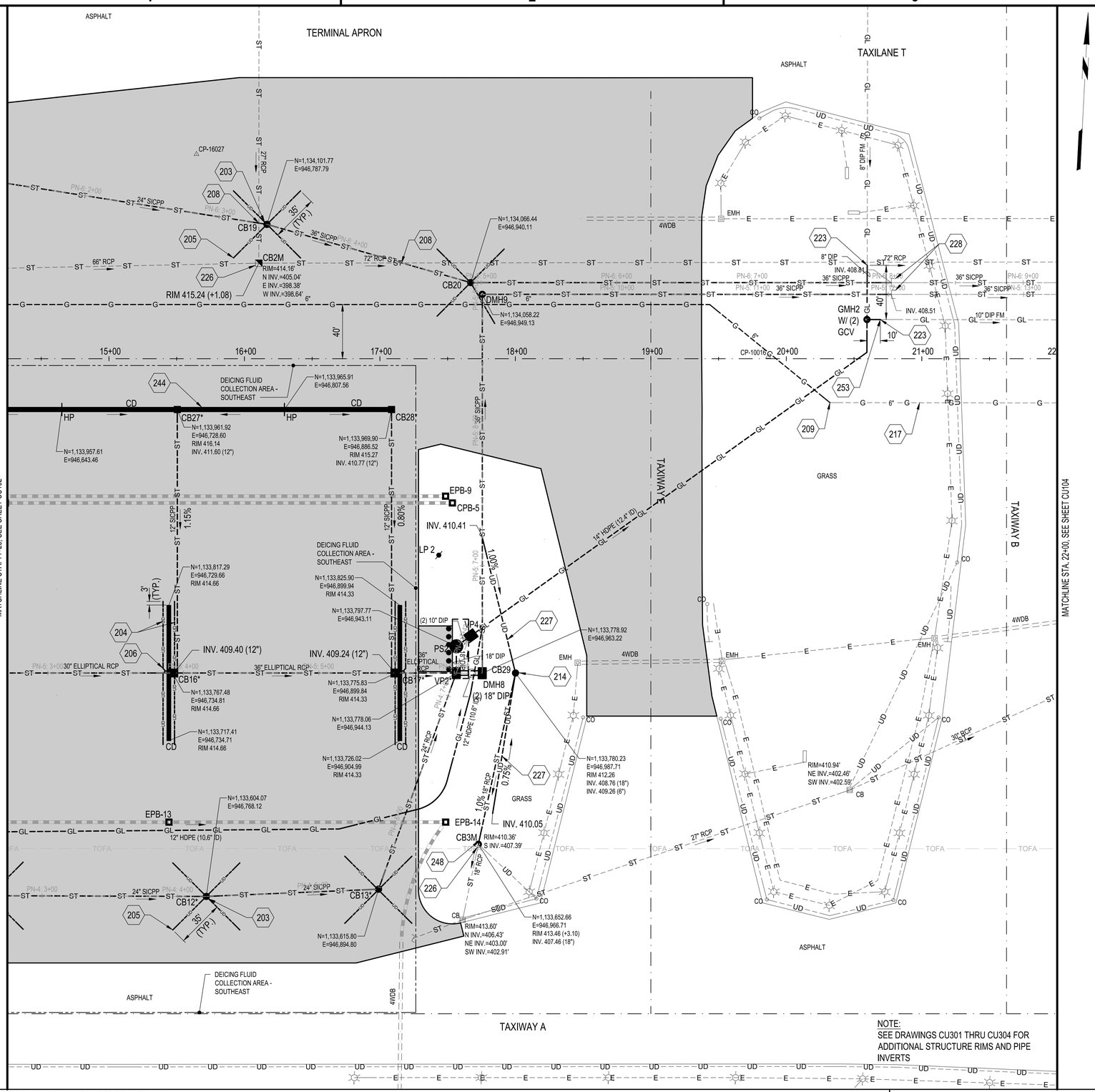
DRAINAGE AND UTILITY PLAN

CU102

SHEET NO. 54 OF 113

Copyright ©

Apr 29, 2026 - 3:35pm
F:\Project\068 - Syracuse Regional Airport Authority\068069001 - Corrso Deicing Part\Design\CADD\Sheet Files\068069001_CU Series.dwg



A1 DRAINAGE AND UTILITY PLAN

SCALE: 1" = 40'

40 0 40 80FT.

40'

A4 KEYED LEGEND

SCALE: NOT TO SCALE

- SMOOTH INTERIOR CORRUGATED POLYETHYLENE OR REINFORCED CONCRETE DRAINAGE PIPE AS NOTED ON PLAN, ITEM D-701. SEE TRENCHING DETAILS ON SHEET CU501.
- CB5 CB7 — STORMWATER CATCH BASIN, ITEM D-751. SEE DETAIL B3/CU501.
- DMH3 DMH2 — STORMWATER DRAINAGE MANHOLE, ITEM D-751. SEE DETAIL B3/CU501.
- CB2M CB3M — STORMWATER DRAINAGE STRUCTURE TO BE MODIFIED, ITEM D-751. SEE DETAIL B1/CU501.
- DMH7* CB5* — *- DENOTES STRUCTURES WITH BENCHWALLS.
- VP2 — STORMWATER VALVE PIT MANHOLE, ITEM D-751. SEE SHEET CU510.
- PS2 — STORMWATER PUMP STATION ITEM D-751. SEE SHEET CU509.
- 6-INCH PERFORATED CORRUGATED PE DRAINAGE PIPE INSTALLED IN PAVEMENT UNLESS OTHERWISE NOTED, ITEM D-705. SEE DETAIL A2/CU502.
- HDPE GLYCOL FORCE MAIN, DR 11 (200PSI), ITEM D-701.
- CD — STORMWATER CHANNEL DRAIN, ITEM D-751. SEE SHEETS CU506 AND CU507.
- GMH2 W/ (2) GCV — GLYCOL MANHOLE WITH (2) GLYCOL CHECK VALVES, ITEM D-751. SEE DETAIL B3/CU512.
- NATURAL GAS LINE, BY NATIONAL GRID.
- COLLISION PROTECTION BOLLARD (TYP.), ITEM F-170, SEE DETAIL C4/CU510.

B4 KEYED NOTES

SCALE: NOT TO SCALE

203. "V" STYLE UNDERDRAIN CONNECTION (TYP.) SEE DETAIL A1/CU502.
204. UNDERDRAIN PIPE SHALL BE PLACED AT THE HIGH END INVERT 12" BELOW THE PAVEMENT SECTION, THEN SLOPE AT 0.5% TO STRUCTURE INVERT (TYP.). SEE DETAIL A2/CU502. PROVIDE END CAP.
205. UNDERDRAIN PIPE SHALL BE PLACED AT A 40" UNIFORM DEPTH BELOW THE PAVEMENT SECTION, SLOPE VARIES, MATCH PAVEMENT SLOPE (TYP.). SEE DETAIL A2/CU502. PROVIDE END CAP.
206. "T" STYLE UNDERDRAIN PIPE CONNECTION, SEE UNDERDRAIN LAYOUT DETAIL B1/CU502.
208. CONTRACTOR TO POT-HOLE ALL EXISTING ACTIVE UTILITIES AND NOTIFY THE ENGINEER IF A CONFLICT WITH PROPOSED UTILITIES WILL OCCUR. ALLOW A MINIMUM OF 2 WEEKS PRIOR TO WORK FOR DESIGN ADJUSTMENTS BY THE ENGINEER IF REQUIRED.
209. CONNECTION TO EXISTING NATURAL GAS MAIN, BY NATIONAL GRID.
214. CONTRACTOR TO REROUTE AND CONNECT 6-INCH UNDERDRAIN PIPE TO EAST OR WEST SIDE OF DRAINAGE STRUCTURE TO AVOID CONFLICT WITH 18" RCP.
217. NATURAL GAS LINE FEED AND SUPPLY (EXACT PIPE CHARACTERISTICS, DEPTH, MATERIAL AND LOCATION UNKNOWN), COORDINATE WITH NATIONAL GRID.
223. CONNECT PROPOSED PIPE TO EXISTING PIPE USING APPROPRIATE COUPLING, SEAL WATERTIGHT, COST INCIDENTAL TO ITEM D-701.
226. MODIFY EXISTING DRAINAGE MANHOLE/CATCH BASIN, ADJUST TO PROPOSED GRADE, ITEM D-751. SEE DETAIL B1/CU501. DISTANCE SHOWN IN PARENTHESIS ON PLANS
227. 6-INCH PERFORATED CORRUGATED PE UNDERDRAIN PIPE INSTALLED IN DRY SWALE, ITEM D-705. SEE DETAIL A1/CE501. PROVIDE END CAP.
228. REMOVE END CAPS, CONNECT PROPOSED PIPE TO EXISTING PIPE USING APPROPRIATE COUPLING, SEAL WATERTIGHT, COST INCIDENTAL TO ITEM D-701.
244. PRESERVE EXISTING GAS LINE, NOT SHOWN ON THIS PLAN FOR CLARITY. PROVIDE A MINIMUM 5-FEET OF CLEARANCE FROM THE WIDEST PORTION OF DRAINAGE ASPECTS DURING TRENCH DRAIN AND CATCH BASIN CONSTRUCTION. FIELD ADJUST TRENCH DRAIN LOCATION AS NECESSARY. COORDINATE WITH RPR.
248. CONNECT PROPOSED PIPE TO EXISTING STRUCTURE, CORE DRILL EXISTING CONCRETE STRUCTURE AND EPOXY GROUT PIPE IN PLACE, WATERTIGHT, COST INCIDENTAL TO ITEM D-701.
253. 10" DIP UNDER TAXIWAY B MAY BE REPLACED WITH 14" DIA. DR11 HDPE UNDER THE TAXIWAY B REHABILITATION PROJECT IN 2026. THE REPLACEMENT PIPE WOULD BE LOCATED PARALLEL TO, AND SOUTH OF, THE EXISTING FORCE MAIN, WITH CAPPED AND MARKED ENDS. COORDINATE EXACT LOCATION AND MATERIAL SIZE/TYPE WITH THE RPR PRIOR TO INSTALLATION.

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BAUER · LICENSED PROFESSIONAL ENGINEER · NO. 083424

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
REVISIONS		

PROJECT NO:	068.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	J. FRAZEE
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

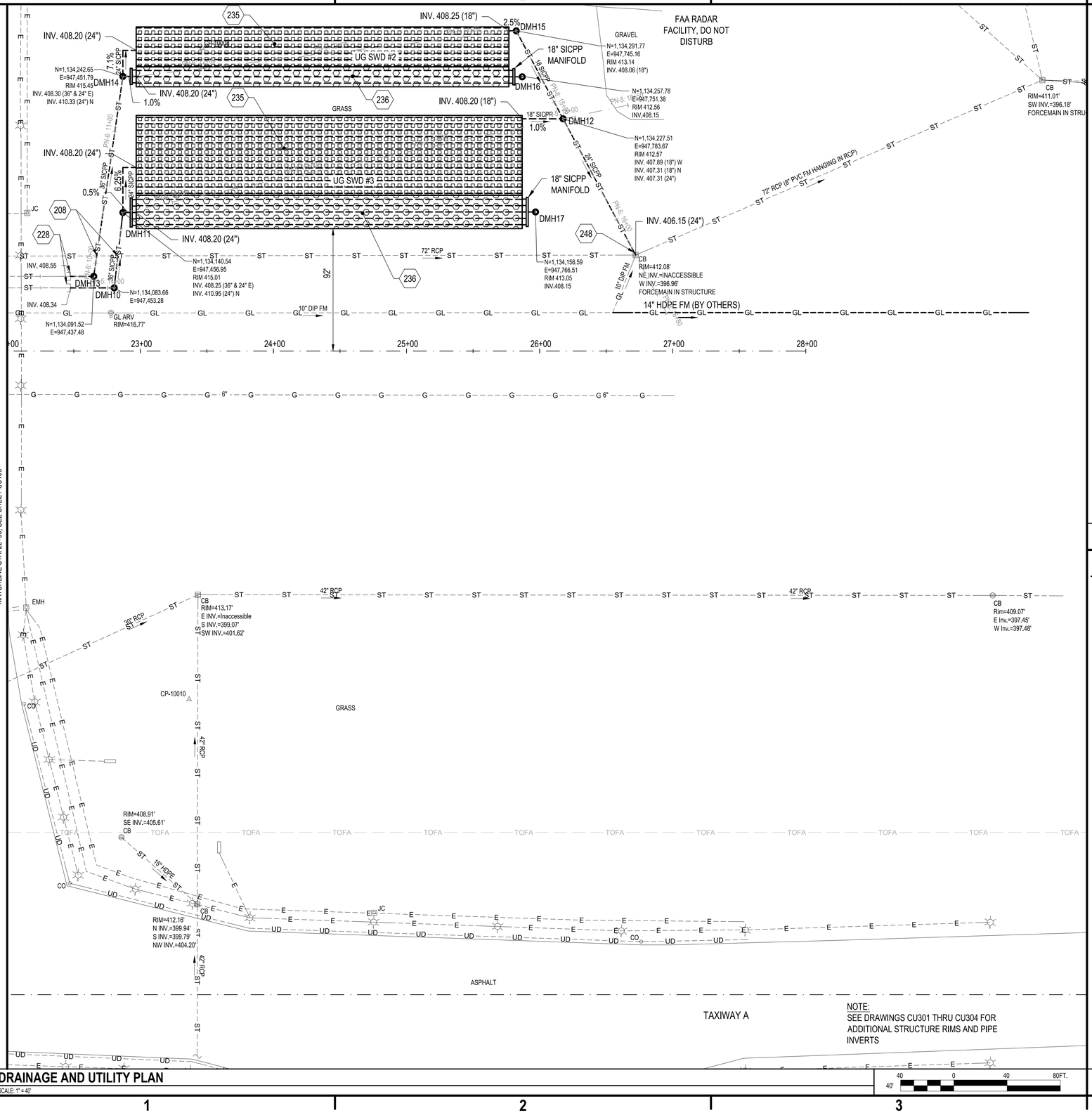
DRAINAGE AND UTILITY PLAN

CU103

SHEET NO. 55 OF 113

Copyright ©

Apr 29, 2026 - 3:45pm
F:\Project\C068 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_CU_Series.dwg



208. CONTRACTOR TO POT-HOLE ALL EXISTING ACTIVE UTILITIES AND NOTIFY THE ENGINEER IF A CONFLICT WITH PROPOSED UTILITIES WILL OCCUR. ALLOW A MINIMUM OF 2 WEEKS PRIOR TO WORK FOR DESIGN ADJUSTMENTS BY THE ENGINEER IF REQUIRED.

228. REMOVE END CAPS, CONNECT PROPOSED PIPE TO EXISTING PIPE USING APPROPRIATE COUPLING, SEAL WATERTIGHT, COST INCIDENTAL TO ITEM D-701.

235. UNDERGROUND STORMWATER MANAGEMENT SYSTEM INFILTRATION CHAMBERS, SEE DETAILS ON SHEETS CU503 & CU504.

236. UNDERGROUND STORMWATER MANAGEMENT SYSTEM SEPARATOR ROWS, SEE DETAILS ON SHEETS CU503 & CU504.

248. CONNECT PROPOSED PIPE TO EXISTING STRUCTURE, CORE DRILL EXISTING CONCRETE STRUCTURE AND EPOXY GROUT PIPE IN PLACE, WATERTIGHT, COST INCIDENTAL TO ITEM D-701.

B4 KEYED NOTES

SCALE: NOT TO SCALE

---ST--- SMOOTH INTERIOR CORRUGATED POLYETHYLENE OR REINFORCED CONCRETE DRAINAGE PIPE AS NOTED ON PLAN, ITEM D-701. SEE TRENCHING DETAILS ON SHEET CU501.

DMH11 STORMWATER DRAINAGE MANHOLE, ITEM D-751. SEE DETAIL B3/CU501.

A1 DRAINAGE AND UTILITY PLAN

SCALE: 1" = 40'

40' 40 0 40 80FT.

A4 KEYED LEGEND

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BAUER · NO. 083424 · LICENSED PROFESSIONAL ENGINEER

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	068.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	J. FRAZEE
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

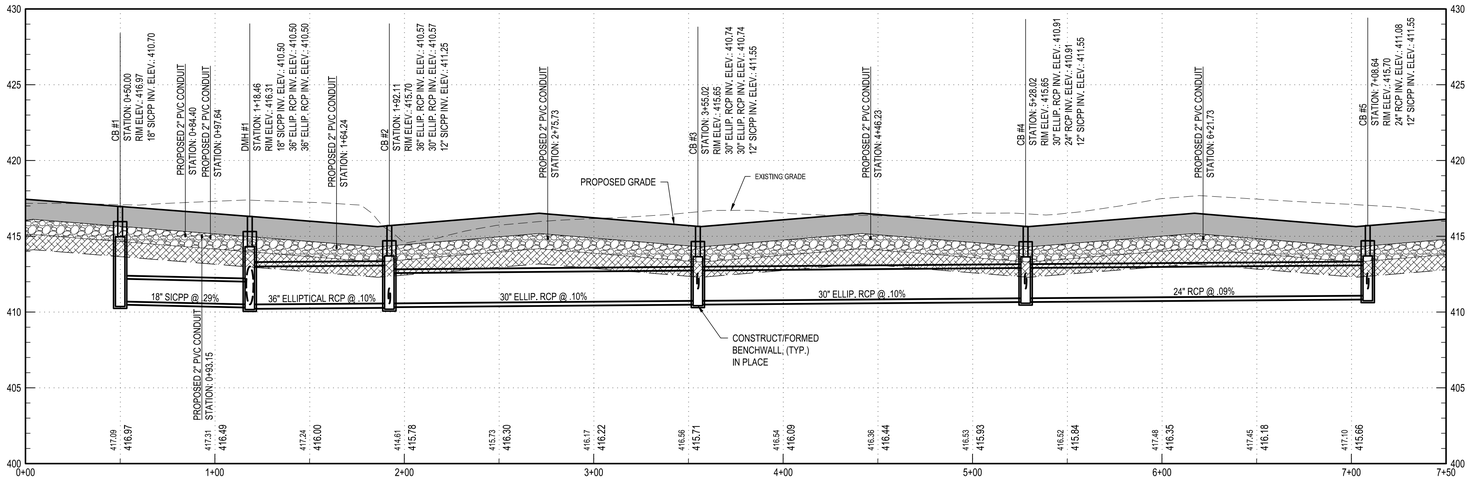
DRAINAGE AND UTILITY PLAN

CU104

SHEET NO. 56 OF 113

Copyright ©

Apr 29, 2026 - 3:35pm
F:\Project\C068 - Syracuse Regional Airport Authority\C068069001 - Comp Deicing Pad\Design\CADD\Sheet Files\C068069001_CU Series.dwg

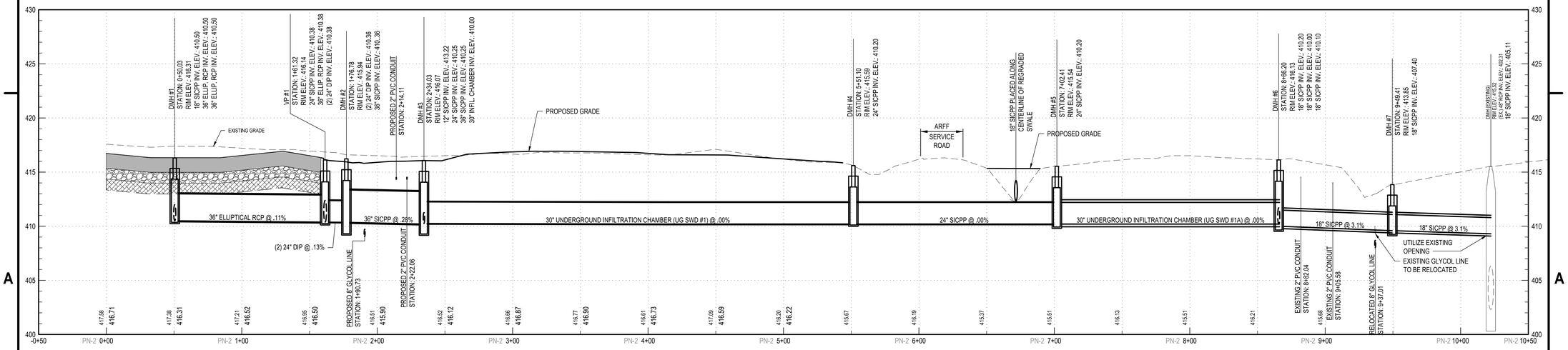


B1 PIPE NETWORK PROFILE #1

SCALE: 1" = 40' HORIZONTAL, 1" = 5' VERTICAL

HORIZ. 40' 40 0 40 80FT.

VERT. 5' 5 0 5 10FT.



A1 PIPE NETWORK PROFILE #2

SCALE: 1" = 40' HORIZONTAL, 1" = 5' VERTICAL

HORIZ. 40' 40 0 40 80FT.

VERT. 5' 5 0 5 10FT.

1 2 3 4

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · LICENSED PROFESSIONAL ENGINEER · NO. 083424

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	068.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	J. POTTER
DESIGNED BY:	J. FRAZEE
CHECKED BY:	C. BRUBACH

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

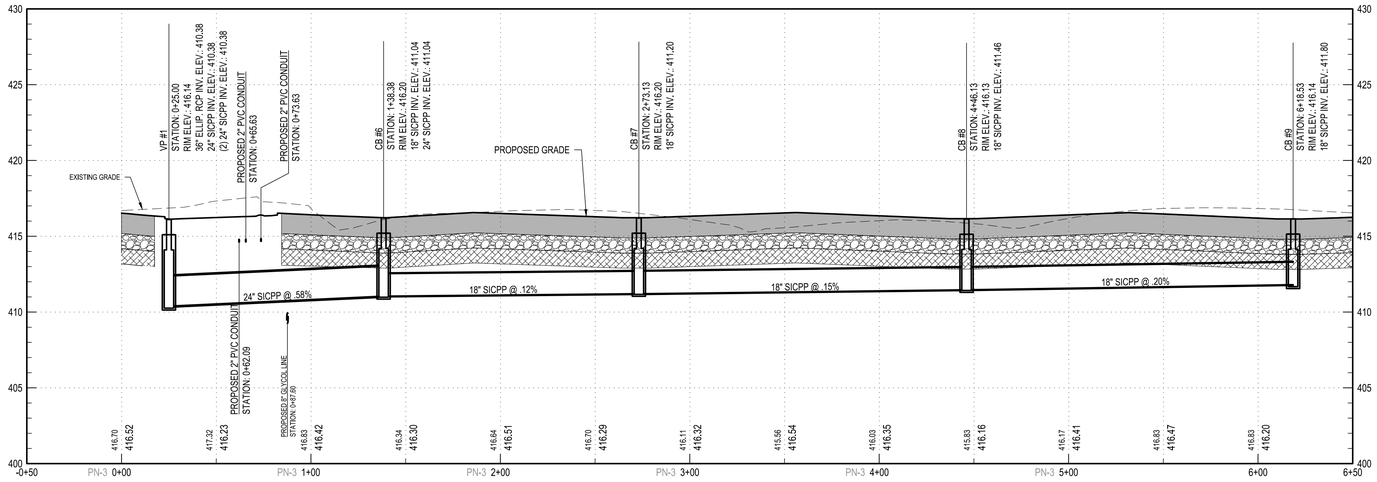
DRAINAGE AND UTILITY PROFILES

CU301

SHEET NO. 57 OF 113

Copyright ©

Apr 29, 2026 - 3:45pm
F:\Projects\CDR - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_CU Series.dwg

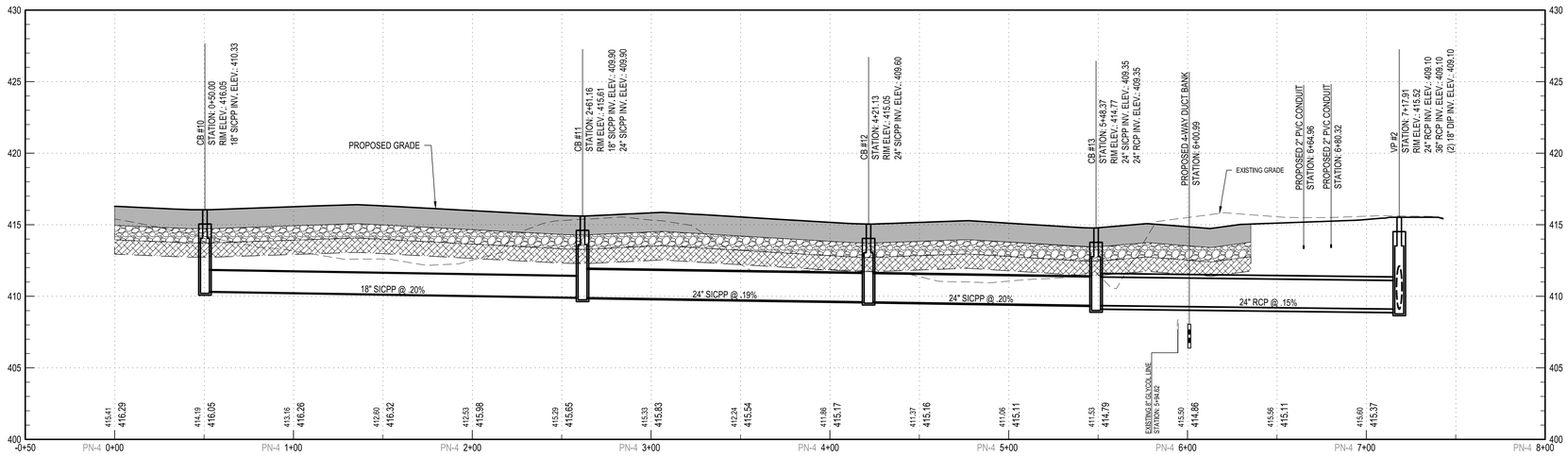


B1 PIPE NETWORK PROFILE #3

SCALE: 1" = 40' HORIZONTAL, 1" = 5' VERTICAL

HORIZ. 40' 40 0 40 80FT.

VERT. 5' 5 0 5 10FT.



A1 PIPE NETWORK PROFILE #4

SCALE: 1" = 40' HORIZONTAL, 1" = 5' VERTICAL

HORIZ. 40' 40 0 40 80FT.

VERT. 5' 5 0 5 10FT.

1 2 3 4

C&S COMPANIES®

C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · LICENSED PROFESSIONAL ENGINEER · NO. 083424

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	068.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	J. POTTER
DESIGNED BY:	J. FRAZEE
CHECKED BY:	C. BRUBACH

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

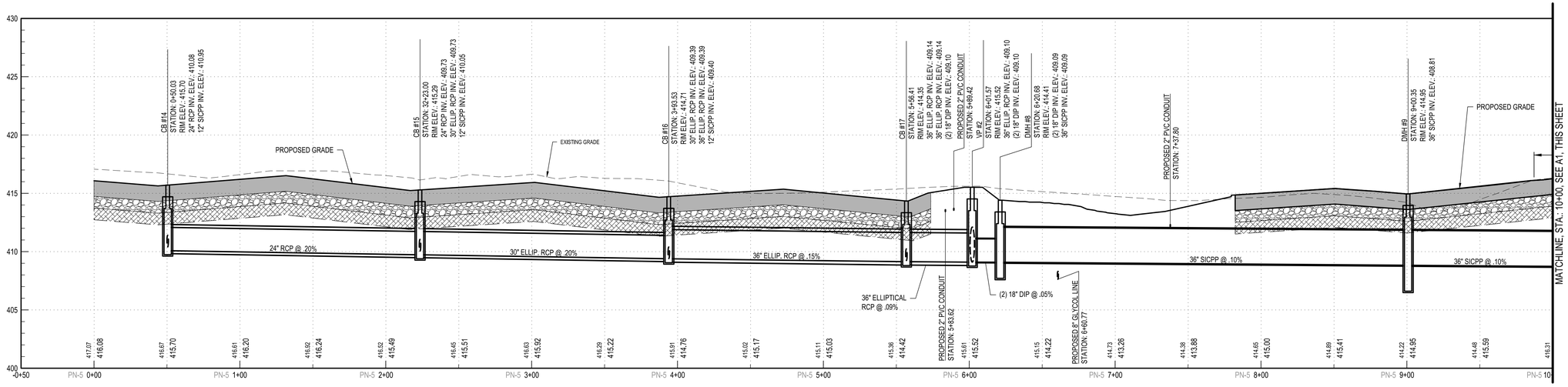
DRAINAGE AND UTILITY PROFILES

CU302

SHEET NO. 58 OF 113

Copyright ©

Apr 29, 2026 - 3:35pm
F:\Project\C08 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_CU Series.dwg

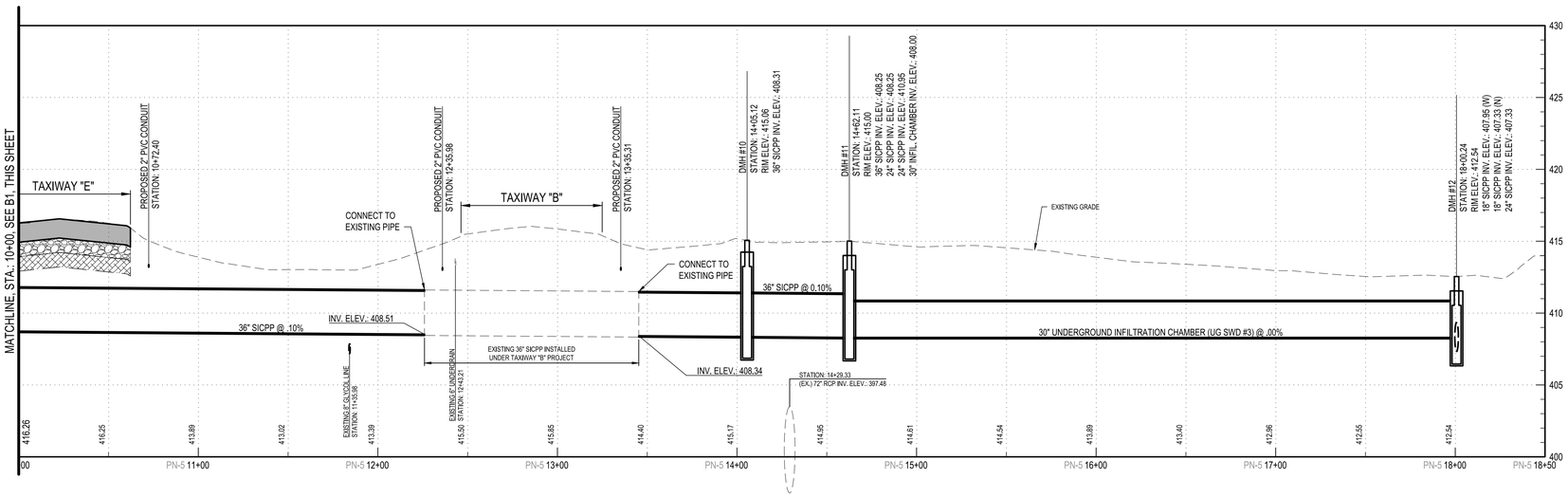


B1 PIPE NETWORK PROFILE #5

SCALE: 1" = 40' HORIZONTAL, 1" = 5' VERTICAL

HORIZ. 40' 40 0 40 80FT.

VERT. 5' 5 0 5 10FT.



A1 PIPE NETWORK PROFILE #5

SCALE: 1" = 40' HORIZONTAL, 1" = 5' VERTICAL

HORIZ. 40' 40 0 40 80FT.

VERT. 5' 5 0 5 10FT.

1 2 3 4

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

CHRISTOPHER D. BRUBACH
LICENSED PROFESSIONAL ENGINEER
NO. 083424
STATE OF NEW YORK

SYR
SYRACUSE
HANCOCK
INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	068.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	J. POTTER
DESIGNED BY:	J. FRAZEE
CHECKED BY:	C. BRUBACH

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

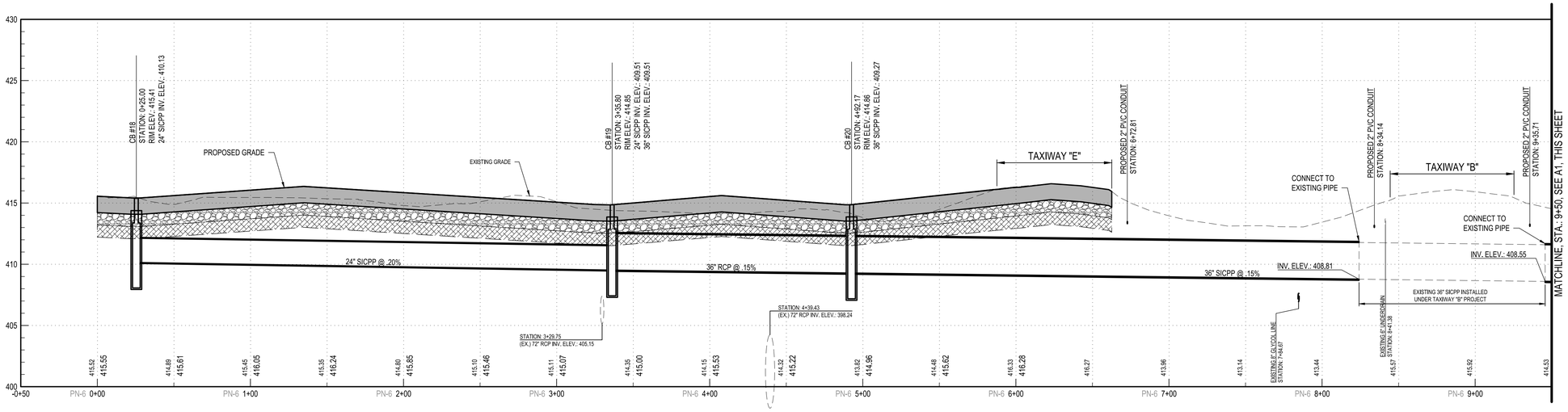
DRAINAGE AND UTILITY PROFILES

CU303

SHEET NO. 59 OF 113

Copyright ©

Apr 29, 2026 - 3:35pm
F:\Project\C08 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_CU Series.dwg

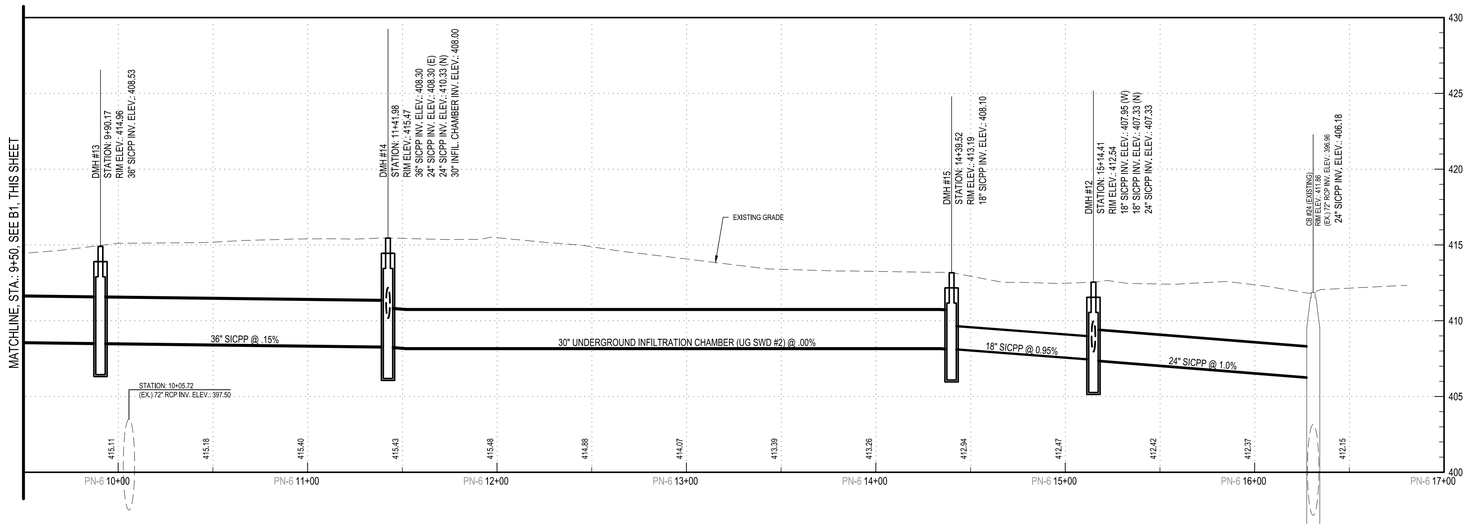


B1 PIPE NETWORK PROFILE #6

SCALE: 1" = 40' HORIZONTAL, 1" = 5' VERTICAL

HORIZ. 40' 40 0 40 80FT.

VERT. 5' 5 0 5 10FT.



A1 PIPE NETWORK PROFILE #6

SCALE: 1" = 40' HORIZONTAL, 1" = 5' VERTICAL

HORIZ. 40' 40 0 40 80FT.

VERT. 5' 5 0 5 10FT.

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · LIC. NO. 083424 · LICENSED PROFESSIONAL ENGINEER

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	068.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	J. POTTER
DESIGNED BY:	J. FRAZEE
CHECKED BY:	C. BRUBACH

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

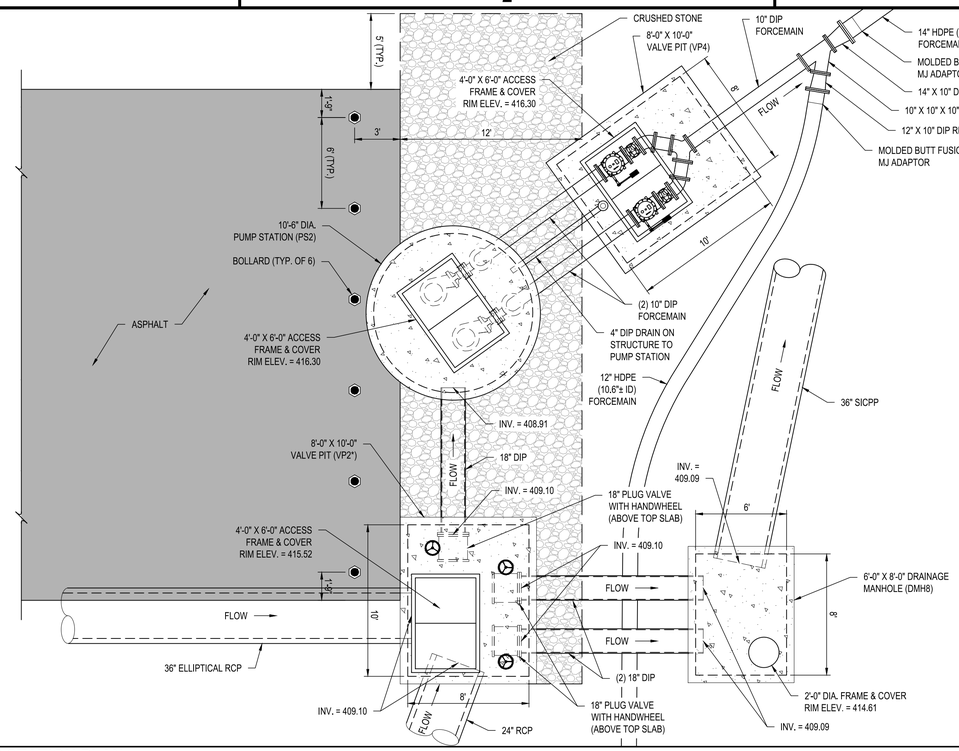
DRAINAGE AND UTILITY PROFILES

CU304

SHEET NO. 60 OF 113

Copyright ©

Apr 29, 2026 - 3:35pm
F:\Project\C068 - Syracuse Regional Airport Authority\C068069001 - Comp Deicing Pad\Design\CADD\Sheet Files\C068069001_CU Series.dwg



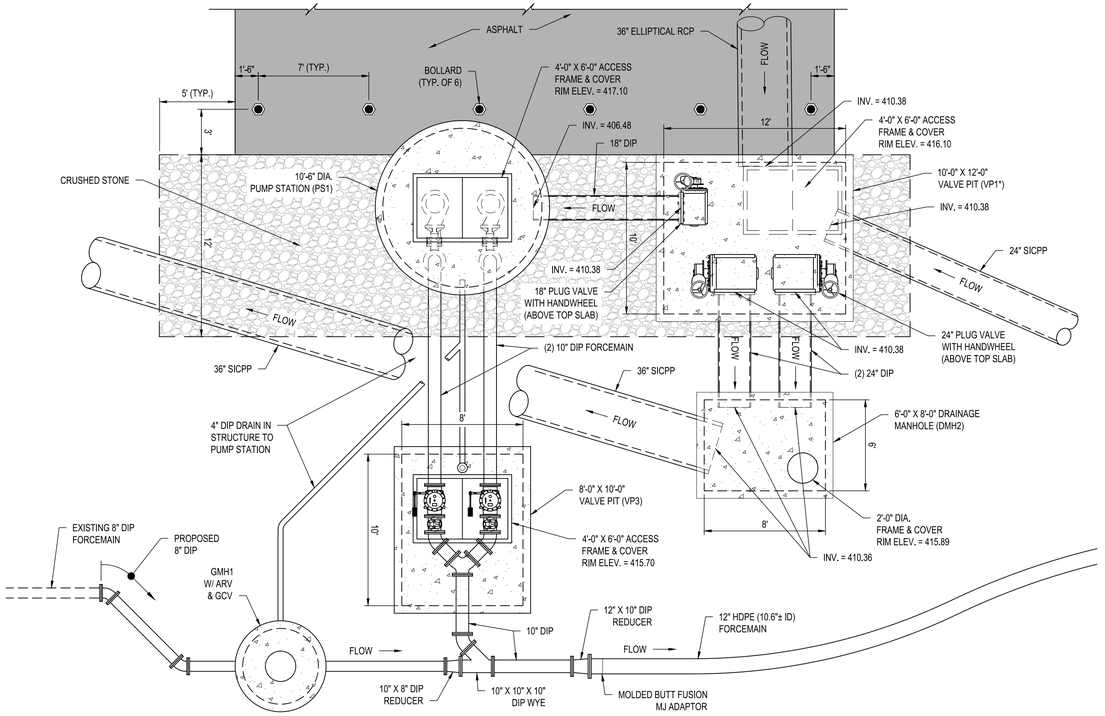
B1 ENLARGED SOUTHEAST PUMP STATION PLAN

SCALE: 1" = 5'

5' 5 0 5 10FT.

B4 KEYED NOTES

SCALE: NOT TO SCALE



A1 ENLARGED SOUTHWEST PUMP STATION PLAN

SCALE: 1" = 5'

5' 5 0 5 10FT.

A4 KEYED LEGEND

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUNCK · NO. 083424 · LICENSED PROFESSIONAL ENGINEER

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	M. ZINGARO
DESIGNED BY:	S. MEARON
CHECKED BY:	E. PROCOPIO

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

ENLARGED PUMP STATION PLANS

CU401

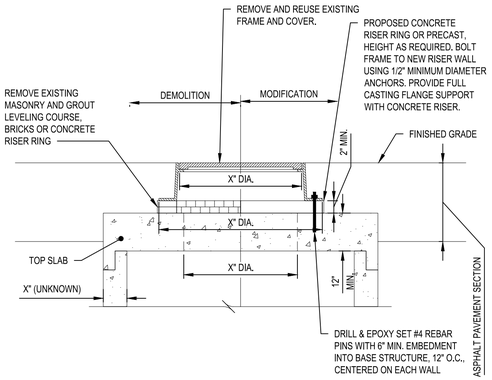
SHEET NO. 61 OF 113

Copyright ©

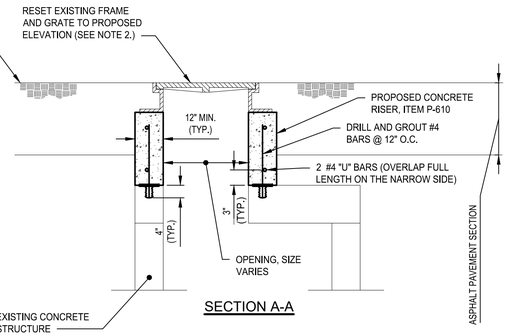
Apr 29, 2026 - 3:36pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_CU Series.dwg

NOTES:

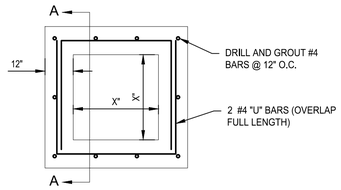
1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS PRIOR TO PERFORMING WORK.
2. ANCHOR FRAME TO TOP OF RISER IN 4 LOCATIONS USING 3/4" DIA. BY 6" LONG S.S. ANCHOR BOLTS.
3. RISERS RING MAY BE FIELD POURED OR PRECAST.
4. CONCRETE SHALL MEET SPECIFICATION P-610.
5. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR EACH STRUCTURE MODIFICATION USING EXACT FIELD MEASUREMENTS FOR REVIEW AND APPROVAL PRIOR TO COMPLETING THE WORK. ALTERNATIVE MODIFICATION DESIGNS SHALL BE CONSIDERED IF THE EXISTING STRUCTURE VARIES THAN THOSE TYPES SHOWN AS LONG AS THE STRUCTURE SUPPORTS THE DESIGN AIRCRAFT SPECIFIED IN NOTE #1, B3, THIS SHEET.



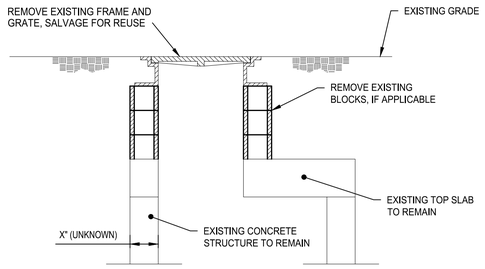
TYPE A



SECTION A-A



TOP VIEW

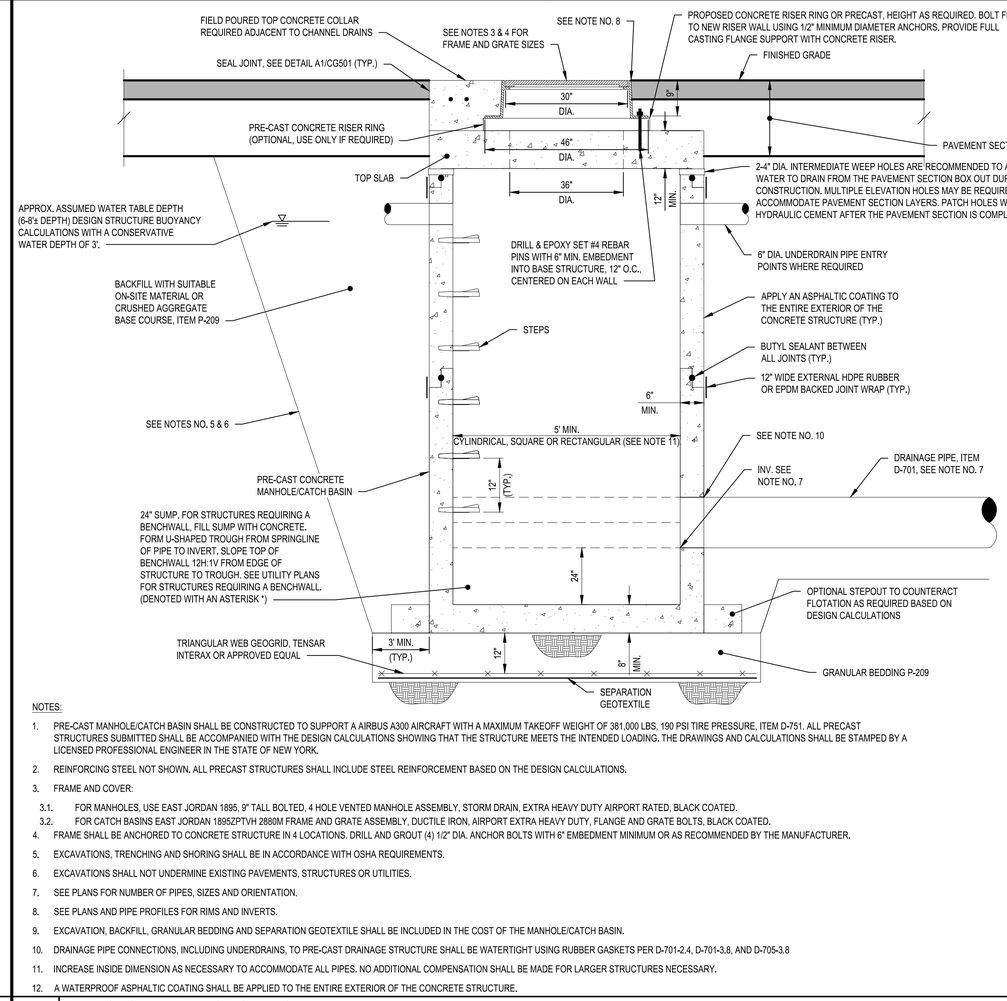


DEMOLITION SECTION

TYPE B

B1 DRAINAGE STRUCTURE MODIFICATION DETAIL

SCALE: NOT TO SCALE



NOTES:

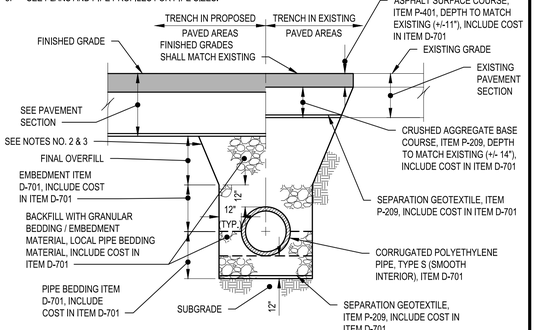
1. PRE-CAST MANHOLE/CATCH BASIN SHALL BE CONSTRUCTED TO SUPPORT A AIRBUS A300 AIRCRAFT WITH A MAXIMUM TAKEOFF WEIGHT OF 381,000 LBS, 190 PSI TIRE PRESSURE, ITEM D-751. ALL PRECAST STRUCTURES SUBMITTED SHALL BE ACCOMPANIED WITH THE DESIGN CALCULATIONS SHOWING THAT THE STRUCTURE MEETS THE INTENDED LOADING. THE DRAWINGS AND CALCULATIONS SHALL BE STAMPED BY A LICENSED PROFESSIONAL ENGINEER IN THE STATE OF NEW YORK.
2. REINFORCING STEEL NOT SHOWN. ALL PRECAST STRUCTURES SHALL INCLUDE STEEL REINFORCEMENT BASED ON THE DESIGN CALCULATIONS.
3. FRAME AND COVER:
   - 3.1. FOR MANHOLES, USE EAST JORDAN 1895, 9" TALL BOLTED, 4 HOLE VENTED MANHOLE ASSEMBLY, STORM DRAIN, EXTRA HEAVY DUTY AIRPORT RATED, BLACK COATED.
   - 3.2. FOR CATCH BASINS EAST JORDAN 18952PTVH 2880M FRAME AND GRATE ASSEMBLY, DUCTILE IRON, AIRPORT EXTRA HEAVY DUTY, FLANGE AND GRATE BOLTS, BLACK COATED.
4. FRAME SHALL BE ANCHORED TO CONCRETE STRUCTURE IN 4 LOCATIONS. DRILL AND GROUT (4) 1/2" DIA. ANCHOR BOLTS WITH 6" EMBEDMENT MINIMUM OR AS RECOMMENDED BY THE MANUFACTURER.
5. EXCAVATIONS, TRENCHING AND SHORING SHALL BE IN ACCORDANCE WITH OSHA REQUIREMENTS.
6. EXCAVATIONS SHALL NOT UNDERMINE EXISTING PAVEMENTS, STRUCTURES OR UTILITIES.
7. SEE PLANS FOR NUMBER OF PIPES, SIZES AND ORIENTATION.
8. SEE PLANS AND PIPE PROFILES FOR RIMS AND INVERTS.
9. EXCAVATION, BACKFILL, GRANULAR BEDDING AND SEPARATION GEOTEXTILE SHALL BE INCLUDED IN THE COST OF THE MANHOLE/CATCH BASIN.
10. DRAINAGE PIPE CONNECTIONS, INCLUDING UNDERDRAINS, TO PRE-CAST DRAINAGE STRUCTURE SHALL BE WATERTIGHT USING RUBBER GASKETS PER D-701-2.4, D-701-3.8, AND D-705-3.8
11. INCREASE INSIDE DIMENSION AS NECESSARY TO ACCOMMODATE ALL PIPES. NO ADDITIONAL COMPENSATION SHALL BE MADE FOR LARGER STRUCTURES NECESSARY.
12. A WATERPROOF ASPHALTIC COATING SHALL BE APPLIED TO THE ENTIRE EXTERIOR OF THE CONCRETE STRUCTURE.

B3 PRE-CAST DRAINAGE STRUCTURE DETAIL

SCALE: NOT TO SCALE

NOTES:

1. PIPE BEDDING / SPECIAL BACK FILL EMBEDMENT AND SEPARATION GEOTEXTILE SHALL BE INCLUDED IN THE COST OF THE PIPE.
2. EXCAVATIONS, TRENCHING AND SHORING SHALL BE IN ACCORDANCE WITH OSHA REQUIREMENTS.
3. EXCAVATIONS SHALL NOT UNDERMINE EXISTING PAVEMENTS, STRUCTURES OR UTILITIES.
4. SEPARATE PIPES IN A COMMON TRENCH BY A MINIMUM OF 24".
5. SEE PLANS AND PIPE PROFILES FOR PIPE SIZES.

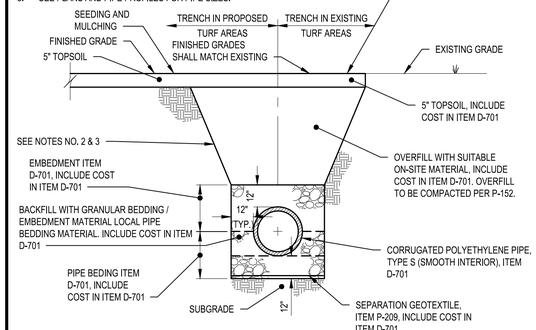


A1 POLYETHYLENE PIPE TRENCHING DETAIL (IN PAVEMENT)

SCALE: NOT TO SCALE

NOTES:

1. PIPE BEDDING / SPECIAL BACK FILL EMBEDMENT AND SEPARATION GEOTEXTILE SHALL BE INCLUDED IN THE COST OF THE PIPE.
2. EXCAVATIONS, TRENCHING AND SHORING SHALL BE IN ACCORDANCE WITH OSHA REQUIREMENTS.
3. EXCAVATIONS SHALL NOT UNDERMINE EXISTING PAVEMENTS, STRUCTURES OR UTILITIES.
4. SEPARATE PIPES IN A COMMON TRENCH BY A MINIMUM OF 24".
5. SEE PLANS AND PIPE PROFILES FOR PIPE SIZES.

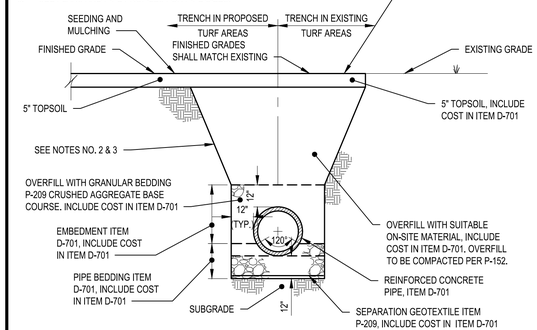


A2 POLYETHYLENE PIPE TRENCHING DETAIL (IN TURF)

SCALE: NOT TO SCALE

NOTES:

1. PIPE BEDDING / SPECIAL BACKFILL / EMBEDMENT AND SEPARATION GEOTEXTILE SHALL BE INCLUDED IN THE COST OF THE PIPE.
2. EXCAVATIONS, TRENCHING AND SHORING SHALL BE IN ACCORDANCE WITH OSHA REQUIREMENTS.
3. EXCAVATIONS SHALL NOT UNDERMINE EXISTING PAVEMENTS, STRUCTURES OR UTILITIES.
4. SEPARATE PIPES IN A COMMON TRENCH BY A MINIMUM OF 24".
5. SEE PLANS AND PIPE PROFILES FOR PIPE SIZES.

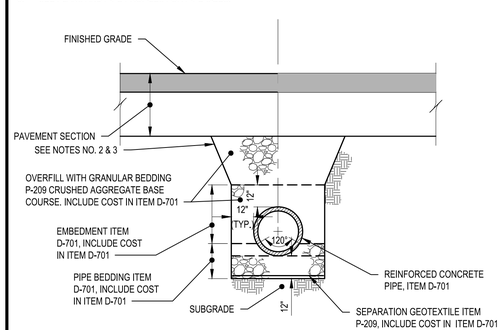


A3 RIGID PIPE TRENCHING DETAIL (IN TURF)

SCALE: NOT TO SCALE

NOTES:

1. PIPE BEDDING / SPECIAL BACKFILL / EMBEDMENT AND SEPARATION GEOTEXTILE SHALL BE INCLUDED IN THE COST OF THE PIPE.
2. EXCAVATIONS, TRENCHING AND SHORING SHALL BE IN ACCORDANCE WITH OSHA REQUIREMENTS.
3. EXCAVATIONS SHALL NOT UNDERMINE EXISTING PAVEMENTS, STRUCTURES OR UTILITIES.
4. SEPARATE PIPES IN A COMMON TRENCH BY A MINIMUM OF 24".
5. SEE PLANS AND PIPE PROFILES FOR PIPE SIZES.



A4 RIGID PIPE TRENCHING DETAIL (IN PAVEMENT)

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · LICENSED PROFESSIONAL ENGINEER · NO. 083424

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	068.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

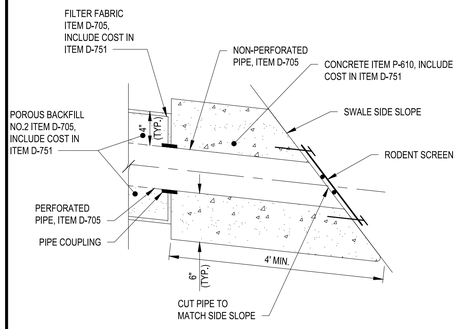
DRIANAGE DETAILS

CU501

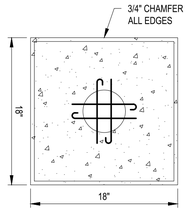
SHEET NO. 62 OF 113

Copyright ©

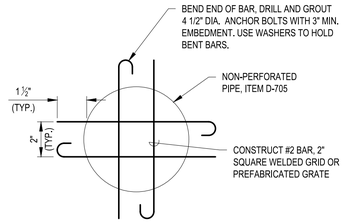
Apr 29, 2026 - 3:36pm
F:\Projects\C068 - Syracuse Regional Airport Authority\C068069001 - Comp Deicing Pad\Design\CADD\Sheet Files\C068069001_CU Details.dwg



SIDE VIEW



END VIEW



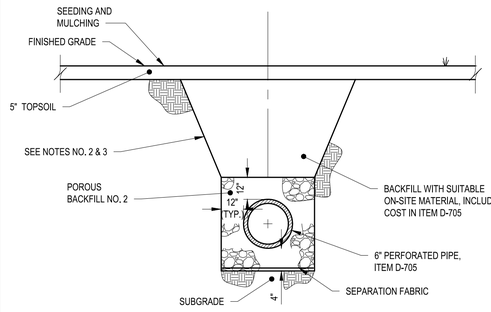
RODENT SCREEN

C1 UNDERDRAIN OUTLET HEADWALL DETAIL - TYPE I

SCALE: NOT TO SCALE

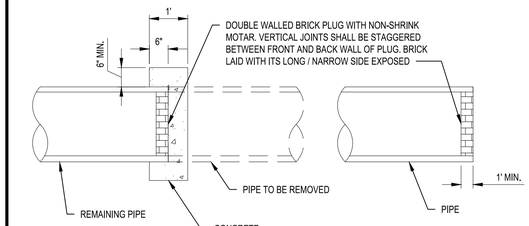
NOTES:

1. POROUS BACKFILL AND SEPARATION FABRIC SHALL BE INCLUDED IN THE COST OF THE PIPE.
2. EXCAVATIONS, TRENCHING AND SHORING SHALL BE IN ACCORDANCE WITH OSHA REQUIREMENTS.
3. EXCAVATIONS SHALL NOT UNDERMINE EXISTING PAVEMENTS, STRUCTURES OR UTILITIES.
4. SEPARATE PIPES IN A COMMON TRENCH BY A MINIMUM OF 24".
5. SEE PLANS FOR PIPE SIZES AND INVERTS.



C3 UNDERDRAIN PIPE TRENCHING DETAIL (IN TURF)

SCALE: NOT TO SCALE



BULKHEAD - B BULK HEAD - A

NOTES:

1. HEIGHTS OF PLUG SHALL BE FULL HEIGHT UNLESS OTHERWISE NOTED OR ORDERED BY THE ENGINEER.
2. PAYMENT FOR BULKHEAD SHALL BE INCIDENTAL TO ITEM P-153, CONTROLLED LOW STRENGTH MATERIAL. FOR PIPES TO BE FILLED AND ABANDONED IN PLACE.

C4 DRAINAGE PIPE BULK HEAD DETAIL

SCALE: NOT TO SCALE

B1 UNDERDRAIN "T" STYLE PIPE CONNECTION DETAIL

SCALE: NOT TO SCALE

NOTES:

1. WHERE REQUIRED, CONTRACTOR SHALL PROVIDE WYE JOINTS TO CONNECT UNDERDRAIN PIPE TO INLET STRUCTURE AT SPECIFIED ELEVATION.
2. NO SEPARATE PAYMENT WILL BE MADE FOR UNDERDRAIN CONNECTIONS.

B2 UNDERDRAIN CONNECTION TO DRAINAGE STRUCTURE

SCALE: NOT TO SCALE

PLAN

SECTION

NOTE:

1. "TOPHAT" OR FLANGE STYLE CLEANOUT FRAME AND COVERS WILL BE ACCEPTABLE, HOWEVER A MINIMUM OF 3" OF CONCRETE COVER SHALL BE PROVIDED, THIS WILL REQUIRE A LARGER DIAMETER CONCRETE ENCASEMENT AT THE CONTRACTORS COST.

END VIEW

B3 UNDERDRAIN CLEANOUT DETAIL

SCALE: NOT TO SCALE

A1 UNDERDRAIN "V" STYLE PIPE CONNECTION DETAIL

SCALE: NOT TO SCALE

UNDERDRAIN AT 40" UNIFORM DEPTH

UNDERDRAIN DEPTH VARIES

UNDERDRAIN NOTES:

1. UNDERDRAINS SHOULD BE INSTALLED AFTER SUBGRADE COMPACTION AND CEMENT TREATED SUBGRADE. POROUS BACKFILL SHALL BE PLACED IN LAYERS CONCURRENTLY WITH, OR AFTER PLACEMENT OF THE CRUSHED AGGREGATE BASE COURSE.
2. THE CONTRACTOR SHALL PROTECT THE POROUS BACKFILL WITH FILTER FABRIC AS NECESSARY TO PREVENT THE INFILTRATION OF FINE MATERIAL INTO THE POROUS BACKFILL. THE SUBBASE MATERIAL SHALL BE IN DIRECT CONTACT WITH THE POROUS BACKFILL FOR ITS ENTIRE THICKNESS.
3. UNDERDRAIN PIPE, POROUS BACKFILL, GEOTEXTILE AND EXCAVATION SHALL BE INCLUDED IN THE COST OF THE UNDERDRAIN.
4. IF THE UNDERDRAIN IS INSTALLED AFTER P-209 IS PLACED AND COMPACTED, THE FILTER FABRIC SHALL EXTEND UP THROUGH THE P-209 LAYER AND OVERLAP ON THE POROUS BACKFILL ENVELOPE.

A2 UNDERDRAIN PIPE TRENCHING DETAIL (IN PAVEMENT)

SCALE: NOT TO SCALE

UNDERDRAIN NOTES:

1. UNDERDRAINS SHOULD BE INSTALLED PRIOR TO COMPACTING PAVEMENT SUBGRADE. POROUS BACKFILL SHALL BE PLACED IN LAYERS CONCURRENTLY WITH THE CRUSHED AGGREGATE BASE COURSE.
2. FILTER FABRIC SHALL BE PLACED OVER TOP OF POROUS BACKFILL NO. 2 AND SUBBASE COURSE, EXTENDING TO EDGE OF ASPHALT.
3. THE CONTRACTOR SHALL PROTECT THE POROUS BACKFILL WITH FILTER FABRIC AS NECESSARY TO PREVENT THE INFILTRATION OF CONTAMINANTS INTO THE POROUS BACKFILL. THE SUBBASE MATERIAL SHALL BE IN DIRECT CONTACT WITH THE POROUS BACKFILL FOR ITS ENTIRE THICKNESS.
4. UNDERDRAIN PIPE SHALL BE INSTALLED SUCH THAT THE INVERT OF THE UNDERDRAIN PIPE SHALL BE A MINIMUM OF 6-INCHES BELOW SUBGRADE.

A4 UNDERDRAIN PIPE AT PAVEMENT EDGE DETAIL

SCALE: NOT TO SCALE

C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · LICENSED PROFESSIONAL ENGINEER · NO. 083424

SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	068.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

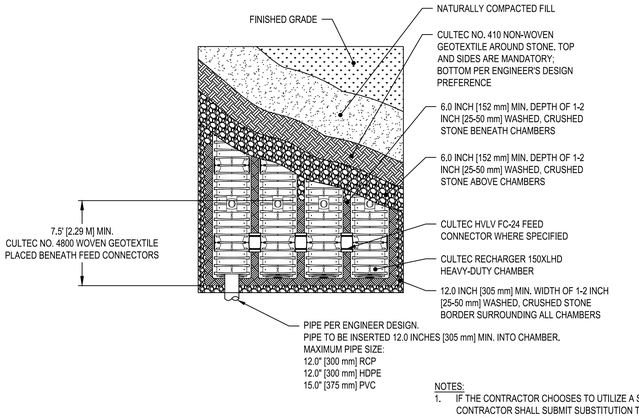
DRAINAGE DETAILS

CU502

SHEET NO. 63 OF 113

Copyright ©

Apr 29, 2026 - 9:36pm
F:\Project\C68 - Syracuse Regional Airport Authority\068069001 - Comp Deicing Pad\Design\CADD\Sheet Files\068069001_CU Details.dwg

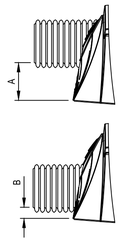


NOTES:
1. IF THE CONTRACTOR CHOOSES TO UTILIZE A SUBSTITUTION FOR THE CULTEC RECHARGER SYSTEM. CONTRACTOR SHALL SUBMIT SUBSTITUTION TO THE RPR A MINIMUM OF 90 DAYS PRIOR TO START OF CONSTRUCTION.

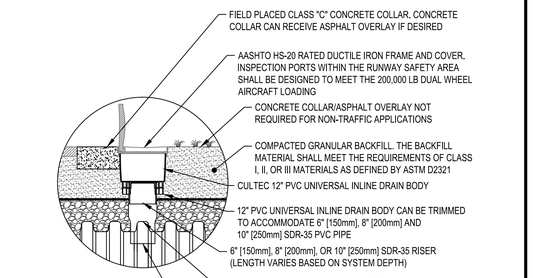
C1 CULTEC RECHARGER 300HD PLAN VIEW (OR APPROVED EQUAL)
SCALE: NTS

PIPE	A	B
6" [150 mm]	18.50" [470 mm]	0.50" [13 mm]
8" [200 mm]	16.50" [420 mm]	0.75" [20 mm]
10" [250 mm]	14.50" [369 mm]	1.00" [26 mm]
12" [300 mm]	12.50" [318 mm]	1.25" [32 mm]
15" [375 mm]	9.00" [229 mm]	1.50" [39 mm]
18" [450 mm]	5.00" [127 mm]	1.75" [45 mm]
24" [600 mm]	N/A	2.50" [64 mm]

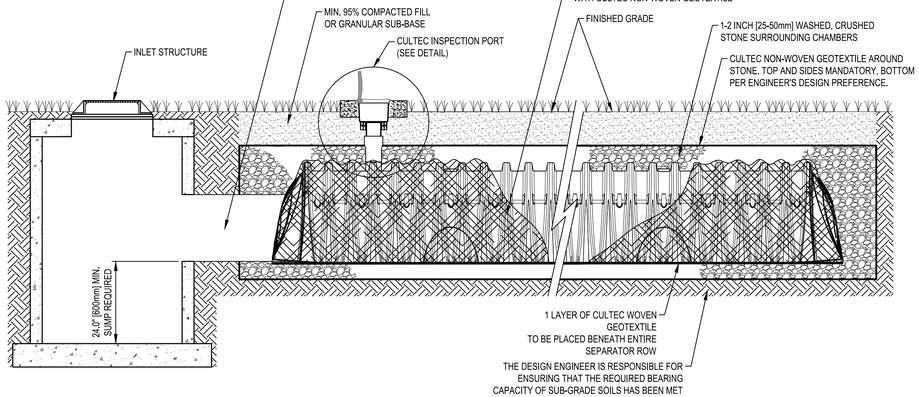
*THE TYPICAL INVERT TABLE ABOVE IS BASED ON THE INSIDE DIAMETER OF STANDARD CORRUGATED PLASTIC PIPE. THE HEAVY DUTY END CAP HAS PRE-MARKED TRIM LINES FOR PIPE DIAMETERS 6" (150mm), 8" (200mm), 10" (250mm), 12" (300mm), 15" (375mm), 18" (450mm) AND 24" (600mm). PIPES OF ANY SIZE AND MATERIAL UP TO 24" (600mm) MAY BE PLACED AT CUSTOM LOCATIONS AND CUSTOM INVERTS. THE CROWN OF THE PIPE MUST REMAIN A MINIMUM OF 3" (75mm) FROM THE EDGE OF THE HEAVY DUTY END CAP.



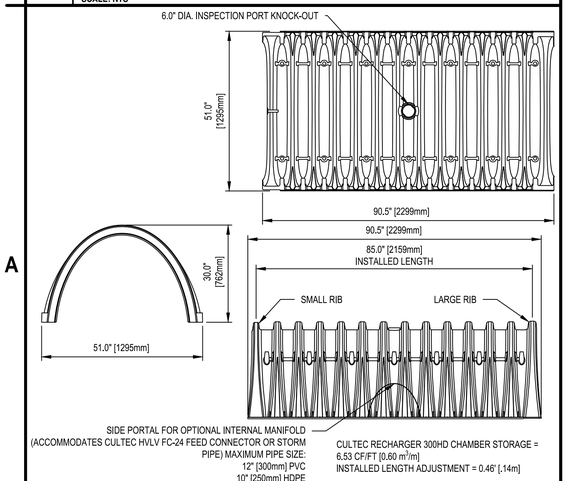
C3 CULTEC RECHARGER 300HD TYPICAL PIPE INVERTS (OR APPROVED EQUAL)
SCALE: NTS



B1 CULTEC RECHARGER 300HD INSPECTION PORT
SCALE: NTS



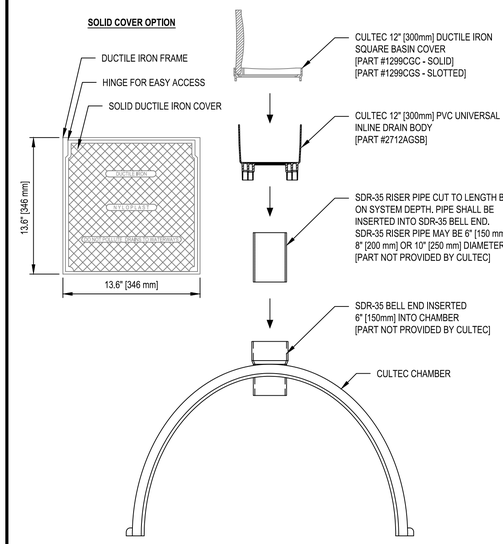
NOTES:
1. THE CHAMBERS SHALL BE DESIGNED AND TESTED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS." THE LOAD CONFIGURATION SHALL INCLUDE:
   1.a. INSTANTANEOUS AASHTO DESIGN TRUCK LIVE LOAD AT MINIMUM COVER
   1.b. MAXIMUM PERMANENT (50-YEAR) COVER LOAD
   1.c. 1-WEEK PARKED AASHTO DESIGN TRUCK LOAD
   1.d. CHAMBERS WITHIN THE RUNWAY SAFETY AREA SHALL BE DESIGNED TO MEET THE 200,000 LB DUAL WHEEL AIRCRAFT LOADING REQUIREMENT.
2. THE CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418 "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS"
3. THE INSTALLED CHAMBER SYSTEM SHALL PROVIDE RESISTANCE TO THE LOADS AND LOAD FACTORS AS DEFINED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS SECTION 12.12, WHEN INSTALLED ACCORDING TO CULTEC'S RECOMMENDED INSTALLATION INSTRUCTIONS. THE STRUCTURAL DESIGN OF THE CHAMBERS SHALL INCLUDE THE FOLLOWING:
   3.a. THE CREEP MODULUS SHALL BE 50-YEAR AS SPECIFIED IN ASTM F2418
   3.b. THE MINIMUM SAFETY FACTOR FOR LIVE LOADS SHALL BE 1.75
   3.c. THE MINIMUM SAFETY FACTOR FOR DEAD LOADS SHALL BE 1.95

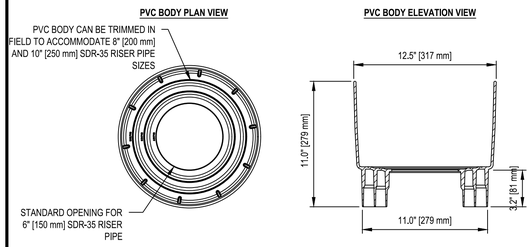


A1 CULTEC RECHARGER 300HD HEAVY DUTY THREE VIEW
SCALE: NTS

A2 CULTEC RECHARGER 300HD SECTION VIEW (OR APPROVED EQUAL)
SCALE: NTS

FINAL ASSEMBLY





A4 CULTEC RECHARGER 300HD INSPECTION PORT KIT
SCALE: NTS

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUNCH · LICENSED PROFESSIONAL ENGINEER · NO. 083424

SYR. SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	J. FRAZEE
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

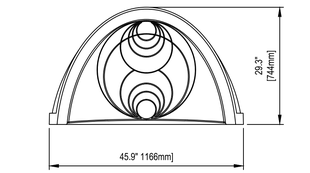
DRAINAGE BMP DETAILS

CU503

SHEET NO. 64 OF 113

Copyright ©

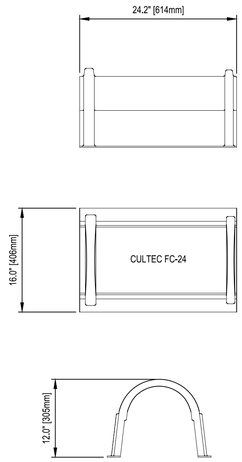
Apr 29, 2026 - 3:36pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_CU Details.dwg



CULTEC RECHARGER 300HD
END CAP STORAGE = 2.66 CF [0,08 m^3] / UNIT
END CAP STORAGE = 3.32 CF/FT [0.31 m^3/m]
INSTALLED LENGTH ADJUSTMENT = 0.22' [,067m]

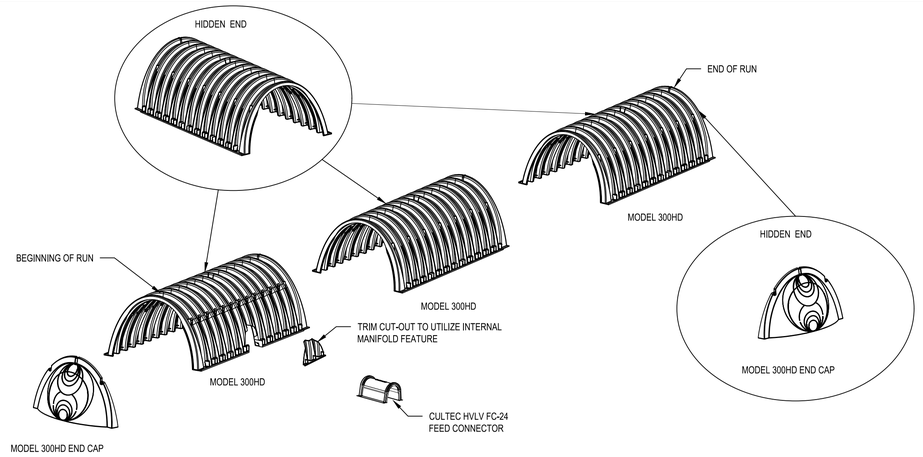
C1 CULTEC RECHARGER 300HD HEAVY DUTY END CAP

SCALE: NOT TO SCALE



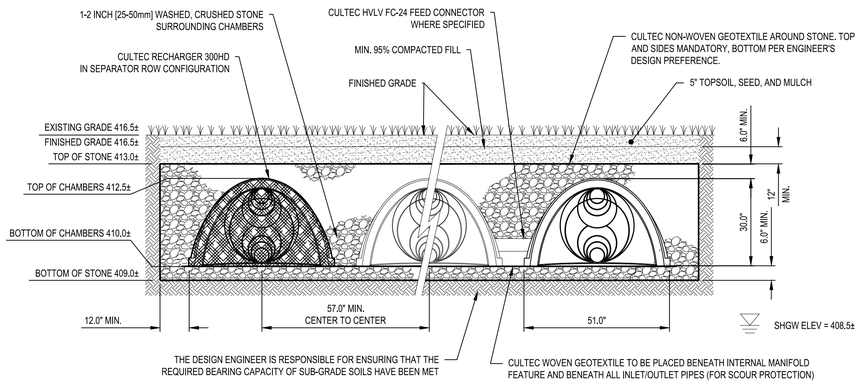
C2 CULTEC HVLV FC-24 FEED CONNECTOR

SCALE: NOT TO SCALE



C3 CULTEC RECHARGER 300HD (OR APPROVED EQUAL) HEAVY DUTY TYPICAL INTERLOCK

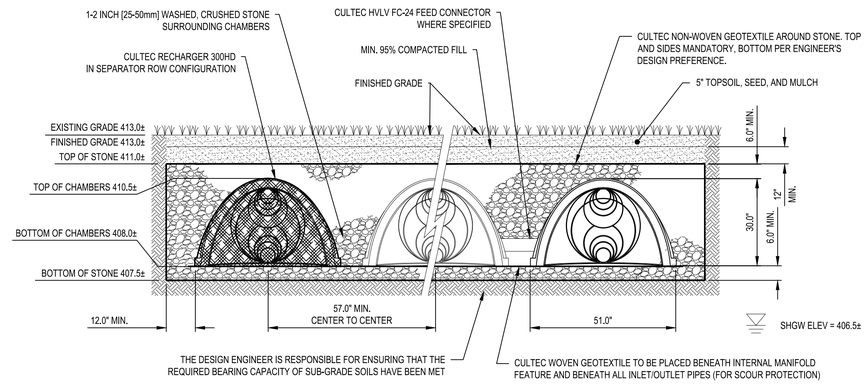
SCALE: NOT TO SCALE



NOTES:
1. THE CHAMBERS SHALL BE DESIGNED AND TESTED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS." THE LOAD CONFIGURATION SHALL INCLUDE:
   1.a. INSTANTANEOUS AASHTO DESIGN TRUCK LIVE LOAD AT MINIMUM COVER
   1.b. MAXIMUM PERMANENT (50-YEAR) COVER LOAD
   1.c. 1-WEEK PARKED AASHTO DESIGN TRUCK LOAD
2. THE CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418 "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS"
3. THE INSTALLED CHAMBER SYSTEM SHALL PROVIDE RESISTANCE TO THE LOADS AND LOAD FACTORS AS DEFINED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS SECTION 12.12, WHEN INSTALLED ACCORDING TO CULTEC'S RECOMMENDED INSTALLATION INSTRUCTIONS. THE STRUCTURAL DESIGN OF THE CHAMBERS SHALL INCLUDE THE FOLLOWING:
   3.a. THE CREEP MODULUS SHALL BE 50-YEAR AS SPECIFIED IN ASTM F2418
   3.b. THE MINIMUM SAFETY FACTOR FOR LIVE LOADS SHALL BE 1.75
   3.c. THE MINIMUM SAFETY FACTOR FOR DEAD LOADS SHALL BE 1.95

A1 UNDERGROUND INFILTRATION CHAMBER SYSTEM - SECTION VIEW (UG SWD #1 AND #1A)

SCALE: NOT TO SCALE



NOTES:
1. THE CHAMBERS SHALL BE DESIGNED AND TESTED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS." THE LOAD CONFIGURATION SHALL INCLUDE:
   1.a. INSTANTANEOUS AASHTO DESIGN TRUCK LIVE LOAD AT MINIMUM COVER
   1.b. MAXIMUM PERMANENT (50-YEAR) COVER LOAD
   1.c. 1-WEEK PARKED AASHTO DESIGN TRUCK LOAD
2. THE CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418 "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS"
3. THE INSTALLED CHAMBER SYSTEM SHALL PROVIDE RESISTANCE TO THE LOADS AND LOAD FACTORS AS DEFINED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS SECTION 12.12, WHEN INSTALLED ACCORDING TO CULTEC'S RECOMMENDED INSTALLATION INSTRUCTIONS. THE STRUCTURAL DESIGN OF THE CHAMBERS SHALL INCLUDE THE FOLLOWING:
   3.a. THE CREEP MODULUS SHALL BE 50-YEAR AS SPECIFIED IN ASTM F2418
   3.b. THE MINIMUM SAFETY FACTOR FOR LIVE LOADS SHALL BE 1.75
   3.c. THE MINIMUM SAFETY FACTOR FOR DEAD LOADS SHALL BE 1.95

A3 UNDERGROUND INFILTRATION CHAMBER SYSTEM - SECTION VIEW (UG SWD #2 AND #3)

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRONCE · LICENSED PROFESSIONAL ENGINEER · NO. 083424

SYR. SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	J. FRAZEE
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

DRAINAGE BMP DETAILS

CU504

SHEET NO. 65 OF 113

Copyright ©

Apr 29, 2026 - 3:36pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 – Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_CU Details.dwg

CULTEC RECHARGER® 300HD SPECIFICATIONS

GENERAL

CULTEC RECHARGER® 300HD CHAMBERS ARE DESIGNED FOR UNDERGROUND STORMWATER MANAGEMENT. THE CHAMBERS MAY BE USED FOR RETENTION, RECHARGING, DETENTION OR CONTROLLING THE FLOW OF ON-SITE STORMWATER RUNOFF.

CHAMBER PARAMETERS

1. THE CHAMBERS SHALL BE MANUFACTURED IN THE U.S.A. BY CULTEC, OF BROOKFIELD, CT (CULTEC.COM, 203-775-4416).
2. THE CHAMBERS SHALL BE DESIGNED AND TESTED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". THE LOAD CONFIGURATION SHALL INCLUDE:
   A. INSTANTANEOUS AASHTO DESIGN TRUCK LIVE LOAD AT MINIMUM COVER
   B. MAXIMUM PERMANENT (50-YEAR) COVER LOAD
   C. 1-WEEK PARKED AASHTO DESIGN TRUCK LOAD
3. THE CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418 "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
4. THE INSTALLED CHAMBER SYSTEM SHALL PROVIDE RESISTANCE TO THE LOADS AND LOAD FACTORS AS DEFINED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS SECTION 12.12, WHEN INSTALLED ACCORDING TO CULTEC'S RECOMMENDED INSTALLATION INSTRUCTIONS. THE STRUCTURAL DESIGN OF THE CHAMBERS SHALL INCLUDE THE FOLLOWING:
   A. THE CREEP MODULUS SHALL BE 50-YEAR AS SPECIFIED IN ASTM F2418
   B. THE MINIMUM SAFETY FACTOR FOR LIVE LOADS SHALL BE 1.75
   C. THE MINIMUM SAFETY FACTOR FOR DEAD LOADS SHALL BE 1.95
5. THE INSTALLED CHAMBER SYSTEM SHALL BE STRUCTURALLY DESIGNED TO PROVIDE RESISTANCE TO LIVE LOADS AS DEFINED BY THE AASHTO H-20/HL-93 SPECIFICATION WHEN INSTALLED ACCORDING TO CULTEC'S RECOMMENDED INSTALLATION INSTRUCTIONS.
6. THE CHAMBER SHALL BE INJECTION MOLDED OF BLUE VIRGIN IMPACT-MODIFIED POLYPROPYLENE.
7. THE CHAMBER SHALL BE ARCHED IN SHAPE.
8. THE CHAMBER SHALL BE OPEN-BOTTOMED.
9. THE CHAMBER SHALL BE JOINED USING AN INTERLOCKING OVERLAPPING RIB METHOD. CONNECTIONS MUST BE FULLY SHOULDERED OVERLAPPING RIBS, HAVING NO SEPARATE COUPLINGS.
10. THE NOMINAL CHAMBER DIMENSIONS OF THE CULTEC RECHARGER® 300HD SHALL BE 30 INCHES (762 MM) TALL, 51 INCHES (1295 MM) WIDE AND 90.5 INCHES (2299 MM) LONG. THE INSTALLED LENGTH OF A JOINED RECHARGER® 300HD SHALL BE 7.08 FEET (2.159 M).
11. MULTIPLE CHAMBERS MAY BE CONNECTED TO FORM DIFFERENT LENGTH ROWS. EACH ROW SHALL BEGIN AND END WITH A SEPARATELY FORMED CULTEC RECHARGER® 300HD END CAP. MAXIMUM INLET OPENING ON THE END CAP IS 24 INCHES (600 MM) HDPE.
12. THE CHAMBER SHALL HAVE TWO SIDE PORTALS TO ACCEPT CULTEC HVLV™ FC-24 FEED CONNECTORS TO CREATE AN INTERNAL MANIFOLD. MAXIMUM ALLOWABLE PIPE SIZE IN THE SIDE PORTAL IS 10 INCHES (250 MM) HDPE AND 12 INCHES (300 MM) PVC.
13. THE NOMINAL CHAMBER DIMENSIONS OF THE CULTEC HVLV™ FC-24 FEED CONNECTOR SHALL BE 12 INCHES (305 MM) TALL, 16 INCHES (406 MM) WIDE AND 24.2 INCHES (615 MM) LONG.
14. THE NOMINAL STORAGE VOLUME OF THE RECHARGER® 300HD CHAMBER SHALL BE 6.53 FT^3 / FT (.607 M^3 / M) - WITHOUT STONE. THE NOMINAL STORAGE VOLUME OF A JOINED RECHARGER® 300HD SHALL BE 46.27 FT^3 / UNIT (1.310 M^3 / UNIT) - WITHOUT STONE.
15. THE RECHARGER 300HD CHAMBER SHALL HAVE 14 CORRUGATIONS.
16. THE CHAMBER SHALL BE CAPABLE OF ACCEPTING A 6 INCH (150 MM) INSPECTION PORT OPENING AT THE TOP CENTER OF EACH CHAMBER, CENTERED ON THE CORRUGATION CREST.
17. THE CHAMBER SHALL BE MANUFACTURED IN A FACILITY EMPLOYING CULTEC'S QUALITY CONTROL AND ASSURANCE PROCEDURES.
18. MAXIMUM ALLOWABLE COVER OVER THE TOP OF THE CHAMBER SHALL BE 12.0 FEET (3.66 M).

END CAP PARAMETERS

1. THE CULTEC RECHARGER® 300HD END CAP (REFERRED TO AS 'END CAP') SHALL BE MANUFACTURED IN THE U.S.A. BY CULTEC, OF BROOKFIELD, CT (CULTEC.COM, 203-775-4416).
2. THE END CAP SHALL BE INJECTION MOLDED OF BLUE VIRGIN IMPACT-MODIFIED POLYETHYLENE COPOLYMERS.
3. THE END CAP SHALL BE ARCHED IN SHAPE.
4. THE END CAP SHALL BE JOINED AT THE BEGINNING AND END OF EACH ROW OF CHAMBERS USING AN INTERLOCKING OVERLAPPING RIB METHOD. CONNECTIONS MUST BE FULLY SHOULDERED OVERLAPPING RIBS, HAVING NO SEPARATE COUPLINGS.
5. THE NOMINAL DIMENSIONS OF THE END CAP SHALL BE 29.3 INCHES (744 MM) TALL, 45.9 INCHES (1166 MM) WIDE AND 12.2 INCHES (310 MM) LONG. WHEN JOINED WITH A RECHARGER 300HD CHAMBER, THE INSTALLED LENGTH OF THE END CAP SHALL BE 9.6 INCHES (244 MM).THE NOMINAL STORAGE VOLUME OF THE END CAP SHALL BE 3.32 FT^3/ FT (0.31 M^3 / M) - WITHOUT STONE. THE NOMINAL STORAGE VOLUME OF AN INTERLOCKED END CAP SHALL BE 2.66 FT^3 / UNIT (0.08 M^3 / UNIT) - WITHOUT STONE.
6. MAXIMUM INLET OPENING ON THE END CAP IS 24 INCHES (600 MM) HDPE.
7. THE CHAMBER SHALL BE MANUFACTURED IN A FACILITY EMPLOYING CULTEC'S QUALITY CONTROL AND ASSURANCE PROCEDURES.
8. THE END CAP SHALL PROVIDE RESISTANCE TO THE LOADS AND LOAD FACTORS AS DEFINED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS SECTION 12.12.

CULTEC HVLV FC-24 FEED CONNECTOR PRODUCT SPECIFICATIONS

GENERAL

CULTEC HVLV FC-24 FEED CONNECTORS ARE DESIGNED TO CREATE AN INTERNAL MANIFOLD FOR CULTEC RECHARGER MODEL 300HD STORMWATER CHAMBERS.

CHAMBER PARAMETERS

1. THE CHAMBERS SHALL BE MANUFACTURED IN THE U.S.A. BY CULTEC, OF BROOKFIELD, CT. (203-775-4416 OR 1-800-428-5832)
2. THE CHAMBER SHALL BE VACUUM THERMOFORMED OF HIGH MOLECULAR WEIGHT HIGH DENSITY POLYETHYLENE (HMWHDPE) WITH A BLACK INTERIOR AND BLUE EXTERIOR.
3. THE CHAMBER SHALL BE ARCHED IN SHAPE.
4. THE CHAMBER SHALL BE OPEN-BOTTOMED.
5. THE NOMINAL CHAMBER DIMENSIONS OF THE CULTEC HVLV FC-24 FEED CONNECTOR SHALL BE 12 INCHES (305 mm) TALL, 16 INCHES (406 mm) WIDE AND 24.2 INCHES (614 mm) LONG.
6. THE NOMINAL STORAGE VOLUME OF THE HVLV FC-24 FEED CONNECTOR SHALL BE 0.913 FT^3 / FT (0.085 m^3 / m) - WITHOUT STONE.
7. THE HVLV FC-24 FEED CONNECTOR CHAMBER SHALL HAVE 2 CORRUGATIONS.
8. THE HVLV FC-24 FEED CONNECTOR MUST BE FORMED AS A WHOLE CHAMBER HAVING TWO OPEN END WALLS AND HAVING NO SEPARATE END PLATES OR SEPARATE END WALLS. THE UNIT SHALL FIT INTO THE SIDE PORTALS OF THE CULTEC RECHARGER STORMWATER CHAMBER AND ACT AS CROSS FEED CONNECTIONS CREATING AN INTERNAL MANIFOLD.
9. THE CHAMBER SHALL BE DESIGNED TO WITHSTAND TRAFFIC LOADS WHEN INSTALLED ACCORDING TO CULTEC'S RECOMMENDED INSTALLATION INSTRUCTIONS.
10. THE CHAMBER SHALL BE MANUFACTURED IN AN ISO 9001:2015 CERTIFIED FACILITY.

CULTEC NO. 410™ NON-WOVEN GEOTEXTILE

CULTEC NO. 410™ NON-WOVEN GEOTEXTILE MAY BE USED WITH CULTEC CONTACTOR® AND RECHARGER® STORMWATER INSTALLATIONS TO PROVIDE A BARRIER THAT PREVENTS SOIL INTRUSION INTO THE STONE.

GEOTEXTILE PARAMETERS

1. THE GEOTEXTILE SHALL BE PROVIDED BY CULTEC, OF BROOKFIELD, CT. (203-775-4416 OR 1-800-428-5832)
2. THE GEOTEXTILE SHALL BE BLACK IN APPEARANCE.
3. THE GEOTEXTILE SHALL HAVE A TYPICAL WEIGHT OF 4.5 OZ/SY (142 G/M).
4. THE GEOTEXTILE SHALL HAVE A TENSILE STRENGTH VALUE OF 120 LBS (533 N) PER ASTM D4632 TESTING METHOD.
5. THE GEOTEXTILE SHALL HAVE AN ELONGATION @ BREAK VALUE OF 50% PER ASTM D4632 TESTING METHOD.
6. THE GEOTEXTILE SHALL HAVE A MULLEN BURST VALUE OF 225 PSI (1551 KPA) PER ASTM D3786 TESTING METHOD.
7. THE GEOTEXTILE SHALL HAVE A PUNCTURE STRENGTH VALUE OF 65 LBS (289 N) PER ASTM D4833 TESTING METHOD.
8. THE GEOTEXTILE SHALL HAVE A CBR PUNCTURE VALUE OF 340 LBS (1513 N) PER ASTM D6241 TESTING METHOD.
9. THE GEOTEXTILE SHALL HAVE A TRAPEZOID TEAR VALUE OF 50 LBS (222 N) PER ASTM D4533 TESTING METHOD.
10. THE GEOTEXTILE SHALL HAVE A AOS VALUE OF 70 U.S. SIEVE (0.212 MM) PER ASTM D4751 TESTING METHOD.
11. THE GEOTEXTILE SHALL HAVE A PERMITTIVITY VALUE OF 1.7 SEC-1 PER ASTM D4491 TESTING METHOD.
12. THE GEOTEXTILE SHALL HAVE A WATER FLOW RATE VALUE OF 135 GAL/MIN/SF (5500 L/MIN/SM) PER ASTM D4491 TESTING METHOD.
13. THE GEOTEXTILE SHALL HAVE A UV STABILITY @ 500 HOURS VALUE OF 70% PER ASTM D4355 TESTING METHOD.

CULTEC AFAB-HPF™ WOVEN GEOTEXTILE

CULTEC AFAB-HPF WOVEN GEOTEXTILE IS DESIGNED AS A UNDERLAYMENT TO PREVENT SCOURING CAUSED BY WATER MOVEMENT WITHIN THE CULTEC CHAMBERS AND FEED CONNECTORS UTILIZING THE CULTEC MANIFOLD FEATURE. IT MAY ALSO BE USED AS A COMPONENT OF THE CULTEC SEPARATOR ROW TO ACT AS A BARRIER TO PREVENT SOIL/CONTAMINANT INTRUSION INTO THE STONE WHILE ALLOWING FOR MAINTENANCE AND TSS REMOVAL.

GEOTEXTILE PARAMETERS

1. THE GEOTEXTILE SHALL BE PROVIDED BY CULTEC, OF BROOKFIELD, CT. (203-775-4416 OR 1-800-428-5832)
2. THE GEOTEXTILE SHALL BE BLACK AND WHITE IN APPEARANCE.
3. THE GEOTEXTILE SHALL HAVE A TENSILE STRENGTH OF 320 X 320 LBS (1,420 X 1,420 N) PER ASTM D4632 TESTING METHOD.
4. THE GEOTEXTILE SHALL HAVE A ELONGATION @ BREAK RESISTANCE OF 15 X 15% PER ASTM D4632 TESTING METHOD.
5. THE GEOTEXTILE SHALL HAVE A WIDE WIDTH TENSILE RESISTANCE OF 3,563 X 3,563 LBS/FT (52 X 52 KN/M) PER ASTM D4595 TESTING METHOD.
6. THE GEOTEXTILE SHALL HAVE A CBR PUNCTURE RESISTANCE OF 1,500 LBS (6,670 N) PER ASTM D6241 TESTING METHOD.
7. THE GEOTEXTILE SHALL HAVE A TRAPEZOIDAL TEAR RESISTANCE OF 120 X 120 LBS (540 X 540 N) PER ASTM D4533 TESTING METHOD.
8. THE GEOTEXTILE SHALL HAVE AN APPARENT OPENING SIZE OF 30 US STD. SIEVE (0.60 MM) PER ASTM D4751 TESTING METHOD.
9. THE GEOTEXTILE SHALL HAVE A PERMITTIVITY RATING OF 0.2 SEC-1 PER ASTM D4491 TESTING METHOD.
10. THE GEOTEXTILE SHALL HAVE A WATER FLOW RATING OF 22 GPM/FT2 (900 LPM/M2) PER ASTM D4491 TESTING METHOD.
11. THE GEOTEXTILE SHALL HAVE A UV RESISTANCE OF 70% @ 500 HRS. PER ASTM D4355 TESTING METHOD.

A1 CULTEC RECHARGER 300HD (OR APPROVED EQUAL) GENERAL NOTES

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BAUER · LICENSED PROFESSIONAL ENGINEER · NO. 083424

SYR. SYRACUSE HANCOCK INTERNATIONAL AIRPORT

**CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK**

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	J. FRAZEE
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

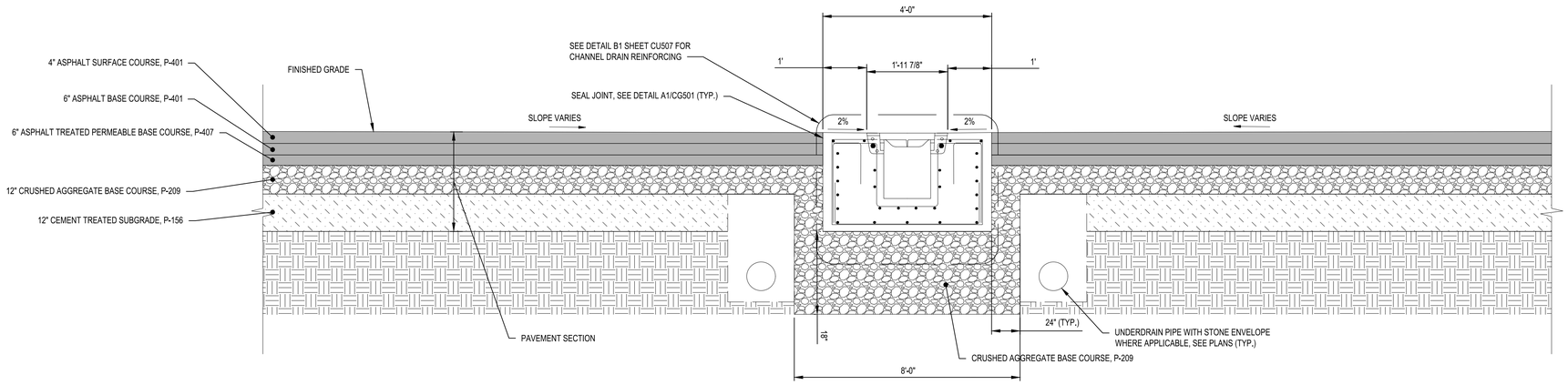
DRAINAGE BMP GENERAL NOTES

CU505

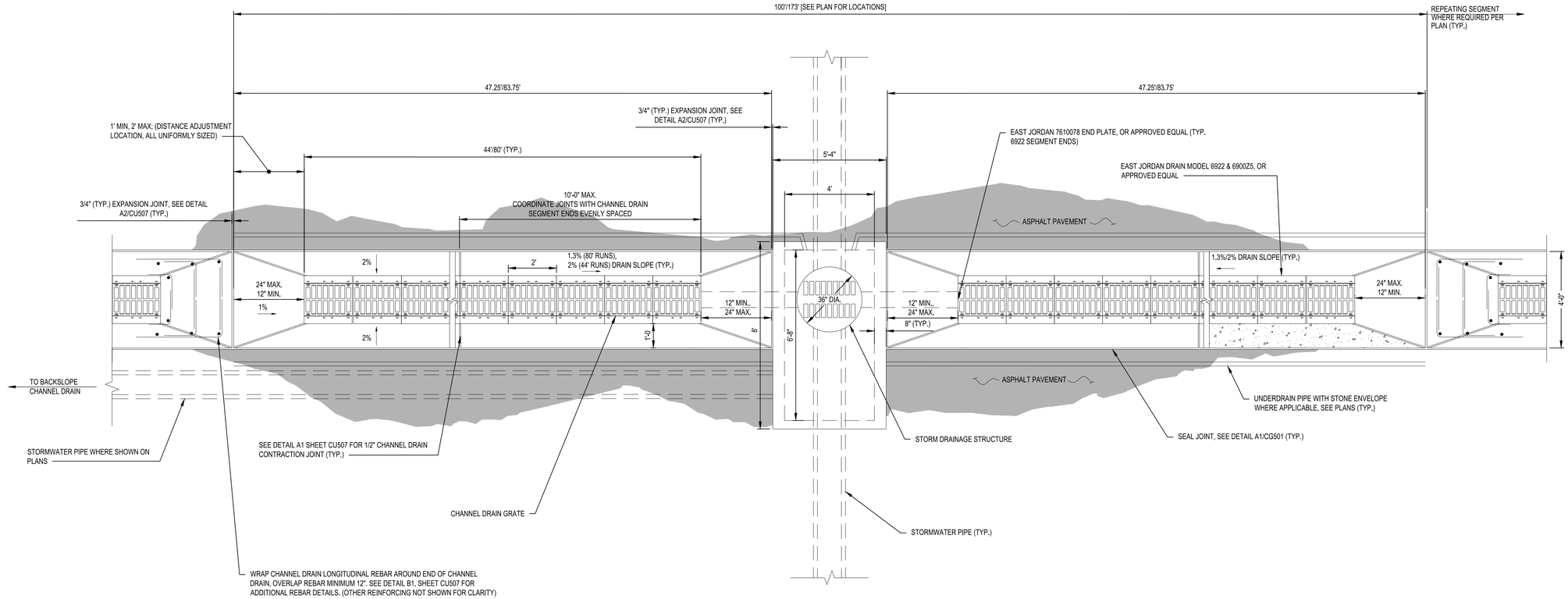
SHEET NO. 66 OF 113

Copyright ©

Apr 29, 2026 - 3:36pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_CU Details.dwg



C1 TYPICAL CHANNEL DRAIN SECTION
SCALE: NOT TO SCALE



A1 TYPICAL CHANNEL DRAIN LAYOUT PLAN
SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · LICENSED PROFESSIONAL ENGINEER · NO. 083424

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

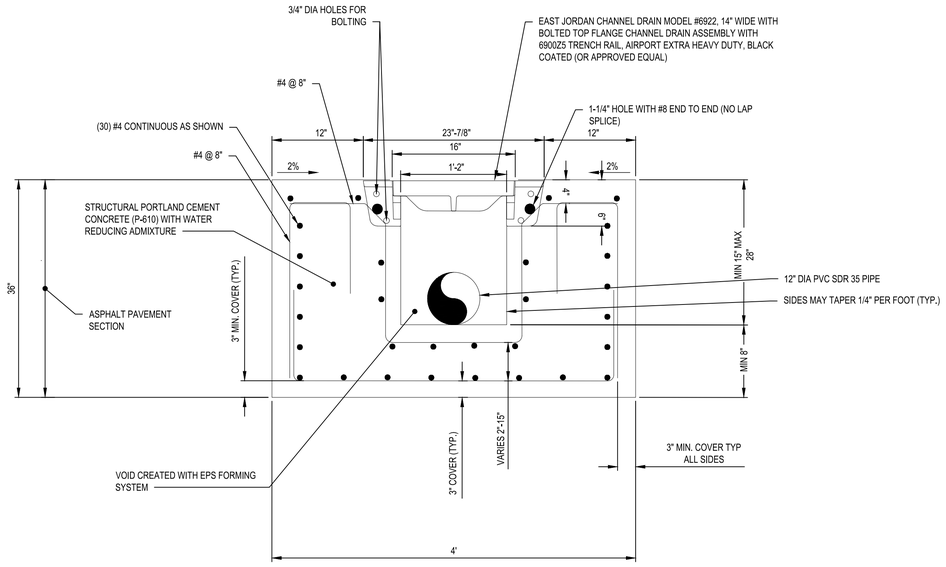
CHANNEL DRAIN DETAILS

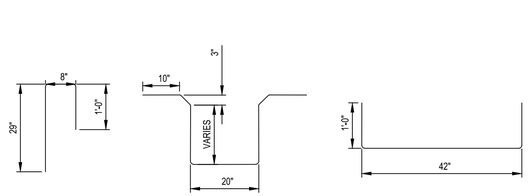
CU506

SHEET NO. 67 OF 113

Copyright ©

Apr 29, 2026 - 2:36pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Como Deicing Pad\Design\CADD\Sheet Files\O68069001_CU Details.dwg

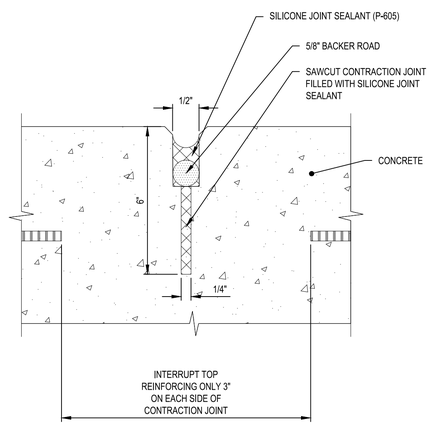




REBAR CONFIGURATIONS

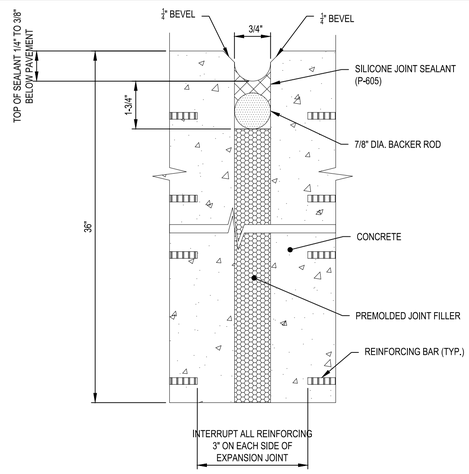
B1 TYPICAL CHANNEL DRAIN REINFORCING DETAIL

SCALE: NOT TO SCALE



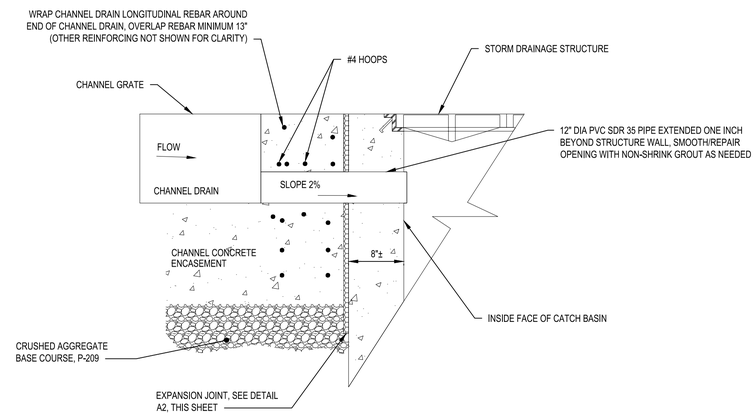
A1 CHANNEL DRAIN CONTRACTION JOINT DETAIL

SCALE: NOT TO SCALE



A2 CHANNEL DRAIN EXPANSION JOINT DETAIL

SCALE: NOT TO SCALE



A3 CHANNEL OUTLET SECTION

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · NO. 083424 · LICENSED PROFESSIONAL ENGINEER

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	068.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

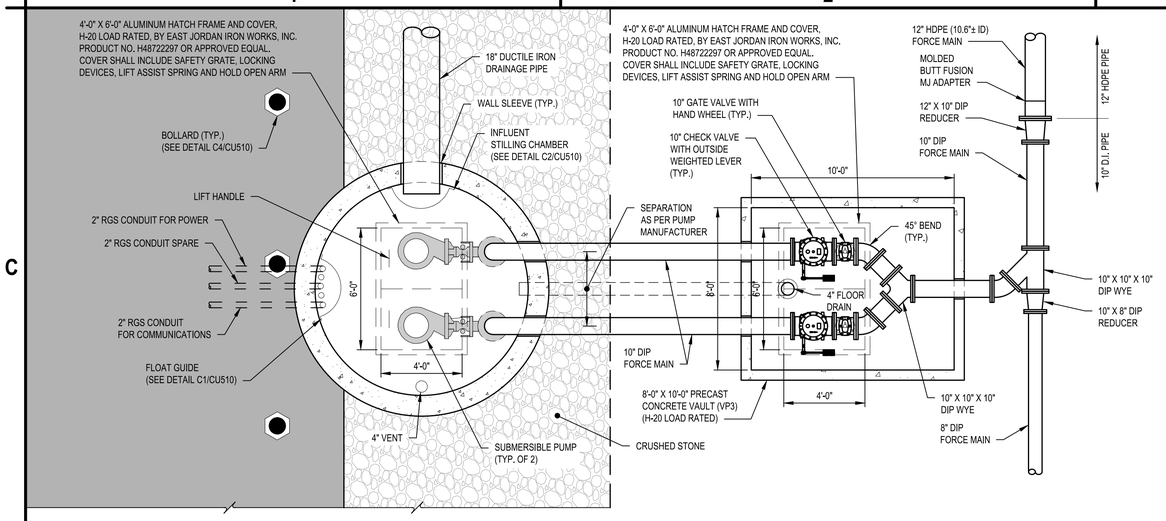
CHANNEL DRAIN DETAILS

CU507

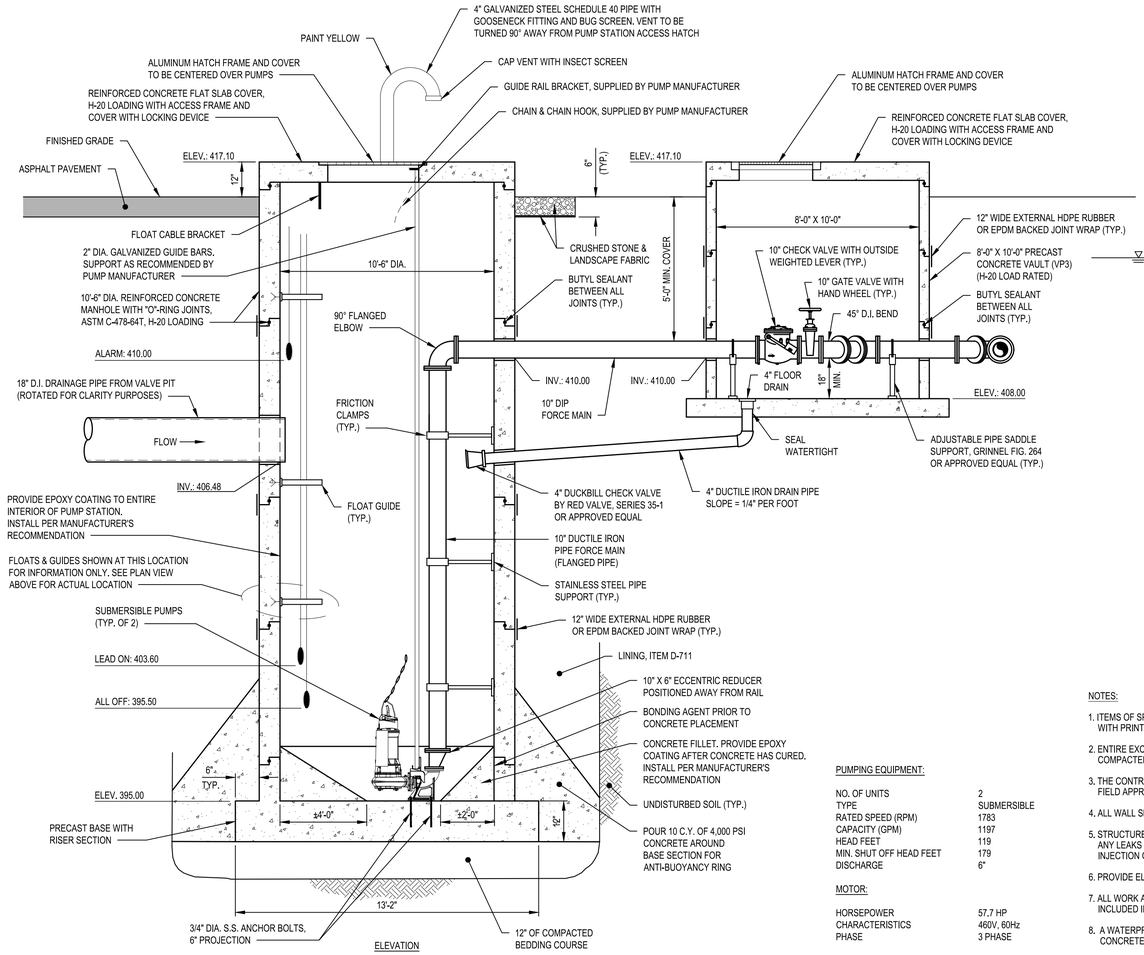
SHEET NO. 68 OF 113

Copyright ©

Apr 29, 2026 - 3:36pm
F:\Project\068 - Syracuse Regional Airport Authority\068069001 - Como Deicing Pad\Design\CADD\Sheet Files\068069001_CU Details.dwg



PLAN



ELEVATION

PUMPING EQUIPMENT:

NO. OF UNITS	2
TYPE	SUBMERSIBLE
RATED SPEED (RPM)	1783
CAPACITY (GPM)	1197
HEAD FEET	119
MIN. SHUT OFF HEAD FEET	179
DISCHARGE	6"

MOTOR:

HORSEPOWER	57.7 HP
CHARACTERISTICS	460V, 60Hz
PHASE	3 PHASE

NOTES:

1. ITEMS OF SPECIFIC MANUFACTURERS SHALL BE INSTALLED IN STRICT ACCORDANCE WITH PRINTED INSTRUCTIONS AND/OR MANUFACTURERS REPRESENTATIVES DIRECTIONS.
2. ENTIRE EXCAVATION SHALL BE BACKFILLED FULL DEPTH WITH LINING, ITEM D-711 COMPACTED IN 6" LIFTS.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PIPE HANGERS AND SUPPORTS. FIELD APPROVAL IS REQUIRED BEFORE INSTALLATION.
4. ALL WALL SLEEVES SHALL BE SEALED WATERTIGHT.
5. STRUCTURES SHALL NOT SHOW ANY SIGNS OF WATER INFILTRATION AFTER INSTALLATION. ANY LEAKS SHALL BE CORRECTED WITH HYDRAULIC CEMENT AND/OR POLYURETHANE INJECTION GROUTING TO THE SATISFACTION OF THE RPR.
6. PROVIDE ELECTRICAL SERVICE, REFER TO ELECTRICAL NOTES.
7. ALL WORK AND MATERIALS ASSOCIATED WITH THE PUMP STATION SHALL BE INCLUDED IN ITEM D-751.
8. A WATERPROOF ASPHALTIC COATING SHALL BE APPLIED TO THE ENTIRE EXTERIOR OF THE CONCRETE STRUCTURE.

A1 SOUTHWEST PUMP STATION (PS1) DETAIL

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUNCK · NO. 083424 · LICENSED PROFESSIONAL ENGINEER

SYR. SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	M. ZINGARO
DESIGNED BY:	S. MEARON
CHECKED BY:	E. PROCOPIO

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

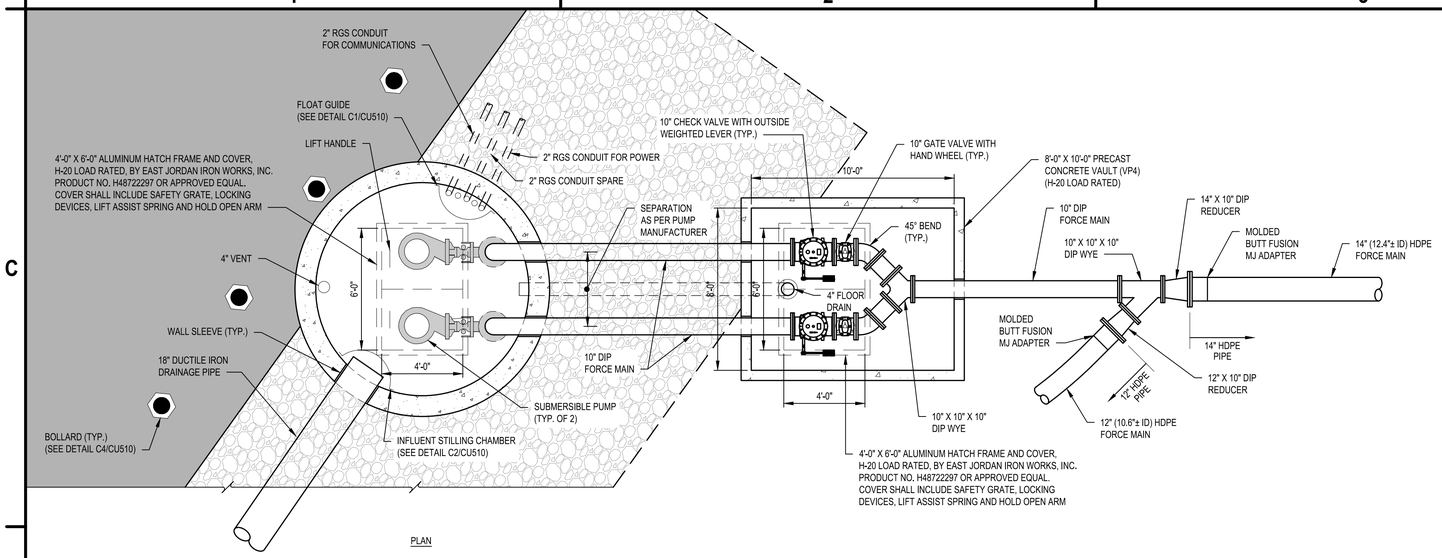
PUMP STATION DETAILS - SOUTHWEST

CU508

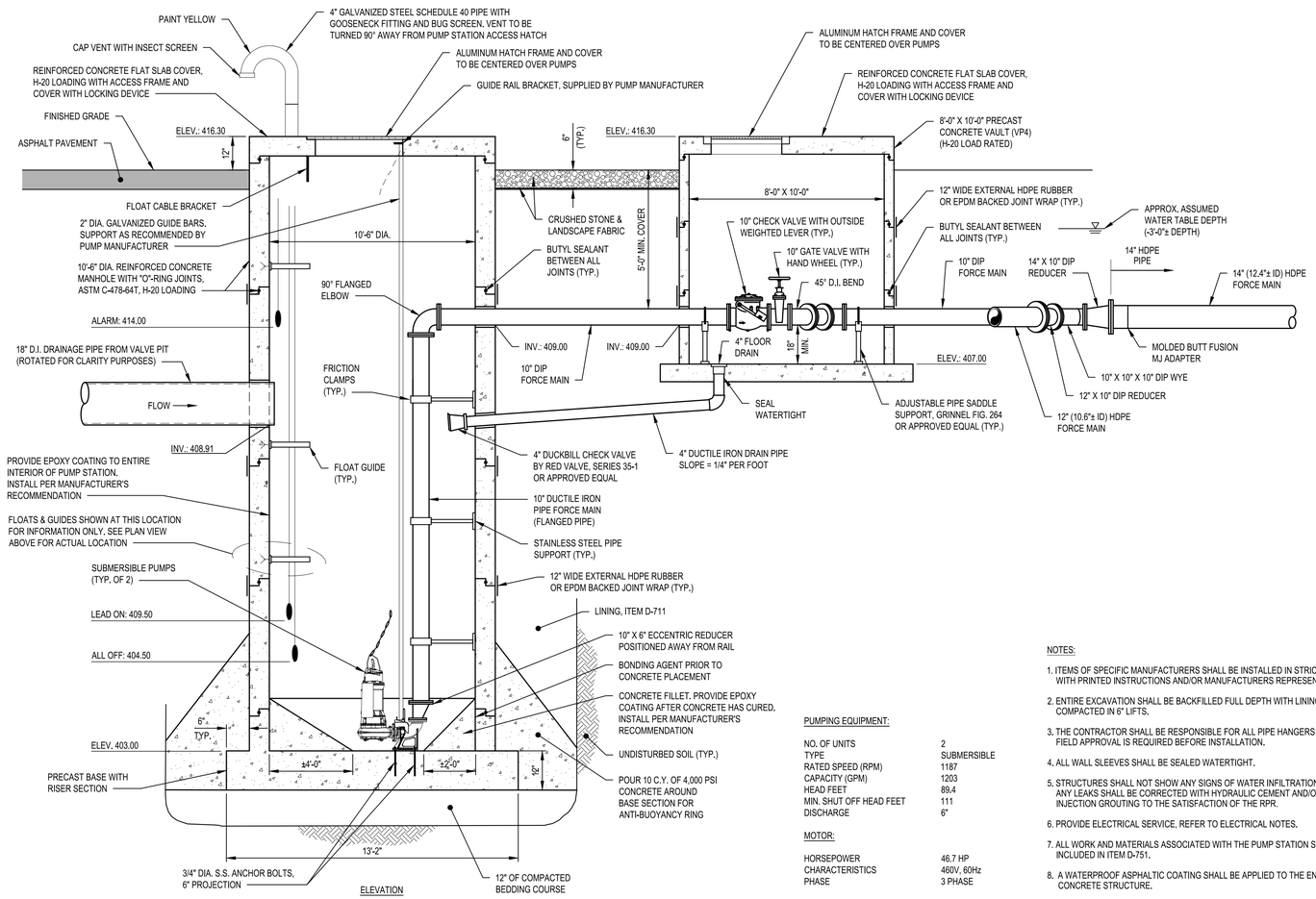
SHEET NO. 69 OF 113

Copyright ©

Apr 29, 2026 - 3:36pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_CU Details.dwg



PLAN



ELEVATION

PUMPING EQUIPMENT:

NO. OF UNITS	2
TYPE	SUBMERSIBLE
RATED SPEED (RPM)	1187
CAPACITY (GPM)	1203
HEAD FEET	89.4
MIN. SHUT OFF HEAD FEET	111
DISCHARGE	6"

MOTOR:

HORSEPOWER	46.7 HP
CHARACTERISTICS	460V, 60Hz
PHASE	3 PHASE

NOTES:

1. ITEMS OF SPECIFIC MANUFACTURERS SHALL BE INSTALLED IN STRICT ACCORDANCE WITH PRINTED INSTRUCTIONS AND/OR MANUFACTURERS REPRESENTATIVES DIRECTIONS.
2. ENTIRE EXCAVATION SHALL BE BACKFILLED FULL DEPTH WITH LINING, ITEM D-711 COMPACTED IN 6" LIFTS.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PIPE HANGERS AND SUPPORTS. FIELD APPROVAL IS REQUIRED BEFORE INSTALLATION.
4. ALL WALL SLEEVES SHALL BE SEALED WATERTIGHT.
5. STRUCTURES SHALL NOT SHOW ANY SIGNS OF WATER INFILTRATION AFTER INSTALLATION. ANY LEAKS SHALL BE CORRECTED WITH HYDRAULIC CEMENT AND/OR POLYURETHANE INJECTION GROUTING TO THE SATISFACTION OF THE RPR.
6. PROVIDE ELECTRICAL SERVICE, REFER TO ELECTRICAL NOTES.
7. ALL WORK AND MATERIALS ASSOCIATED WITH THE PUMP STATION SHALL BE INCLUDED IN ITEM D-751.
8. A WATERPROOF ASPHALTIC COATING SHALL BE APPLIED TO THE ENTIRE EXTERIOR OF THE CONCRETE STRUCTURE.

A1 SOUTHEAST PUMP (PS2) STATION DETAIL

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRONCE · NO. 083424 · LICENSED PROFESSIONAL ENGINEER

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	M. ZINGARO
DESIGNED BY:	S. MEARON
CHECKED BY:	E. PROCOPIO

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

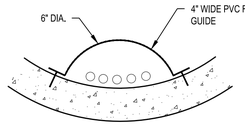
PUMP STATION DETAILS - SOUTHEAST

CU509

SHEET NO. 70 OF 113

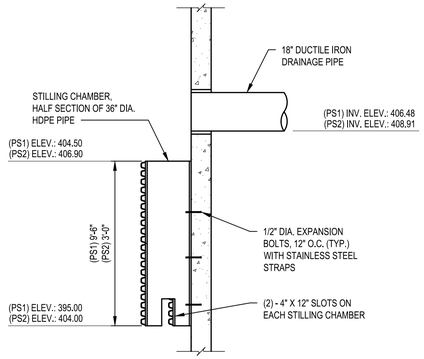
Copyright ©

Apr 29, 2026 - 3:36pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_CU Details.dwg



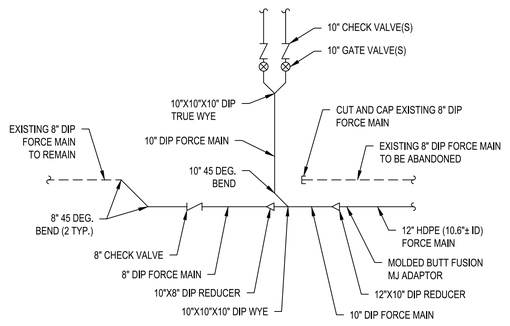
C1 FLOAT GUIDE DETAIL

SCALE: NOT TO SCALE



C2 STILLING CHAMBER DETAIL

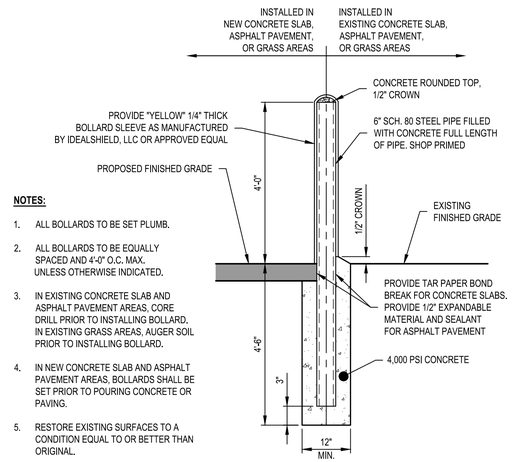
SCALE: NOT TO SCALE



NOTE:
CONCRETE STRUCTURES NOT SHOWN.

C3 GLYCOL FORCE MAIN CONNECTION DETAIL

SCALE: NOT TO SCALE

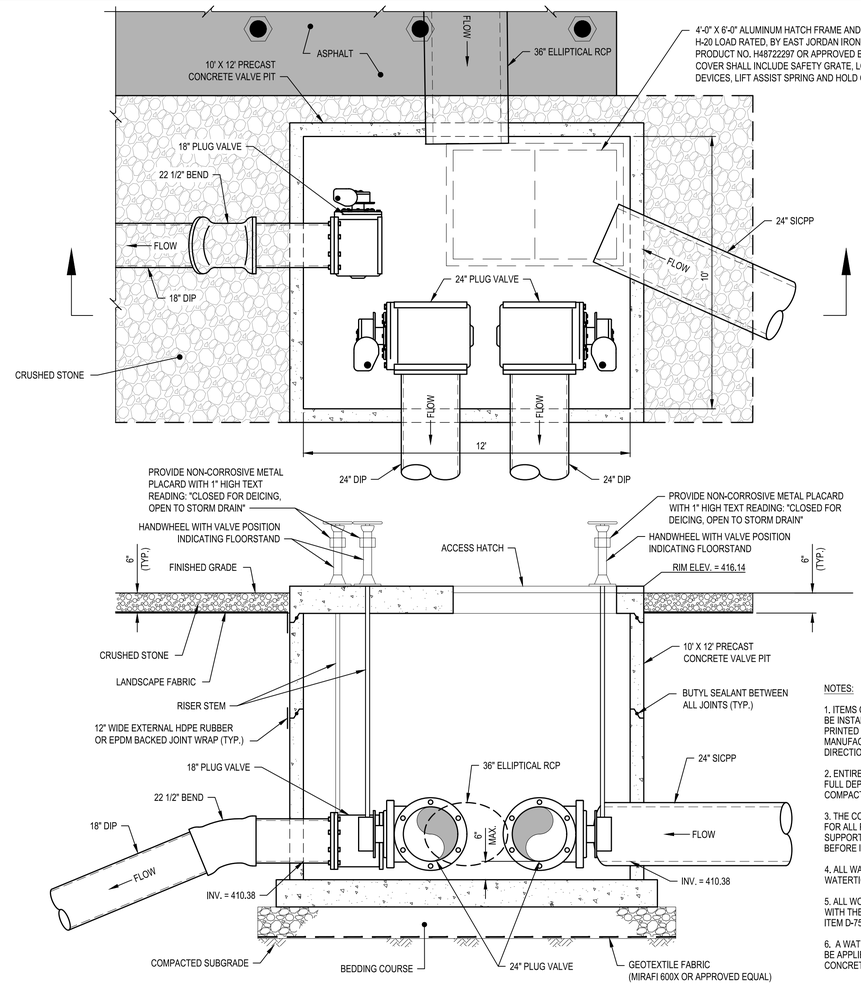


NOTES:

1. ALL BOLLARDS TO BE SET PLUMB.
2. ALL BOLLARDS TO BE EQUALLY SPACED AND 4'-0" O.C. MAX. UNLESS OTHERWISE INDICATED.
3. IN EXISTING CONCRETE SLAB AND ASPHALT PAVEMENT AREAS, CORE DRILL PRIOR TO INSTALLING BOLLARD. IN EXISTING GRASS AREAS, AUGER SOIL PRIOR TO INSTALLING BOLLARD.
4. IN NEW CONCRETE SLAB AND ASPHALT PAVEMENT AREAS, BOLLARDS SHALL BE SET PRIOR TO POURING CONCRETE OR PAVING.
5. RESTORE EXISTING SURFACES TO A CONDITION EQUAL TO OR BETTER THAN ORIGINAL.

C4 PIPE BOLLARD DETAIL

SCALE: NOT TO SCALE

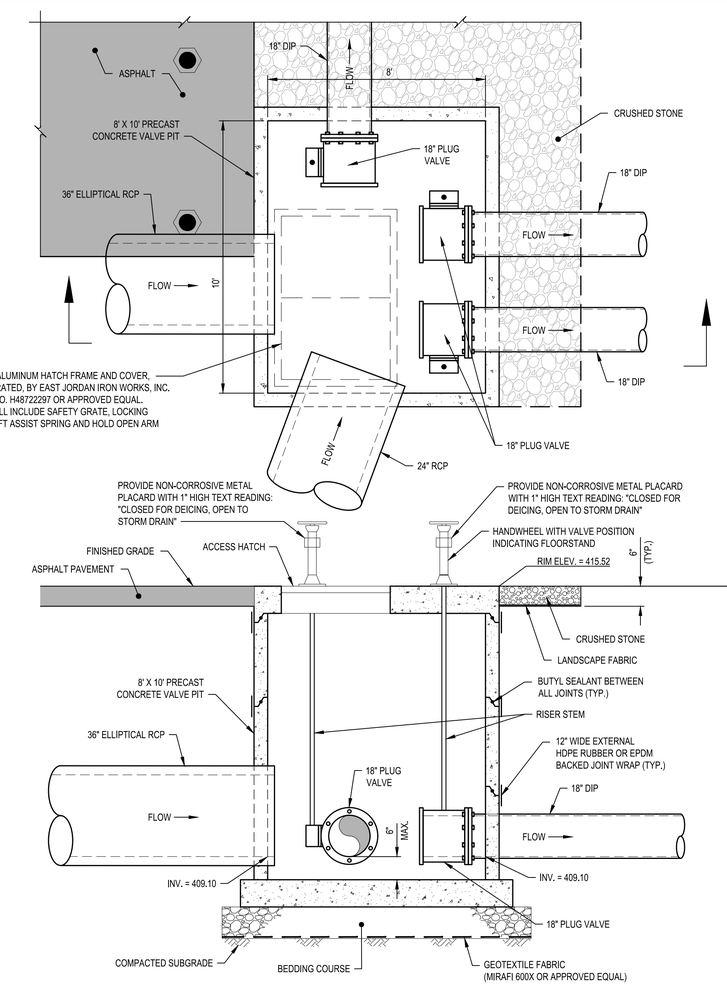


NOTES:

1. ITEMS OF SPECIFIC MANUFACTURERS SHALL BE INSTALLED IN STRICT ACCORDANCE WITH PRINTED INSTRUCTIONS AND/OR MANUFACTURERS REPRESENTATIVES DIRECTIONS.
2. ENTIRE EXCAVATION SHALL BE BACKFILLED FULL DEPTH WITH LINING, ITEM D-711 COMPACTED IN 6" LIFTS.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PIPE / VALVE HANGERS AND SUPPORTS. FIELD APPROVAL IS REQUIRED BEFORE INSTALLATION.
4. ALL WALL SLEEVES SHALL BE SEALED WATERTIGHT.
5. ALL WORK AND MATERIALS ASSOCIATED WITH THE VALVE PIT SHALL BE INCLUDED IN ITEM D-751.
6. A WATERPROOF ASPHALTIC COATING SHALL BE APPLIED TO THE ENTIRE EXTERIOR OF THE CONCRETE STRUCTURE.

A1 SOUTHWEST VALVE PIT (VP1*) DETAIL

SCALE: NOT TO SCALE



NOTES:

1. ITEMS OF SPECIFIC MANUFACTURERS SHALL BE INSTALLED IN STRICT ACCORDANCE WITH PRINTED INSTRUCTIONS AND/OR MANUFACTURERS REPRESENTATIVES DIRECTIONS.
2. ENTIRE EXCAVATION SHALL BE BACKFILLED FULL DEPTH WITH LINING, ITEM D-711 COMPACTED IN 6" LIFTS.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PIPE / VALVE HANGERS AND SUPPORTS. FIELD APPROVAL IS REQUIRED BEFORE INSTALLATION.
4. ALL WALL SLEEVES SHALL BE SEALED WATERTIGHT.
5. ALL WORK AND MATERIALS ASSOCIATED WITH THE VALVE PIT SHALL BE INCLUDED IN ITEM D-751.
6. A WATERPROOF ASPHALTIC COATING SHALL BE APPLIED TO THE ENTIRE EXTERIOR OF THE CONCRETE STRUCTURE.

A3 SOUTHEAST VALVE PIT (VP2*) DETAIL

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · NO. 083424 · LICENSED PROFESSIONAL ENGINEER

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

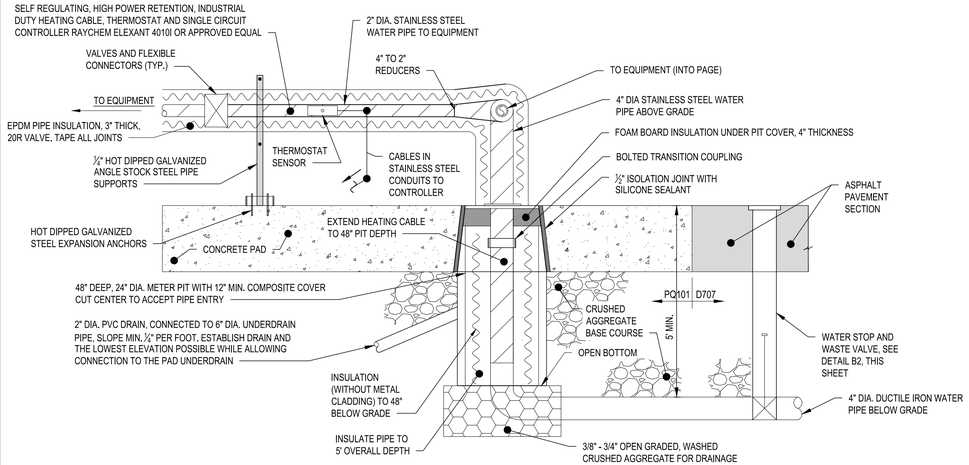
DRAINAGE DETAILS

CU510

SHEET NO. 71 OF 113

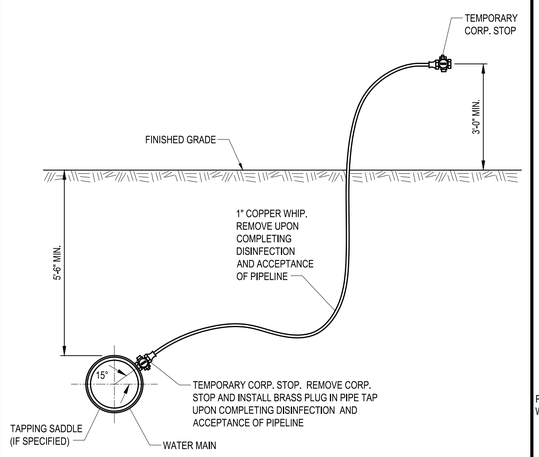
Copyright ©

Apr 29, 2026 - 3:36pm
P:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_CU Details.dwg



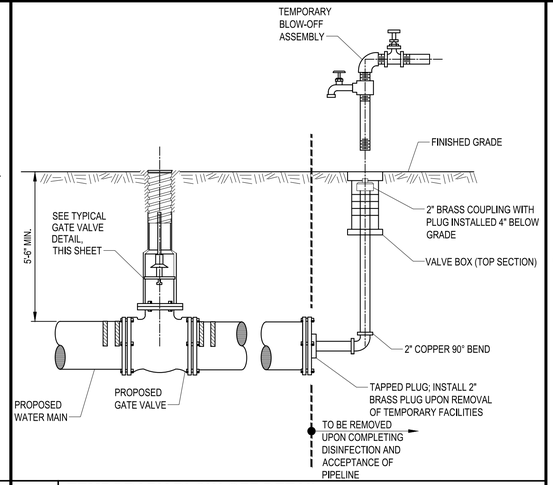
C1 DEICING EQUIPMENT WATER SUPPLY PIPE DETAIL

SCALE: NOT TO SCALE



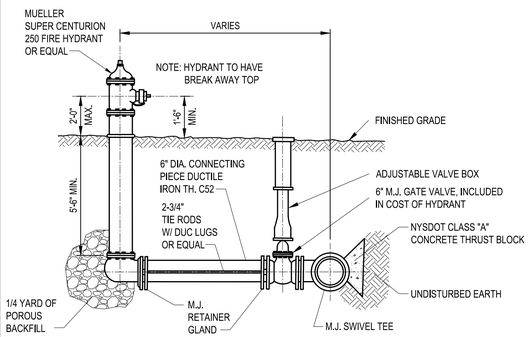
C3 SAMPLING AND DISINFECTION TAP DETAIL

SCALE: NOT TO SCALE



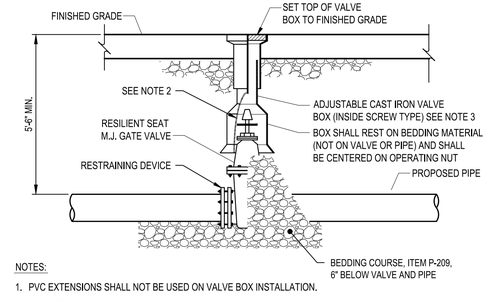
C4 TEMPORARY BLOW-OFF DETAIL

SCALE: NOT TO SCALE



B1 FIRE HYDRANT ASSEMBLY DETAIL

SCALE: NOT TO SCALE

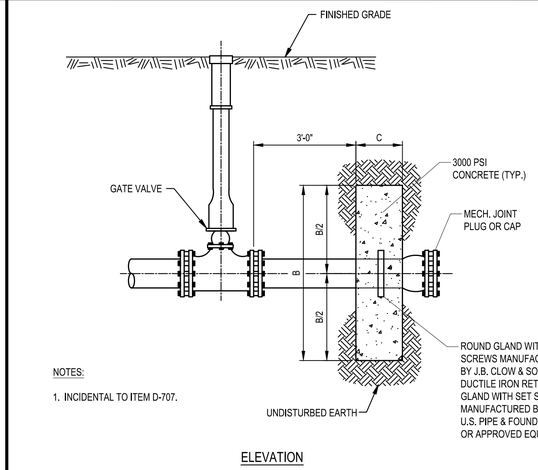


NOTES:

1. PVC EXTENSIONS SHALL NOT BE USED ON VALVE BOX INSTALLATION.
2. THE ACTUATING NUT FOR VALVES SHALL BE EXTENDED TO A MAXIMUM OF 30-INCHES BELOW FINISHED GRADE.
3. ADJUST TO MID-RANGE TO ALLOW FOR FUTURE BOX ADJUSTMENTS.
4. INSTALL A WATER VALVE MARKER AT EACH GATE VALVE LOCATED IN TURF, INCLUDED IN COST FOR GATE VALVE, SEE DETAIL A4, THIS SHEET.

B2 TYPICAL GATE VALVE DETAIL

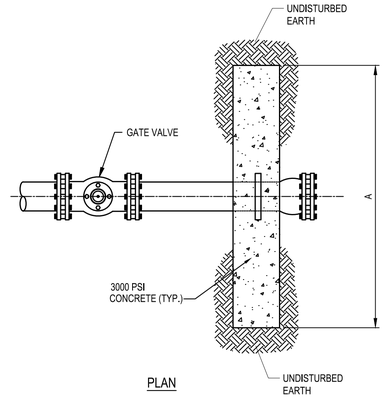
SCALE: NOT TO SCALE



NOTES:

1. INCIDENTAL TO ITEM D-707.

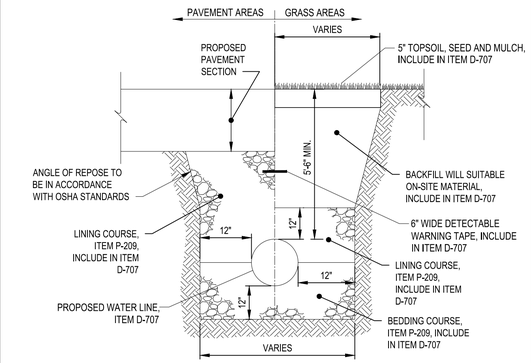
ELEVATION



PLAN

B3 DUCTILE IRON PIPE ANCHOR & PLUG DETAIL

SCALE: NOT TO SCALE

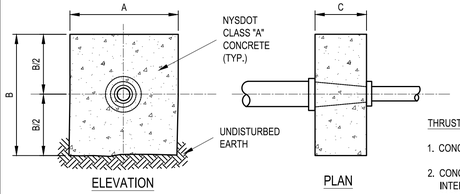


A1 TYPICAL WATER PIPE TRENCHING DETAIL

SCALE: NOT TO SCALE

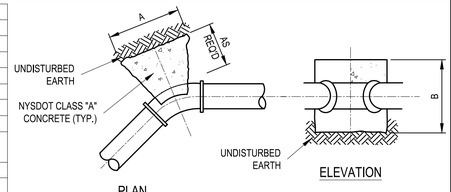
CONCRETE ANCHOR & THRUST BLOCK DIMENSIONS

SIZE	12"			10"			8"			6"			4"		
DIMENSIONS	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
BEND 90°	3'-6"	3'-6"	----	2'-11"	2'-11"	----	2'-4"	2'-4"	----	1'-6"	1'-6"	----	1'-2"	1'-2"	----
BEND 45°	2'-6"	2'-6"	----	2'-2"	2'-2"	----	1'-9"	1'-9"	----	1'-2"	1'-2"	----	0'-10"	0'-10"	----
BEND 22 1/2°	1'-10"	1'-10"	----	1'-6"	1'-6"	----	1'-3"	1'-3"	----	1'-0"	1'-0"	----	1'-0"	1'-0"	----
BEND 11 1/4°	1'-4"	1'-4"	----	1'-2"	1'-2"	----	0'-11"	0'-11"	----	1'-0"	1'-0"	----	1'-0"	1'-0"	----
D.I. ANCHOR	7'-0"	5'-0"	1'-0"	7'-0"	4'-0"	1'-0"	6'-0"	3'-0"	1'-0"	5'-4"	2'-6"	1'-0"	4'-6"	2'-0"	1'-0"
TS&V, TEE BRANCH SIZE	3'-0"	3'-0"	----	2'-6"	2'-6"	----	2'-0"	2'-0"	----	1'-10"	1'-10"	----	1'-0"	1'-0"	----
REDUCER 12"X	----	----	----	2'-6"	2'-6"	1'-2"	3'-8"	3'-8"	1'-2"	4'-0"	4'-0"	1'-2"	4'-6"	4'-6"	1'-2"
REDUCER 10"X	----	----	----	----	----	----	2'-6"	2'-6"	1'-0"	2'-6"	2'-6"	1'-0"	4'-0"	4'-0"	1'-0"
REDUCER 8"X	----	----	----	----	----	----	----	----	----	2'-0"	2'-0"	0'-11"	2'-8"	2'-8"	0'-11"
REDUCER 6"X	----	----	----	----	----	----	----	----	----	----	----	----	1'-8"	1'-8"	0'-9"



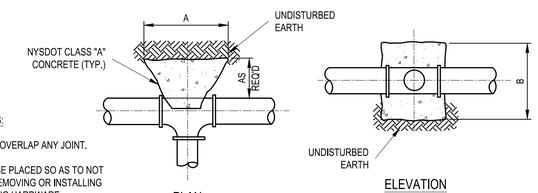
ELEVATION PLAN

REDUCER



PLAN ELEVATION

BEND



PLAN ELEVATION

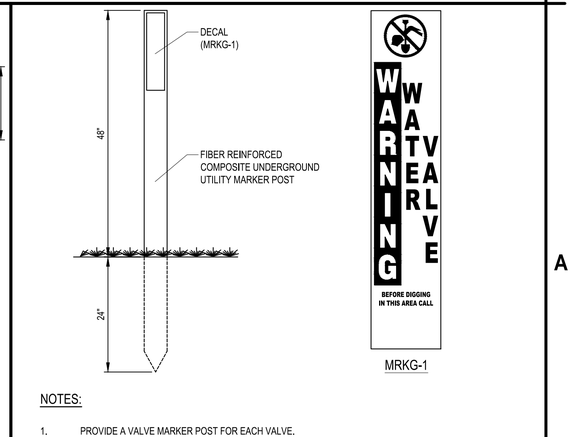
TEE & T.S. & V.

THRUST BLOCK NOTES:

1. CONCRETE NOT TO OVERLAP ANY JOINT.
2. CONCRETE SHALL BE PLACED SO AS TO NOT INTERFERE WITH REMOVING OR INSTALLING ANY OF THE JOINTING HARDWARE.
3. INCIDENTAL TO ITEM D-707.

A2 TYPICAL THRUST BLOCK DETAILS

SCALE: NOT TO SCALE



MRKG-1

NOTES:

1. PROVIDE A VALVE MARKER POST FOR EACH VALVE.
2. THE VALVE MARKER POST SHALL BE BLUE IN COLOR, 4" WIDE (FLAT), 72" LONG. VALVE MARKER SHALL BE RHINO MARKING AND PROTECTION SYSTEMS "RHINO 3-RAIL" OR APPROVED EQUAL.

A4 TYPICAL MARKER DETAIL

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · NO. 083424 · LICENSED PROFESSIONAL ENGINEER

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

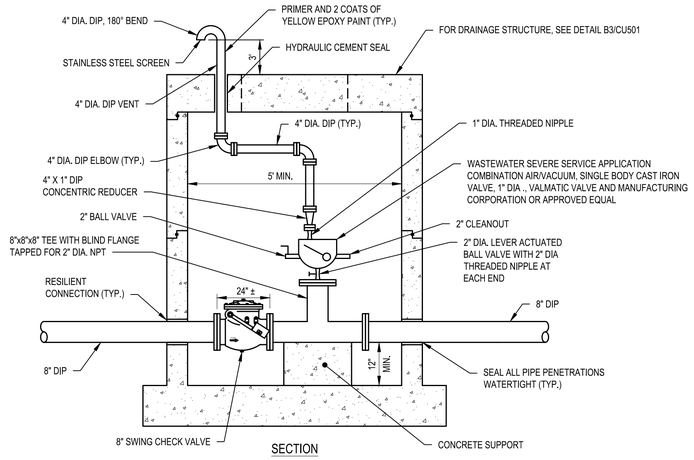
WATER UTILITY DETAILS

CU511

SHEET NO. 72 OF 113

Copyright ©

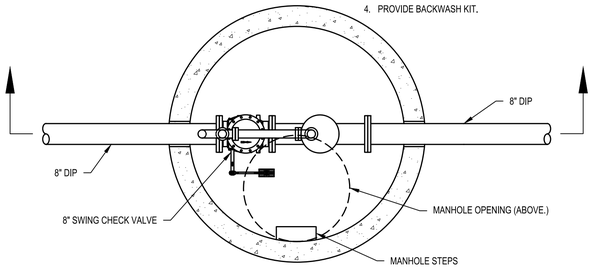
Apr 29, 2026 - 3:37pm
F:\Project\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_CU Details.dwg



SECTION

NOTES:

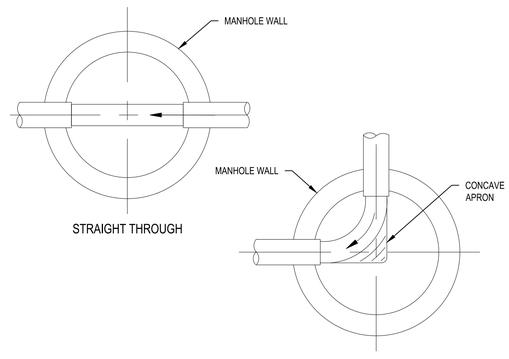
1. INSTALL AIR VAULT VALVE AT THE PIPE RUN HIGH POINT. ADJUST POSITION AS NEEDED TO COMPLY.
2. VALVE SIZE AND ORIFICE DIAMETER SHALL BE DETERMINED BY THE MANUFACTURER BASED ON THE SITE AND SYSTEM DESIGN. PROVIDE SUPPORTING CALCULATIONS WITH SHOP DRAWING SUBMITTALS. COORDINATE WITH GLYCOL PUMP STATION PERFORMANCE CHARACTERISTICS.
3. VALVE SHALL BE DESIGNED TO EXHAUST LARGE QUANTITIES OF AIR AT SYSTEM STARTUP, RELEASE AIR POCKETS DURING SYSTEM OPERATION AND PROVIDE PIPELINE VACUUM PROTECTION.
4. PROVIDE BACKWASH KIT.

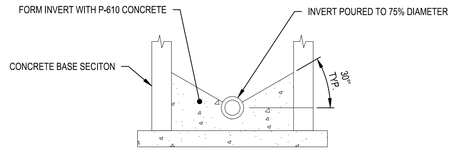


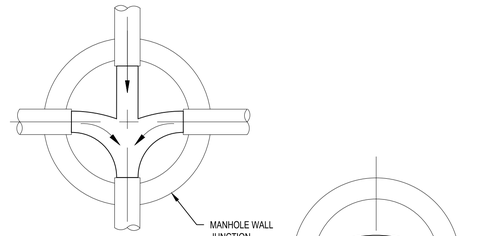
PLAN

C1 GLYCOL FORCE MAIN AIR RELEASE AND CHECK VALVE VAULT DETAIL

SCALE: NOT TO SCALE

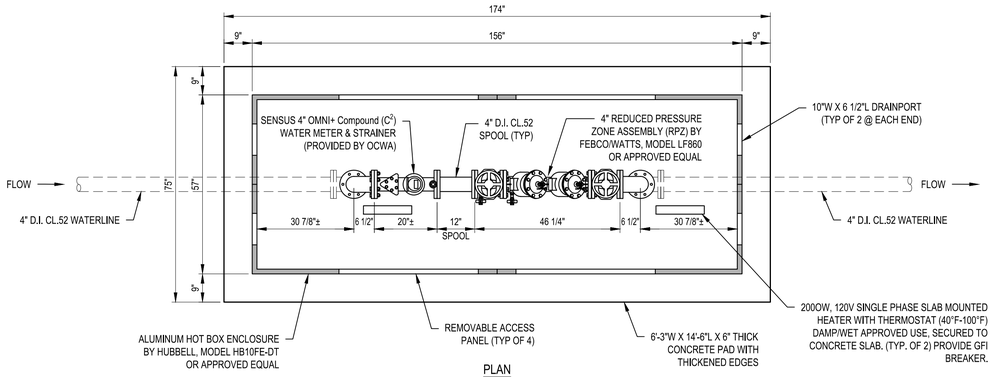




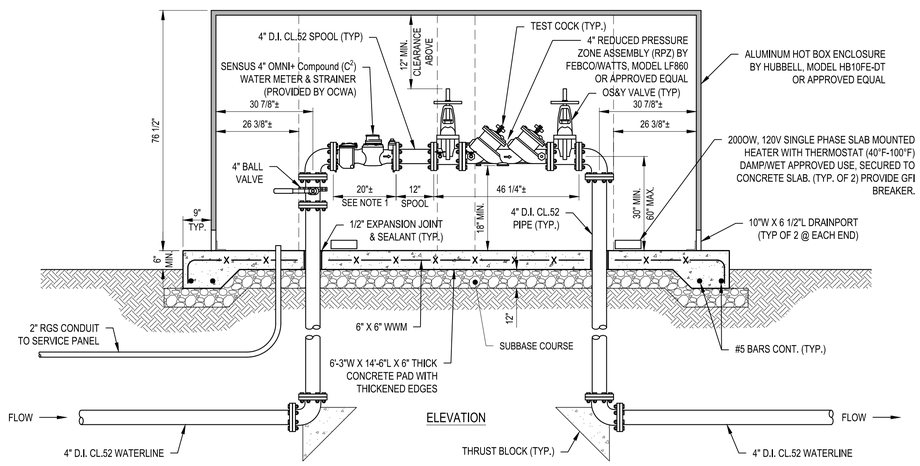


NOTES:

1. DEPTH OF ALL CHANNELS TO BE 75% OF PIPE DIAMETER.
2. FINISH ALL CHANNELS AT PROPER GRADE AS TO ALLOW SMOOTH AND UNOBSTRUCTED FLOW. ALL INVERTS TO BE FLUSH WITH SIDES



PLAN

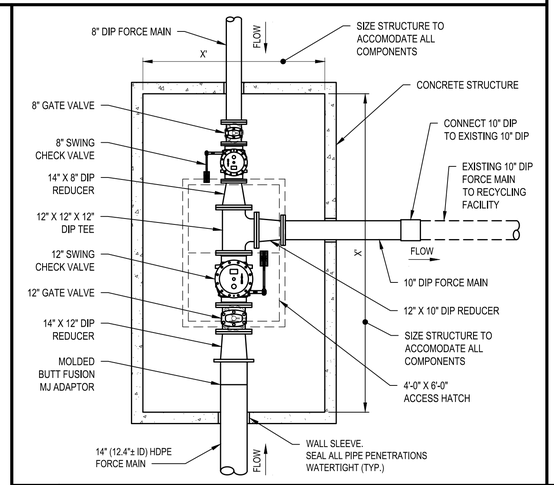


NOTE:

1. CONTRACTOR TO PROVIDE A 20"± SPOOL SECTION OF PIPE TO TEMPORARILY REPLACE METER/STRAINER FPR TESTING, PRIOR TO METER INSTALLATION.

A1 REDUCED PRESSURE ZONE ASSEMBLY (RPZ) & WATER METER DETAIL

SCALE: NOT TO SCALE

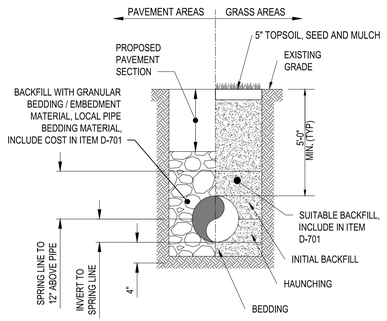


B3 GLYCOL FORCE MAIN CHECK VALVE VAULT DETAIL

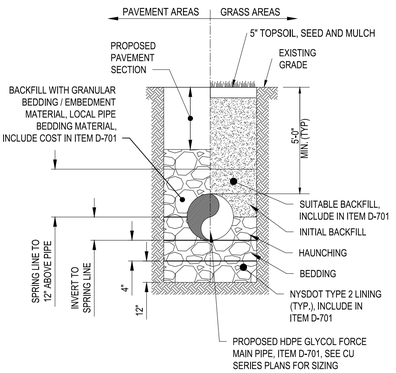
SCALE: NOT TO SCALE

B4 FLOW CHANNEL DETAILS

SCALE: NOT TO SCALE



BANK RUN SAND AND GRAVEL
(DRY, SUITABLE BEDDING CONDITIONS)



SCREENED GRAVEL OR STONE
(CLAY, WET OR UNSUITABLE BEDDING CONDITIONS)

NOTES:

1. SUITABLE BACKFILL SHALL CONSIST OF BANK RUN SAND AND GRAVEL OR SUITABLE EXCAVATED MATERIAL FREE FROM ORGANIC OR DELETERIOUS MATERIAL.
2. SUITABLE BACKFILL TO BE THOROUGHLY COMPACTED IN 6" LIFTS BY MECHANICAL TAMPING (OR BY HAND TAMPING WHEN AND WHERE DIRECTED).
3. SUITABLE BACKFILL SHALL BE COMPACTED TO 95% STANDARD PROCTOR DENSITY OR AS DIRECTED IN THE SPECIFICATION.
4. AREAS SURROUNDING PIPE SHALL BE HAND TAMPED TO FILL ALL CAVITIES.
5. EXCAVATION SHALL COMPLY WITH OSHA REQUIREMENTS.
6. THE CONTRACTOR MUST DEWATER PRIOR TO PLACING THE PIPE IF WET TRENCH CONDITIONS ARE FOUND. THE PIPE MUST REMAIN IN DRY CONDITIONS UNTIL BACKFILLED.
7. BACKFILLING SHALL BE INCLUDED IN THE COST OF PIPE INSTALLATION.

A3 GLYCOL FORCE MAIN PIPE TRENCHING DETAIL

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · NO. 083424 · LICENSED PROFESSIONAL ENGINEER

SYR. SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	068.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

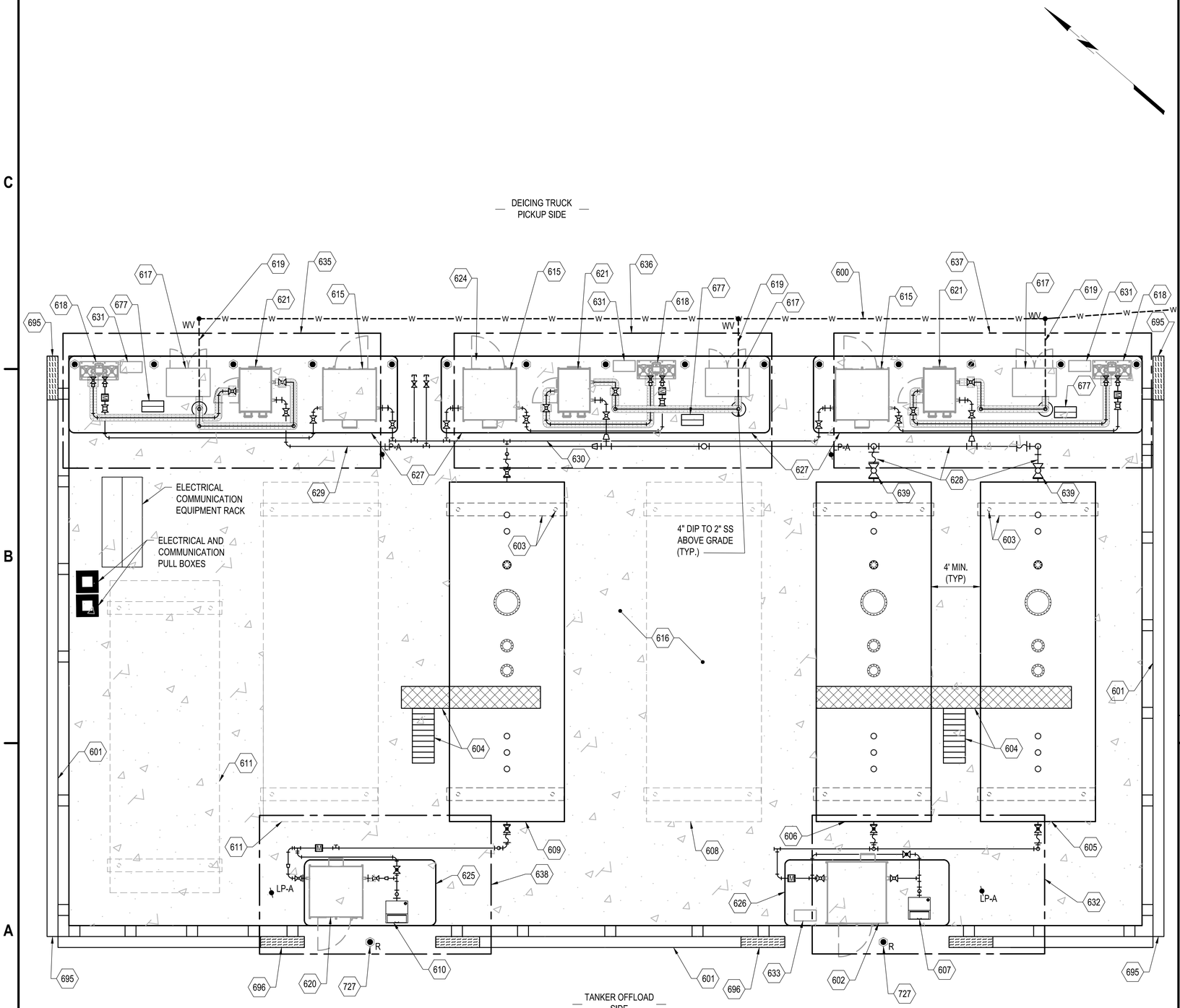
UTILITY DETAILS

CU512

SHEET NO. 73 OF 113

Copyright ©

Apr 29, 2026 - 3:37pm
F:\Projects\C68 - Syracuse Regional Airport Authority\068069001 - Comp Deicing Pad\Design\CADD\Sheet Files\068069001_CU Details.dwg



NOTES:
1. ADF = TYPE I AIRCRAFT DEICING FLUID
2. AAF = TYPE IV AIRCRAFT ANTIICING FLUID
3. TANK SADDLES SHALL BE SET BACK 2' (MIN) FROM PAVEMENT JOINTS
4. ALL ADF AND AAF PIPING SHALL USE LONG SWEEP ELBOWS AND FULL PORT BALL VALVES

A1 DEICING TANKS PLAN (ADD ON #1)
SCALE: 1" = 5'

5' 5 0 5 10FT.

600. 4" UNDERGROUND WATER SUPPLY HEADER. SEE CU SERIES FOR DETAILS.
601. 6" BOX BEAM GUARDRAIL AND POST (TYP.). SEE DETAIL A1/PQ503, PAID UNDER F-170.
602. ADF OFFLOADING PUMP SKID. (EQUIPMENT PROCURED FROM LAS BY SRAA)
603. TANK SADDLE AND ANCHOR BOLT (TYP.)
604. TANK ACCESS STAIRS AND CATWALK.
605. 20K GAL ADF STORAGE AST. APPROX. 10.5' DIA. X 31'. SEE DETAIL B4/PQ503
606. 20K GAL ADF STORAGE AST. APPROX. 10.5' DIA. X 31'. SEE DETAIL B4/PQ503
607. ADF REMOTE FILL BOX
608. FUTURE 20K GAL ADF STORAGE AST.
609. 20K GAL AAF STORAGE AST. APPROX. 10.5' DIA. X 31'. SEE DETAIL B4/PQ503
610. AAF REMOTE SPILL BOX
611. FUTURE 20K GAL AAF STORAGE AST.
615. HEATED AAF TRANSFER PUMP SKID. APPROX. 4' X 4'. (EQUIPMENT PROCURED FROM LAS BY SRAA)
616. CONCRETE PAVEMENT. SEE CP SERIES FOR DETAILS.
617. HEATED WATER CABINET (EQUIPMENT PROCURED FROM LAS BY SRAA).
618. ADF AND AAF 2-HOSE LOAD STAND (EQUIPMENT PROCURED FROM LAS BY SRAA).
619. 4" UNDERGROUND WATER LINE TO WATER CABINET AND BLENDING UNIT
620. AAF OFFLOADING PUMP SKID. (EQUIPMENT PROCURED FROM LAS BY SRAA)
621. ADF BLENDING UNIT (EQUIPMENT PROCURED FROM LAS BY SRAA).
624. 6" COLLISION BOLLARD, FIELD ADJUST LOCATIONS AS NECESSARY 5' MAX. SPACING (TYP.), SEE DETAIL C4/CU510,PAID UNDER F-170.
625. APPROXIMATELY 12' WIDE X 6' DEEP RAISED 6" CONCRETE ISLAND (LEVEL)
626. APPROXIMATELY 15' WIDE X 6' DEEP RAISED 6" CONCRETE ISLAND (LEVEL)
627. APPROXIMATELY 30' WIDE X 7' DEEP RAISED 6" CONCRETE ISLAND (LEVEL)
628. 6" ADF ABOVEGROUND STAINLESS STEEL LOAD PIPING
630. 3" AAF ABOVEGROUND STAINLESS STEEL LOAD PIPING
631. ONLOADING FMS KIOSK (EQUIPMENT PROCURED FROM LAS BY SRAA)
632. SEE DETAIL A2/PQ202
633. OFFLOADING FMS KIOSK (EQUIPMENT PROCURED FROM LAS BY SRAA)
635. SEE DETAIL C1/PQ201
636. SEE DETAIL B1/PQ201
637. SEE DETAIL A1/PQ201
638. SEE DETAIL A1/PQ202
639. 6" SS BALL VALVE
677. HEAT TRACE SUPPLY/CONTROLLER
695. SQUARE GUIDE RAIL CORNER, CAP ENDS.
696. PROVIDE ANGLED TRANSITION GUIDE RAIL PIECE AT EACH TERMINATION POINT.
727. REMOVABLE 6" COLLISION BOLLARD, PROVIDE LARGER PIPE SLEEVE IN CONCRETE TO ACCOMMODATE BOLLARD, PAID UNDER F-170

B4 KEYED NOTES
SCALE: NOT TO SCALE

A. THE OWNER (SRAA) WILL BE PROCURRING THE FOLLOWING EQUIPMENT FROM LIQUID AUTOMATION SYSTEMS (LAS) UNDER A SEPARATE CONTRACT:
- DEICECUBE W/ CONCENTRATE OUTLET/ADF BLENDING UNITS
- LOADSTANDS
- HEATED TYPE IV DISPENSE PUMP SKID/HEATED AAF TRANSFER PUMP SKIDS
- HEATED TYPE IV (AAF) OFFLOAD PUMPS
- HEATED TYPE I (ADF) OFFLOAD PUMPS
- HEATED WATER CABINET/HOSE REELS
- FLUID MANAGEMENT SYSTEM (FMS) SOFTWARE AND CONTROLS, 3 DISPENSE UNITS, 1 OFFLOAD UNIT

i. THE EQUIPMENT WILL BE STORED ON AIRPORT PROPERTY AND AVAILABLE PRIOR TO THE START OF THIS CONTRACT. THE CONTRACTOR IS RESPONSIBLE FOR TRANSPORTATION TO THE TANK FACILITY SITE, EQUIPMENT INSTALLATION, TESTING AND COMMISSIONING.
ii. ALL INCIDENTAL MATERIALS REQUIRED FOR INSTALLATION SHALL BE PROVIDED BY THE CONTRACTOR.
iii. ITEMS SHADED IN GRAY DESIGNATE ITEMS PROCURED BY THE OWNER.

B. ALL WORK SHOWN TO BE PAID UNDER THEIR RESPECTIVE LUMP SUM PAY ITEMS, UNLESS SPECIFIED OTHERWISE ON PLANS.

C. THE EQUIPMENT/PIPING LAYOUT IS SCHEMATIC ONLY AND MAY NOT NECESSARILY BE DRAWN TO SCALE. LAYOUT SHALL BE ADJUSTED BASED ON THE ACTUAL EQUIPMENT AND PLUMBING SIZES PROVIDED. THE OVERALL PAD SIZE AND RAISED CONCRETE ISLANDS MAY HAVE TO BE ENLARGED AS NECESSARY TO PROVIDE PROPER POSITIONING AND MAINTENANCE/OPERATIONS SPACING. THE CONTRACTOR SHALL LAYOUT ALL EQUIPMENT PRIOR TO INSTALLATION FOR FIELD VERIFICATION BY THE RPR AND SRAA.

A4 SHEET NOTES
SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUNCK · NO. 083424 · LICENSED PROFESSIONAL ENGINEER

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	T. RUBIETTA
DESIGNED BY:	T. RUBIETTA
CHECKED BY:	W. FRYE

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

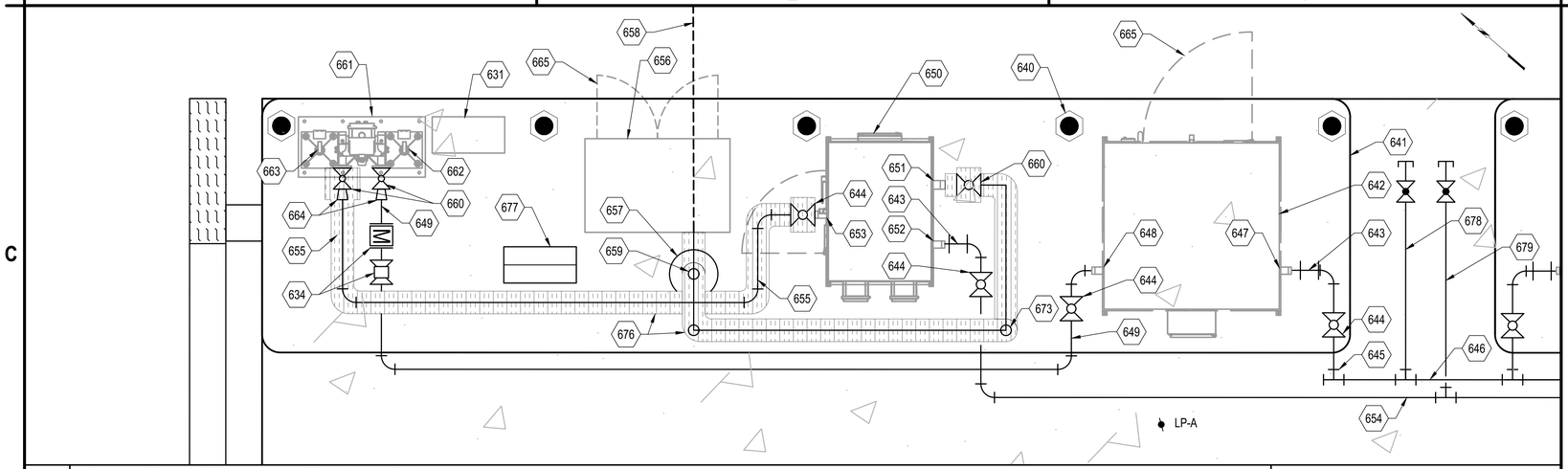
DEICING TANKS PLAN (ADD ON #1)

PQ101

SHEET NO. 74 OF 113

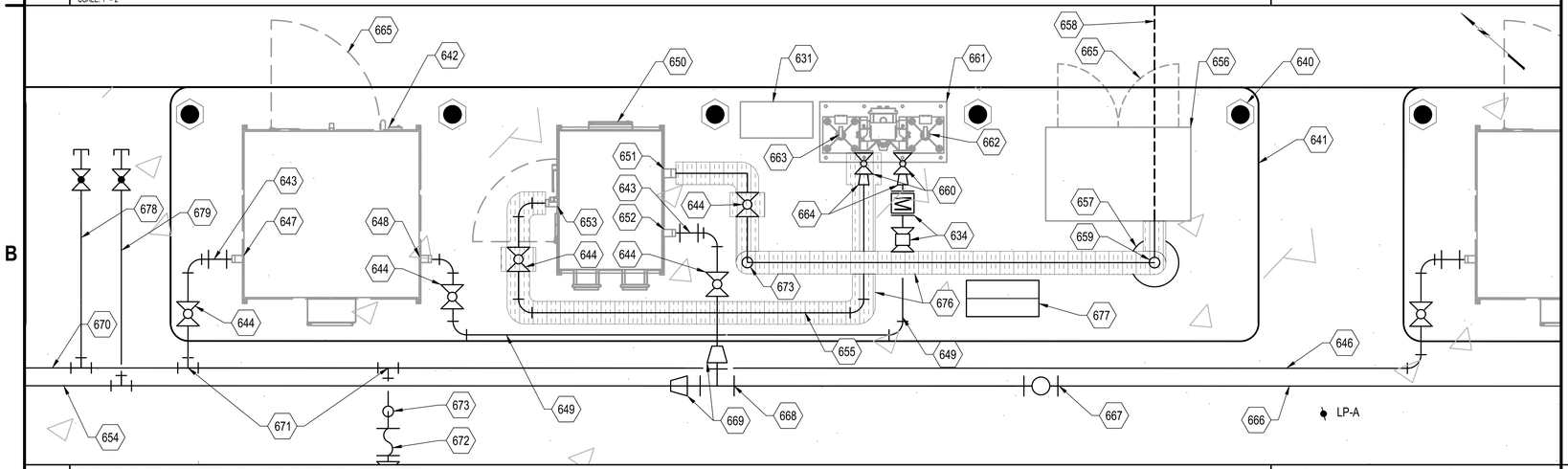
Copyright ©

Apr 29, 2026 - 3:37pm
F:\Project\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_PQ Series.dwg



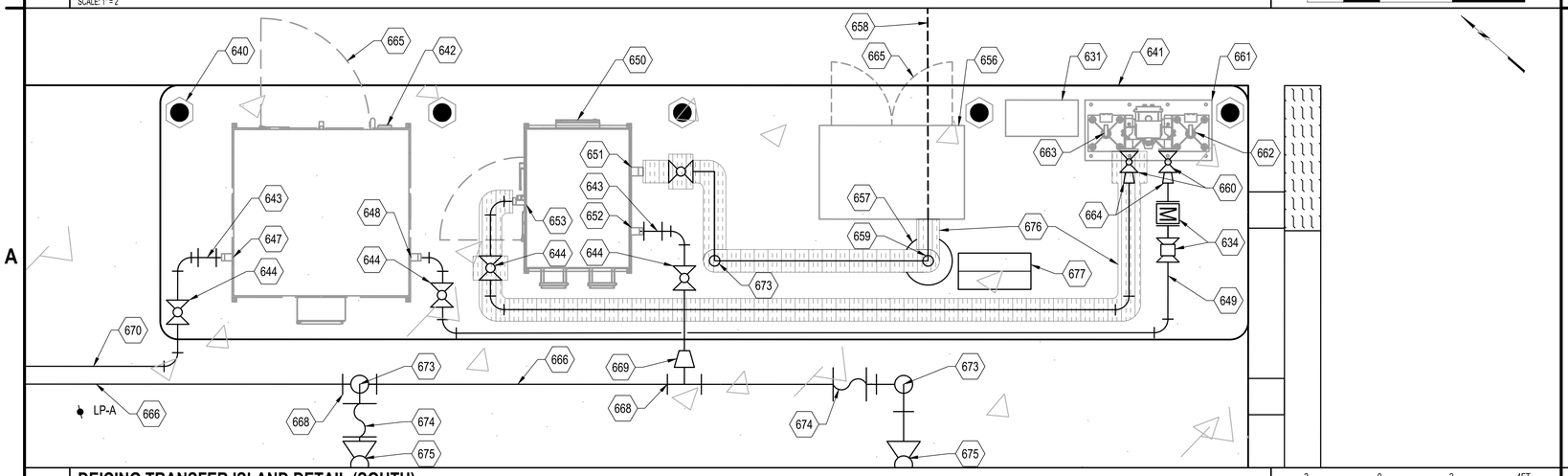
C1 DEICING TRANSFER ISLAND DETAIL (NORTH)

SCALE: 1" = 2'



B1 DEICING TRANSFER ISLAND DETAIL (CENTER)

SCALE: 1" = 2'



A1 DEICING TRANSFER ISLAND DETAIL (SOUTH)

SCALE: 1" = 2'

631. ONLOADING FMS KIOSK (EQUIPMENT PROCURED FROM LAS BY SRAA)
634. AAF 3" FLOW METER AND 3" MOTOR ACTUATED BALL VALVE
640. 6" COLLISION BOLLARD (TYP.)
641. 30' WIDE X 7' DEEP RAISED 6" CONCRETE ISLAND (LEVEL).
642. HEATED AAF TRANSFER PUMP SKID. APPROX. 4' X 4'. (EQUIPMENT PROCURED FROM LAS BY SRAA)
643. 6" FLANGED SPOOL FOR MAINTENANCE
644. 3" SS BALL VALVE
645. 3-WAY SS TEE WITH BLIND FLANGE IN 9 O'CLOCK FOR FUTURE TANK CONNECTION
646. 3" SS AAF SUPPLY PIPING FROM STORAGE
647. AAF TRANSFER SKID INLET
648. AAF TRANSFER SKID OUTLET
649. 3" SS AAF DISCHARGE PIPING TO LOAD STAND
650. ADF BLENDING UNIT. (EQUIPMENT PROCURED FROM LAS BY SRAA)
651. ADF BLENDING UNIT WATER SUPPLY INLET
652. ADF PRODUCT INLET
653. ADF PRODUCT OUTLET
654. 3" SS ADF SUPPLY PIPING FROM STORAGE
655. 3" SS ADF DISCHARGE PIPING TO LOAD STAND
656. HEATED WATER CABINET. (EQUIPMENT PROCURED FROM LAS BY SRAA)
657. WATER PIPING TRANSITION PIT
658. 4" UNDERGROUND WATER LINE TO WATER CABINET AND BLENDING UNIT
659. 4" DIP TO 2" SS TRANSITION AND 2" SS 3-WAY TEE. 2" WATER PIPING TO ADF BLENDING UNIT AND HEATED WATER CABINET
660. 2" SS BALL VALVE
661. ADF AND AAF 2-HOSE LOAD STAND. (EQUIPMENT PROCURED FROM LAS BY SRAA)
662. AAF TRANSFER HOSE AND HIGH-HOSE RETRACTOR
663. ADF TRANSFER HOSE AND HIGH-HOSE RETRACTOR
664. 3X2 REDUCER
665. CABINET ACCESS SWING DOOR (TYP.)
666. 6" SS ADF SUPPLY PIPING FROM STORAGE
667. 6" 3-WAY TEE PLUGGED IN VERTICAL POSITION FOR FUTURE TANK CONNECTION
668. 6" 3-WAY TEE
669. 6X3 REDUCER
670. 3" SS AAF SUPPLY PIPING TO AAF CABINET
671. 3" 3-WAY TEE
672. 3" SS BRAIDED FLEX CONNECTOR
673. DOWN PIPE
674. 6" BRAIDED SS FLEX CONNECTOR
675. 6" SS BALL VALVE
676. 2" FIBERGLASS INSULATION WITH ALUMINUM JACKETING AND HEAT TRACE CABLE
677. HEAT TRACE SUPPLY/CONTROLLER
678. 2" AAF EMERGENCY HOSE CONNECTION W/ 2" BALL VALVE, 2" MALE CAMLOCK AND DUST COVER.
679. 2" ADF EMERGENCY HOSE CONNECTION W/ 2" BALL VALVE, 2" MALE CAMLOCK AND DUST COVER.

B4 KEYED NOTES

SCALE: NOT TO SCALE

1. ADF = TYPE I AIRCRAFT DEICING FLUID.
2. AAF = TYPE IV AIRCRAFT ANTIICING FLUID.
3. TANK SADDLES SHALL BE SET BACK 2' (MIN) FROM PAVEMENT JOINTS.
4. ALL ADF AND AAF PIPING SHALL USE LONG SWEEP ELBOWS AND FULL PORT BALL VALVES.
5. ALL VALVES AND FLEX CONNECTORS SHALL BE FLANGED.
6. ALL PIPING AND FITTINGS SHALL BE BUTT WELDED 310 STAINLESS STEEL.
7. THE EQUIPMENT/PIPING LAYOUT IS SCHEMATIC ONLY AND MAY NOT NECESSARILY BE DRAWN TO SCALE. LAYOUT SHALL BE ADJUSTED BASED ON THE ACTUAL EQUIPMENT AND PLUMBING SIZES PROVIDED. THE OVERALL PAD SIZE AND RAISED CONCRETE ISLANDS MAY HAVE TO BE ENLARGED AS NECESSARY TO PROVIDE PROPER POSITIONING AND MAINTENANCE/OPERATIONS SPACING. THE CONTRACTOR SHALL LAYOUT ALL EQUIPMENT PRIOR TO INSTALLATION FOR FIELD VERIFICATION BY THE RPR AND SRAA.
8. ALL EQUIPMENT ANCHOR BOLTS SHALL BE POSITIONED A MINIMUM OF 3" FROM THE EDGE OF CONCRETE OR A CONCRETE JOINT.
9. PIPE SUPPORTS ARE NOT SHOWN FOR CLARITY AND THE LOCATIONS SHALL BE DETERMINED BY THE CONTRACTOR. THE PIPE SHALL BE FIRMLY SUPPORTED, MAXIMUM SPACING SHALL BE 8'. SEE DETAIL A4/PQ503.

A4 NOTES

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRONCE · LICENSED PROFESSIONAL ENGINEER · NO. 083424

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	T. RUBIETTA
DESIGNED BY:	T. RUBIETTA
CHECKED BY:	W. FRYE

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

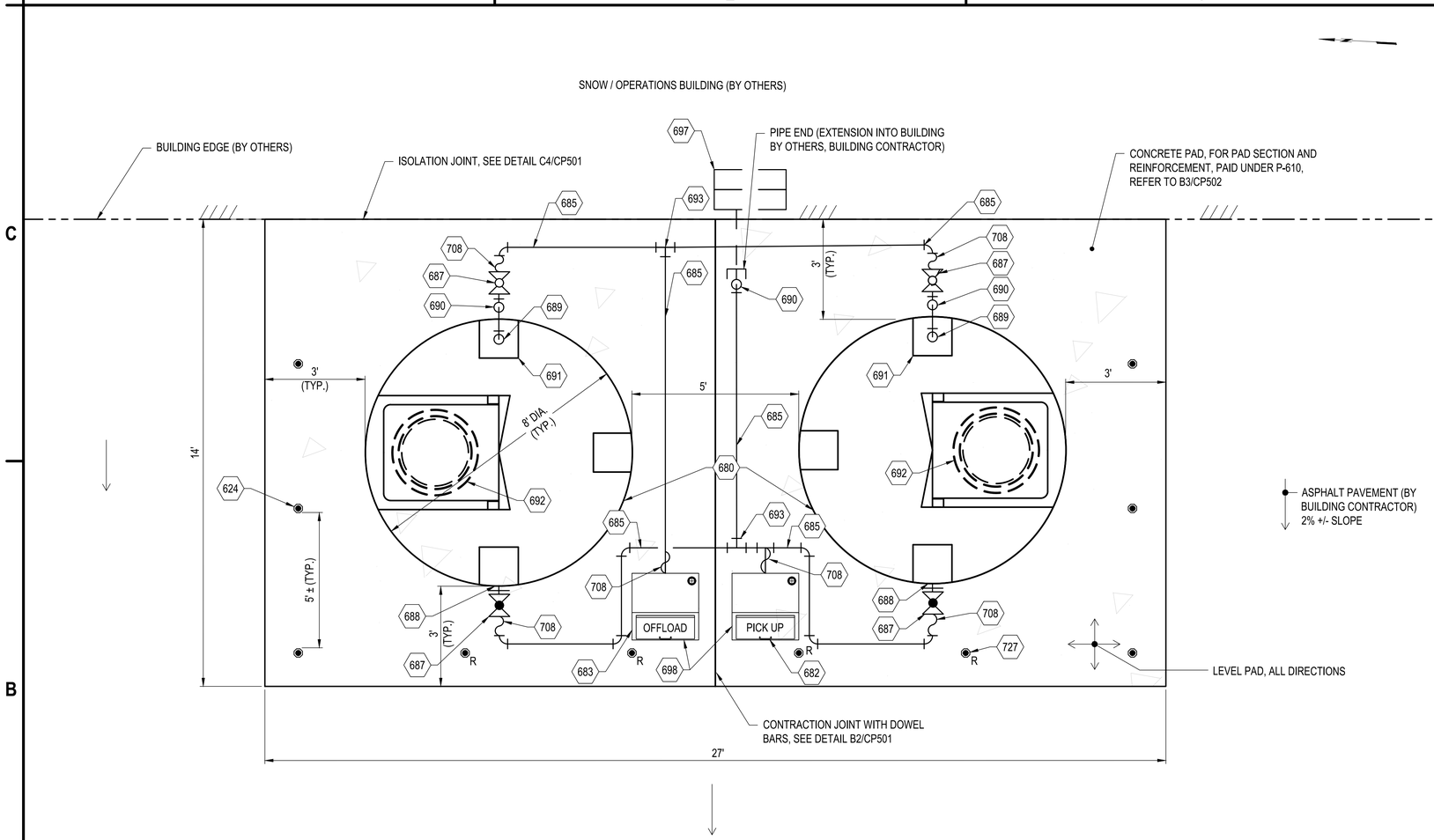
DEICING TANK LAYOUT DETAILS (ADD ON #1)

PQ201

SHEET NO. 75 OF 113

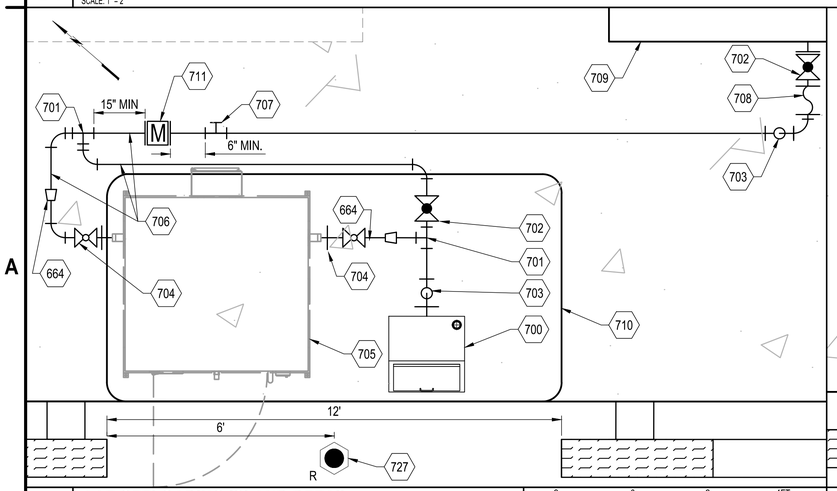
Copyright ©

Apr 29, 2026 - 9:37pm
F:\Project\C0B - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_PQ Series.dwg



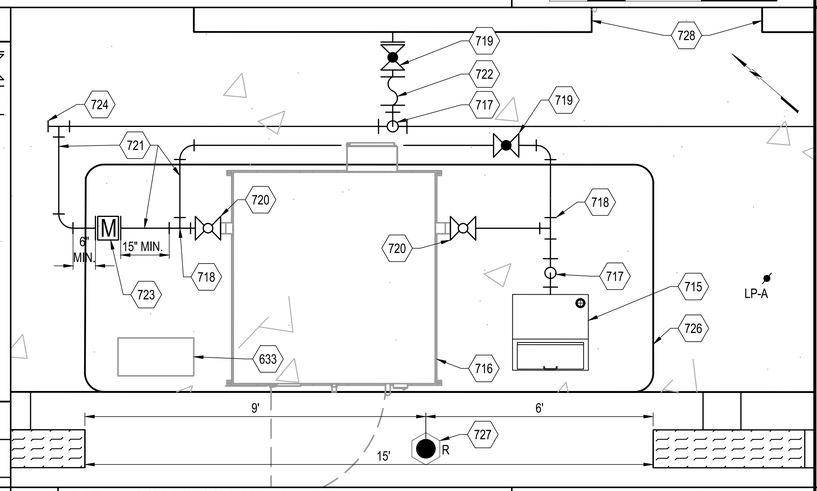
B1 POTASSIUM ACETATE TANK LAYOUT DETAIL

SCALE: 1" = 2'



A1 AAF OFFLOADING ISLAND DETAIL

SCALE: 1" = 2'



A2 ADF OFFLOADING ISLAND DETAIL

SCALE: 1" = 2'

2 0 2 4FT.
2'

B4 KEYED NOTES

SCALE: NOT TO SCALE

624. 6" COLLISION BOLLARD, FIELD ADJUST LOCATIONS AS NECESSARY 5' MAX. SPACING (TYP.), SEE DETAIL C4/CU510,PAID UNDER F-170.
633. OFFLOADING FMS KIOSK (EQUIPMENT PROCURED FROM LAS BY SRAA)
664. 3X2 REDUCER
680. 5,600 GAL. 8' DIA X 196" TALL, VERTICAL, SINGLE WALL, POLY, POTASSIUM ACETATE STORAGE TANK
682. POTASSIUM ACETATE OFFLOADING REMOTE SPILL BOX
683. POTASSIUM ACETATE LOADING REMOTE SPILL BOX
685. 3" SS PIPING
687. 3" SS BALL VALVE
688. 3" TANK BOTTOM CONNECTION
689. 3" TANK TOP CONNECTION
690. PIPING DOWN TO GRADE
691. TANK TOP DOME FLAT (TYP.)
692. 24" MANWAY W/ HINGED COVER (TYP.)
693. 3-WAY TEE
697. POTASSIUM ACETATE UNLOADING BOX, TO BE LOCATED INSIDE THE OPERATIONS BUILDING GARAGE BAY. CONTRACTOR PROVIDED, TO BE INSTALLED BY OTHERS (BUILDING CONTRACTOR)
698. CHECK VALVE AND BALL VALVE LOCATED WITHIN REMOTE SPILL BOX (TYP.)
700. AAF OFFLOADING SPILL BOX
701. 3-WAY TEE
702. 3" BALL VALVE (NORMALLY CLOSED)
703. DOWN PIPE
704. 2" SS BALL VALVE (NORMALLY OPEN)
705. HEATED AAF OFFLOADING PUMP SKID. (EQUIPMENT PROCURED FROM LAS BY SRAA)
706. 3" SS PIPING
707. 3-WAY TEE W/ PLUG IN 12 O'CLOCK FOR FUTURE TANK CONNECTION
708. 3" BRAIDED SS FLEX CONNECTOR
709. AAF STORAGE TANK
710. APPROXIMATELY 6' DEEP X 12' WIDE 6" RAISED CONCRETE ISLAND
711. 3" FLOW METER
715. ADF OFFLOADING REMOTE SPILL BOX
716. HEATED ADF OFFLOADING PUMP SKID. (EQUIPMENT PROCURED FROM LAS BY SRAA)
717. DOWN PIPE
718. 3-WAY TEE
719. 3" SS BALL VALVE (NORMALLY CLOSED)
720. 3" SS BALL VALVE (NORMALLY OPEN)
721. 3" SS PIPING
722. 3" BRAIDED SS FLEX CONNECTOR
723. 3" FLOW METER
724. 3-WAY TEE PLUGGED IN 9 O'CLOCK FOR FUTURE TANK CONNECTION
726. APPROXIMATELY 6' DEEP X 15' WIDE 6" RAISED CONCRETE ISLAND
727. REMOVABLE 6" COLLISION BOLLARD, PROVIDE LARGER PIPE SLEEVE IN CONCRETE TO ACCOMMODATE BOLLARD, PAID UNDER F-170

B4 KEYED NOTES

SCALE: NOT TO SCALE

1. ADF = TYPE I AIRCRAFT DEICINC FLUID
2. AAF = TYPE IV AIRCRAFT ANTIICING FLUID
3. TANK SADDLES SHALL BE SET BACK 2' (MIN) FROM PAVEMENT JOINTS
4. ALL ADF AND AAF PIPING SHALL USE LONG SWEEP ELBOWS AND FULL PORT BALL VALVES
5. ALL VALVES AND FLEX CONNECTORS SHALL BE FLANGED
6. ALL PIPING AND FITTINGS SHALL BE BUTT WELDED 310 STAINLESS STEEL
7. CONTRACTOR SHALL COORDINATE WITH BUILDING CONTRACTOR AS NECESSARY. IN GENERAL, THE BUILDING FOUNDATION, BACKFILL, STEEL AND SIDING ERECTION SHALL BE COMPLETED PRIOR TO STARTING TANK PAD CONSTRUCTION.
8. THE EQUIPMENT/PIPING LAYOUT IS SCHEMATIC ONLY AND MAY NOT NECESSARILY BE DRAWN TO SCALE. LAYOUT SHALL BE ADJUSTED BASED ON THE ACTUAL EQUIPMENT AND PLUMBING SIZES PROVIDED. THE OVERALL PAD SIZE AND RAISED CONCRETE ISLANDS MAY HAVE TO BE ENLARGED AS NECESSARY TO PROVIDE PROPER POSITIONING AND MAINTENANCE/OPERATIONS SPACING. THE CONTRACTOR SHALL LAYOUT ALL EQUIPMENT PRIOR TO INSTALLATION FOR FIELD VERIFICATION BY THE RPR AND SRAA.
9. ALL EQUIPMENT ANCHOR BOLTS SHALL BE POSITIONED A MINIMUM OF 3" FROM THE EDGE OF CONCRETE OR A CONCRETE JOINT.
10. PIPE SUPPORTS ARE NOT SHOWN FOR CLARITY AND THE LOCATIONS SHALL BE DETERMINED BY THE CONTRACTOR. THE PIPE SHALL BE FIRMLY SUPPORTED, MAXIMUM SPACING SHALL BE 8'. SEE DETAIL A4/PQ503.

A4 NOTES

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUNCK · LICENSED PROFESSIONAL ENGINEER · NO. 083424

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	T. RUBIETTA
DESIGNED BY:	T. RUBIETTA
CHECKED BY:	W. FRYE

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

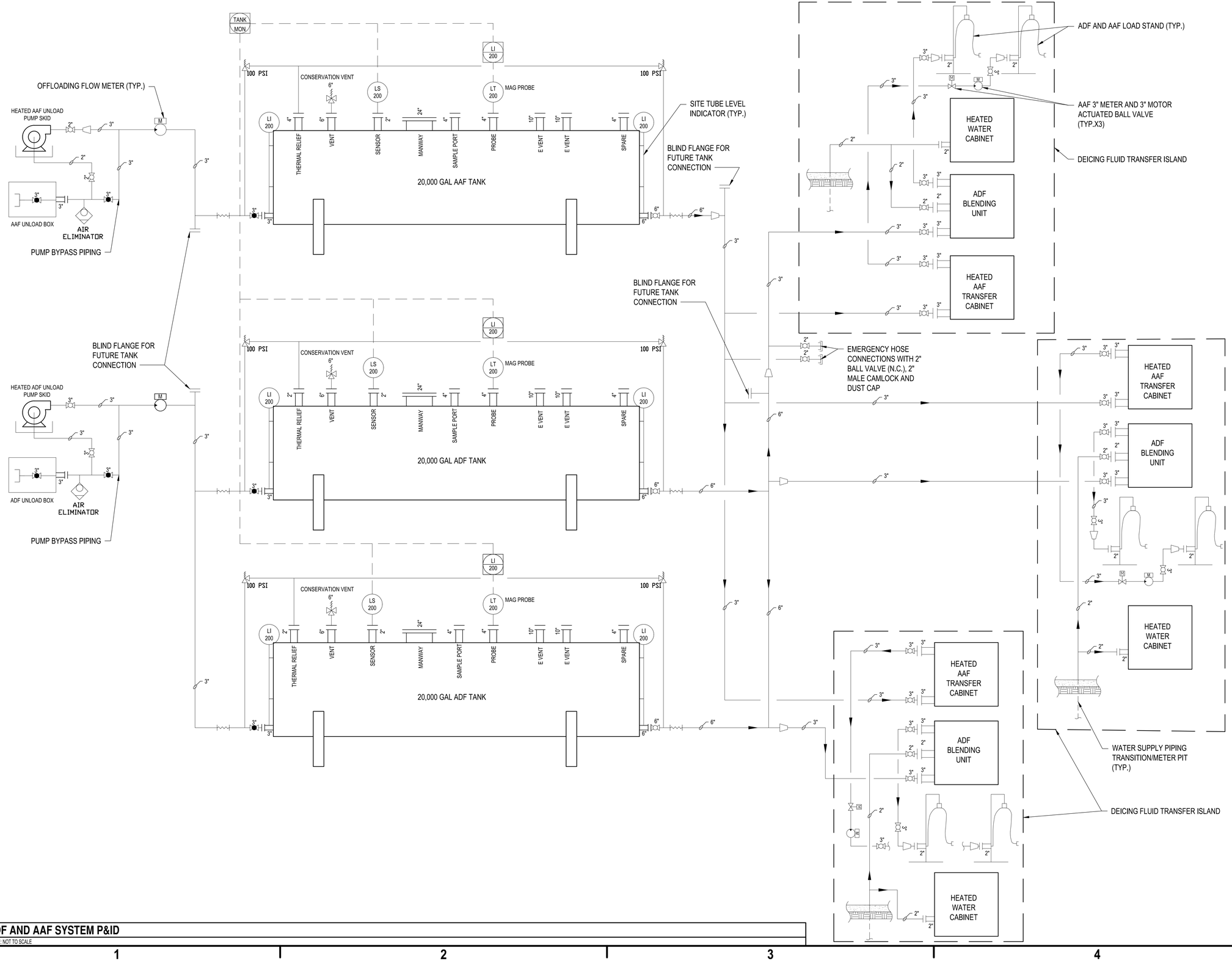
DEICING TANK LAYOUT DETAILS (ADD ON #1)

PQ202

SHEET NO. 76 OF 113

Copyright ©

Apr 29, 2026 - 3:37pm
F:\Project\O68 - Syracuse Regional Airport Authority\O68069001 - Como Deicing Pad\Design\CADD\Sheet Files\O68069001_PQ Series.dwg



A1 ADF AND AAF SYSTEM P&ID

SCALE: NOT TO SCALE

C&S COMPANIES®

C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUNCK · NO. 083424 · LICENSED PROFESSIONAL ENGINEER

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	T. RUBIETTA
DESIGNED BY:	T. RUBIETTA
CHECKED BY:	W. FRYE

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

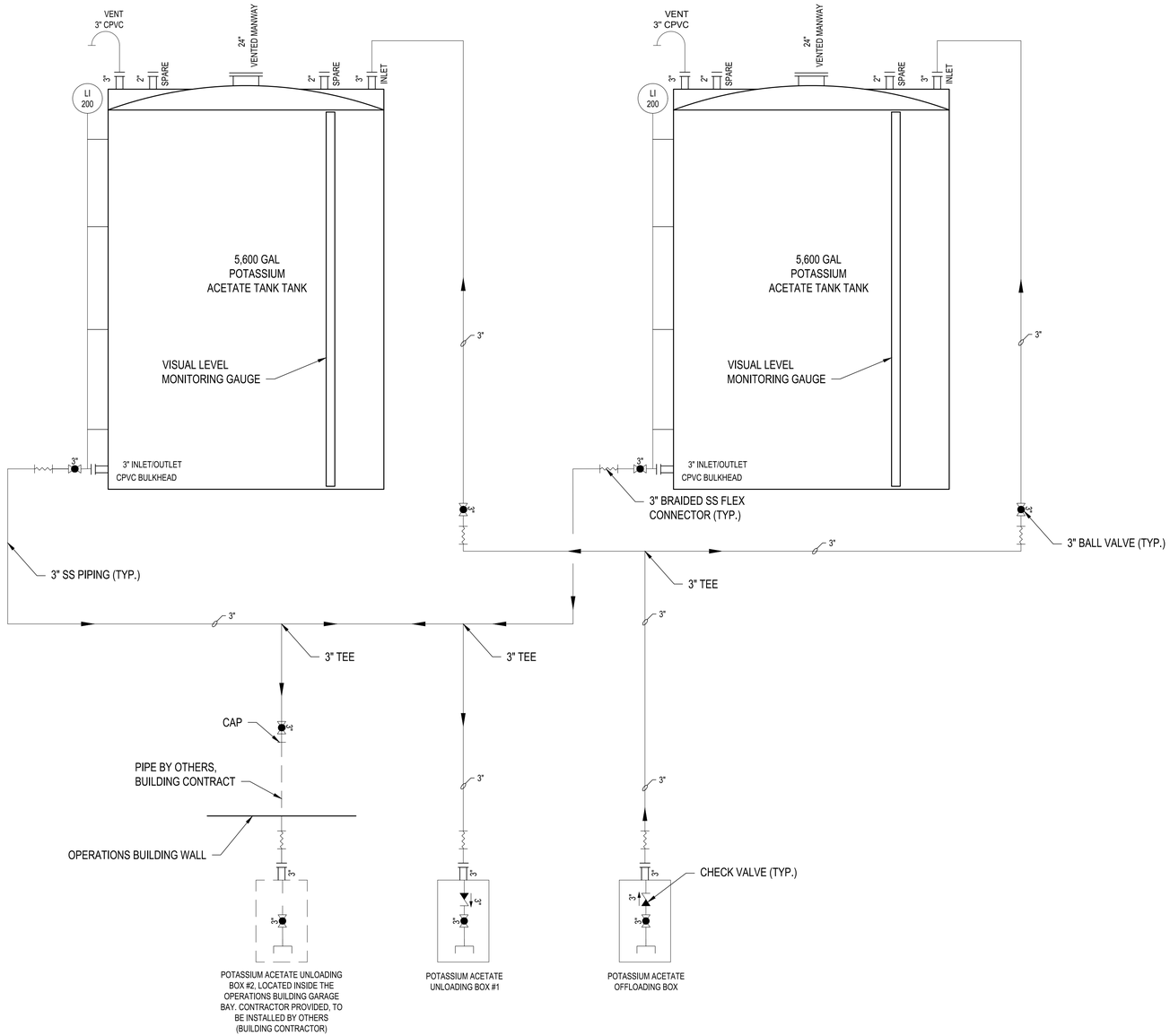
ADF AND AAF SYSTEM P&ID (ADD ON #1)

PQ501

SHEET NO. 77 OF 113

Copyright ©

Apr 29, 2026 - 3:37pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Como Deicing Pad\Design\CADD\Sheet Files\O68069001_PQ Details.dwg



NOTE: ALL PIPING SHALL BE 3" SCH 80 CPVC

A1 POTASSIUM ACETATE SYSTEM P&ID

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUNCK · NO. 083424 · LICENSED PROFESSIONAL ENGINEER

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	T. RUBIETTA
DESIGNED BY:	T. RUBIETTA
CHECKED BY:	W. FRYE

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

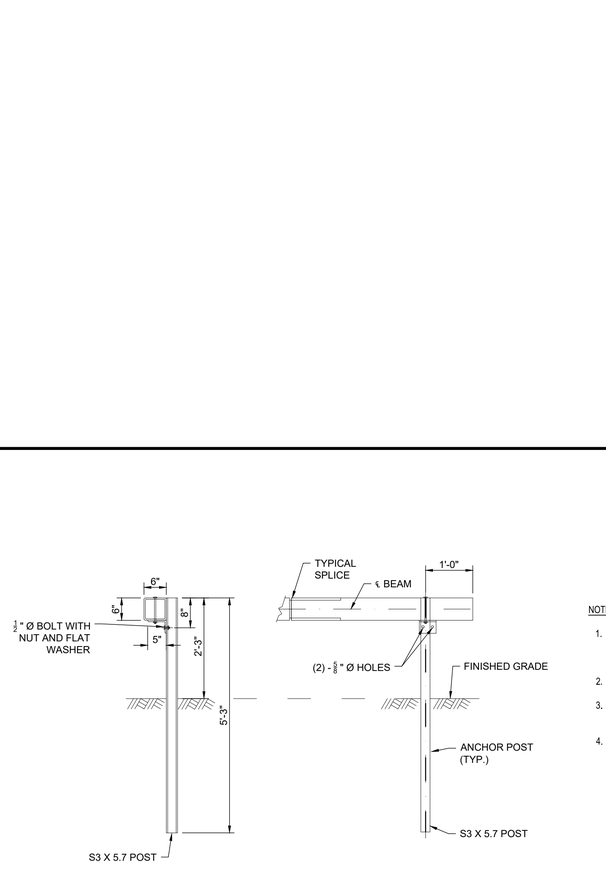
POTASSIUM ACETATE SYSTEM P&ID (ADD ON #1)

PQ502

SHEET NO. 78 OF 113

Copyright ©

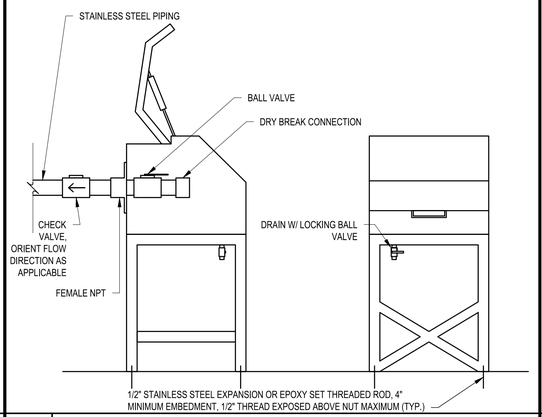
Apr 29, 2026 - 3:37pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Como Deicing Pad\Design\CADD\Sheet Files\O68069001_PQ Details.dwg



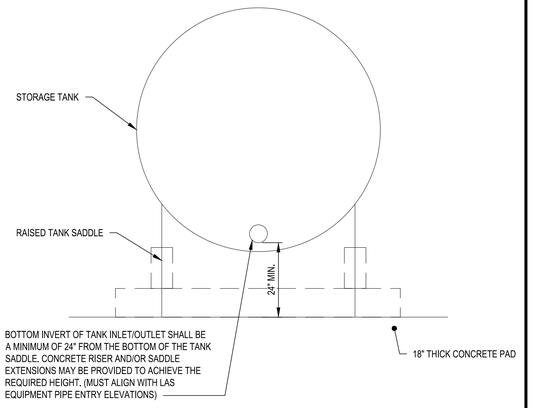
A1 BOX BEAM GUIDE RAIL DETAIL
SCALE: NOT TO SCALE

NOTES:

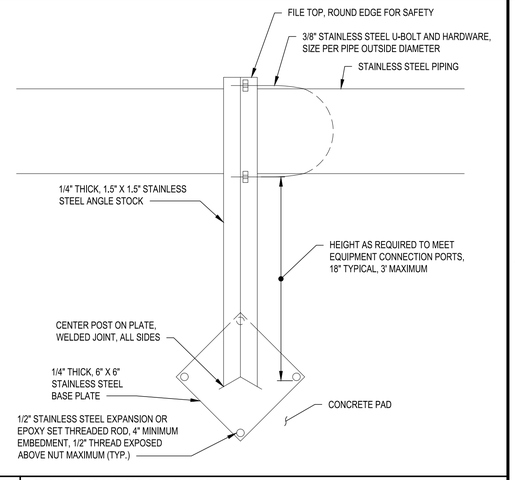
1. ALL POSTS, OFFSET BLOCKS, BEAM ELEMENTS, AND HARDWARE (INCLUDING BOLTS, NUTS, AND WASHERS) SHALL CONFORM TO THE CURRENT NYSDOT STANDARD GUIDE RAIL SPECIFICATIONS. MATERIAL SHALL BE HOT DIPPED GALVANIZED STEEL.
2. ALL GUIDE RAIL RUNS SHALL HAVE TERMINAL ENDS ON THE ENDS.
3. GUIDE RAIL POSTS TO BE INSTALLED IN ASPHALT PAVEMENT IMMEDIATELY ADJACENT TO THE AIRCRAFT DEICING FACILITY TANK CONCRETE PAD.
4. PROVIDE ANGLED TRANSITION PIECE AT EACH TERMINATION POINT.



A3 REMOTE FILL PORT DETAIL
SCALE: NOT TO SCALE



B4 TYPICAL RAISED TANK SADDLE DETAIL
SCALE: NOT TO SCALE



A4 PIPING SUPPORT DETAIL
SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK
CHRISTOPHER D. BRUNCK
LICENSED PROFESSIONAL ENGINEER
NO. 083424

SYR
SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	T. RUBIETTA
DESIGNED BY:	T. RUBIETTA
CHECKED BY:	W. FRYE

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

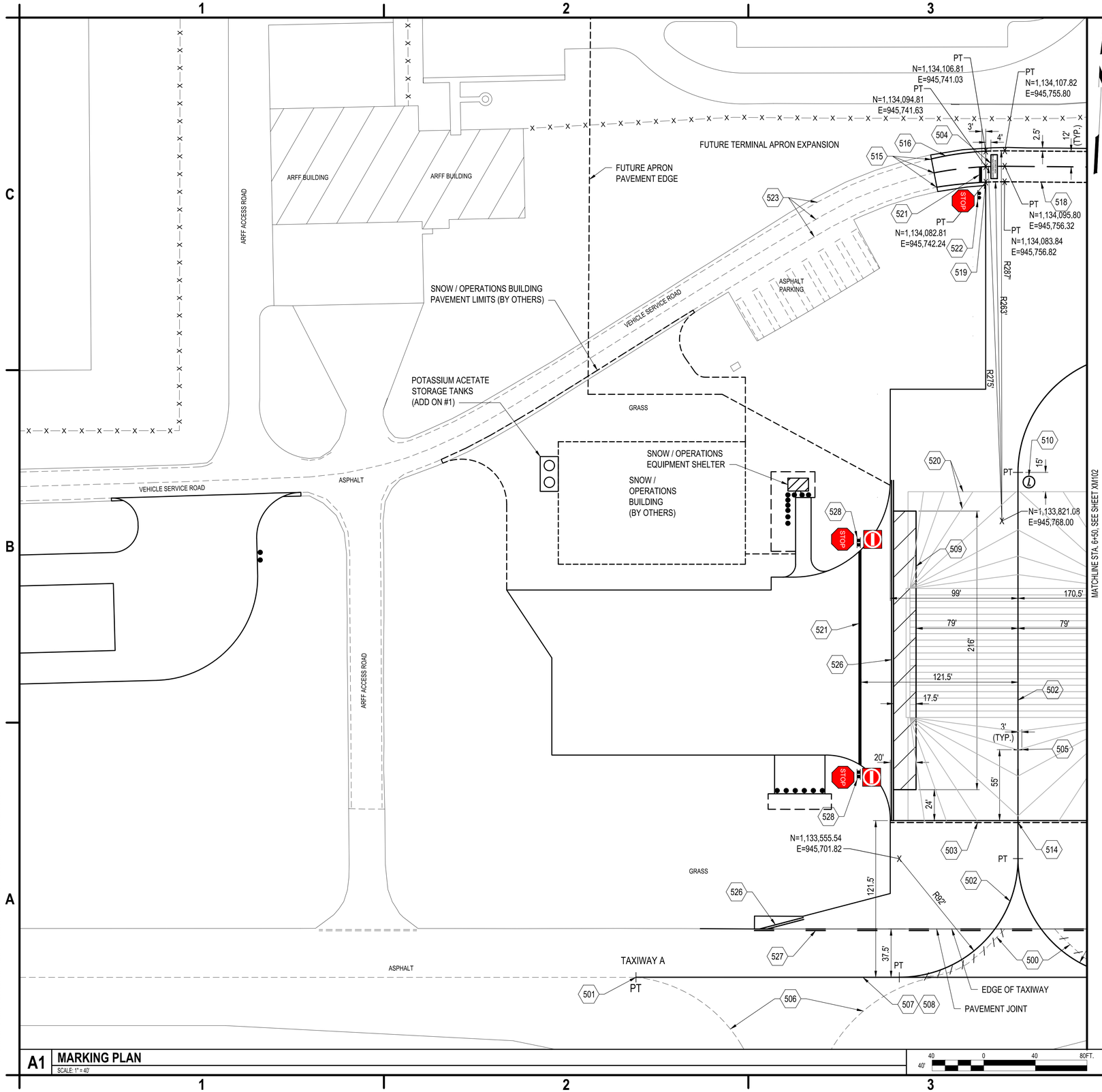
DEICING DETAILS
(ADD ON #1)

PQ503

SHEET NO. 79 OF 113

Copyright ©

Apr 29, 2026 - 3:37pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Como Deicing Pad\Design\CADD\Sheet Files\O68069001_PQ Details.dwg



A1 MARKING PLAN
SCALE: 1" = 40'

40' 40 0 40 80FT.

500. NON-CONFORMING TAXIWAY CENTERLINE MARKING TO BE REMOVED (OUTSIDE OF PAVEMENT REHABILITATION LIMITS), ITEM P-620.

501. MEET EXISTING TAXIWAY CENTERLINE MARKING. ENSURE PROPOSED MARKINGS ALIGN WITH EXISTING MARKINGS (TYP.).

502. TAXIWAY CENTERLINE MARKING, ITEM P-620. SEE DETAIL A3/XM501.

503. NON-MOVEMENT AREA BOUNDARY MARKING, THERMOPLASTIC, ITEM P-620. SEE DETAIL A4/XM501.

504. VEHICLE ROADWAY SURFACE MARKING, THERMOPLASTIC, ITEM P-620. SEE DETAIL A2/XM501.

505. AIRCRAFT DEICING HOLDING POSITION MARKING, 6" WIDE, YELLOW WITH 6" WIDE BLACK BORDER, ITEM P-620.

506. EXISTING TAXIWAY CENTERLINE MARKING (TYP.).

507. EXISTING MARKINGS (OUTSIDE OF PAVEMENT REHABILITATION LIMITS) WHICH ARE BEING REMARKED OR REPLACED WITH THERMOPLASTIC, SHALL BE REMOVED PRIOR TO APPLICATION OF NEW MARKINGS. EXISTING MARKINGS WHICH ARE BEING REMARKED (USE NEW LAYOUT DATA FOR REPLACEMENT MARKINGS) ARE NOT SHOWN FOR CLARITY. ANY AREAS OF REMOVAL ON ASPHALT PAVEMENT WHICH DO NOT ALIGN WITH NEW MARKINGS SHALL BE SEALED IN ACCORDANCE WITH ITEM P-620. REMOVAL METHODS SHALL NOT DAMAGE EXISTING PAVEMENT.

508. REPAINT EXISTING TAXIWAY CENTERLINE MARKING, ITEM P-620. SEE DETAIL A3/XM501.

509. VEHICLE SAFETY ZONE MARKING (VSZ). SEE DETAIL B3/XM501.

510. AIRCRAFT DEICING PAD IDENTIFICATION SURFACE MARKING. SEE DETAIL B1/XM502.

514. TAXIWAY CENTERLINE MARKINGS ARE INTERRUPTED FOR NON MOVEMENT AREA BOUNDARY MARKINGS (TYP.). SEE DETAIL A4/XM501.

515. MEET EXISTING VEHICLE ROADWAY MARKINGS. ENSURE PROPOSED MARKINGS ALIGN WITH EXISTING MARKINGS (TYP.).

516. VEHICLE ROADWAY MARKINGS, ITEM P-620, SEE DETAIL B1/XM501.

518. ZIPPER STYLE VEHICLE ROADWAY MARKINGS, ITEM P-620, SEE DETAIL B2/XM501.

519. END OF ZIPPER STYLE VEHICLE ROADWAY MARKINGS, BEGINNING OF VEHICLE ROADWAY MARKINGS AT EDGE OF APRON.

520. PAVEMENT SAW-CUT GROOVING, ITEM P-621, SEE DETAIL C1/XM501. COORDINATE ALIGNMENT AND LAYOUT WITH THE RPR AND AIRPORT OPERATIONS. (TYP.)

521. VEHICLE ROADWAY STOP BAR MARKING, 2' WIDE, WHITE, ITEM P-620.

522. RETROREFLECTIVE STOP SIGN, ITEM L-125, SEE DETAIL C2/XM501.

523. EXISTING VEHICLE ROADWAY MARKINGS.

526. DOUBLE SOLID CONTINUOUS TAXIWAY EDGE MARKING, ITEM P-620, SEE DETAIL C4/XM501.

527. DOUBLE DASHED TAXIWAY EDGE MARKING, ITEM P-620, SEE DETAIL B4/XM501.

528. RETROREFLECTIVE STOP SIGN AND INTERNATIONAL NO AIRCRAFT ENTRY SIGN, ITEM L-125, SEE DETAIL C2/XM501.

B4 KEYED NOTES
SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · LICENSED PROFESSIONAL ENGINEER · NO. 083424

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

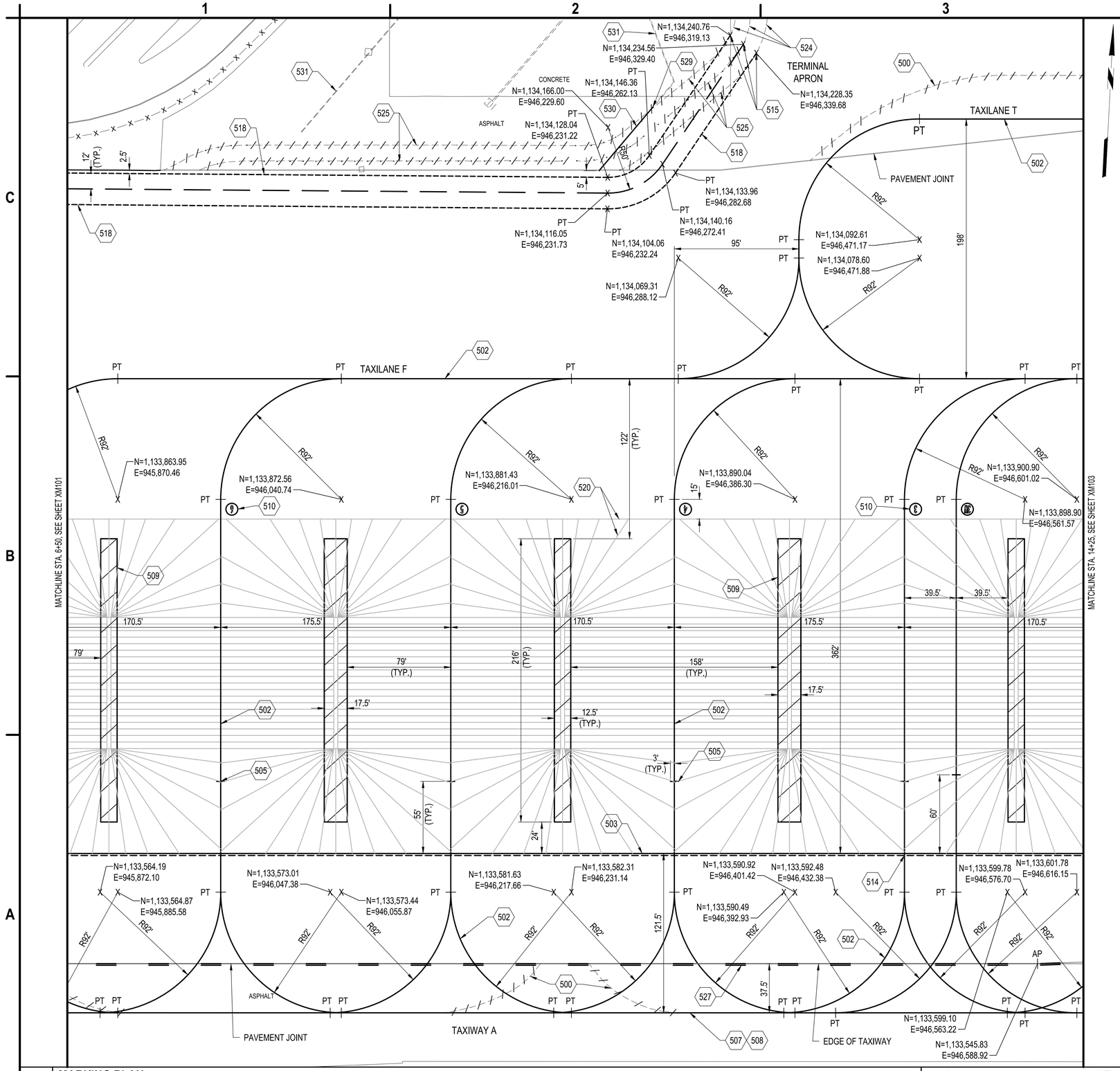
MARKING PLAN

XM101

SHEET NO. 80 OF 113

Copyright ©

Apr 29, 2026 - 3:39pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_XM_Series.dwg



A1 MARKING PLAN

SCALE: 1" = 40'

40 0 40 80FT.

40'

B4 KEYED NOTES

SCALE: NOT TO SCALE

500. NON-CONFORMING TAXIWAY CENTERLINE MARKING TO BE REMOVED (OUTSIDE OF PAVEMENT REHABILITATION LIMITS), ITEM P-620.

501. MEET EXISTING TAXIWAY CENTERLINE MARKING. ENSURE PROPOSED MARKINGS ALIGN WITH EXISTING MARKINGS (TYP.).

502. TAXIWAY CENTERLINE MARKING, ITEM P-620. SEE DETAIL A3/XM501.

503. NON-MOVEMENT AREA BOUNDARY MARKING, THERMOPLASTIC, ITEM P-620. SEE DETAIL A4/XM501.

505. AIRCRAFT DEICING HOLDING POSITION MARKING, 6" WIDE, YELLOW WITH 6" WIDE BLACK BORDER, ITEM P-620.

506. EXISTING TAXIWAY CENTERLINE MARKING (TYP.).

507. EXISTING MARKINGS (OUTSIDE OF PAVEMENT REHABILITATION LIMITS) WHICH ARE BEING REMARKED OR REPLACED WITH THERMOPLASTIC, SHALL BE REMOVED PRIOR TO APPLICATION OF NEW MARKINGS. EXISTING MARKINGS WHICH ARE BEING REMARKED (USE NEW LAYOUT DATA FOR REPLACEMENT MARKINGS) ARE NOT SHOWN FOR CLARITY. ANY AREAS OF REMOVAL ON ASPHALT PAVEMENT WHICH DO NOT ALIGN WITH NEW MARKINGS SHALL BE SEALED IN ACCORDANCE WITH ITEM P-620. REMOVAL METHODS SHALL NOT DAMAGE EXISTING PAVEMENT.

508. REPAINT EXISTING TAXIWAY CENTERLINE MARKING, ITEM P-620. SEE DETAIL A3/XM501.

509. VEHICLE SAFETY ZONE MARKING (VSZ). SEE DETAIL B3/XM501.

510. AIRCRAFT DEICING PAD IDENTIFICATION SURFACE MARKING. SEE DETAIL B1/XM502.

514. TAXIWAY CENTERLINE MARKINGS ARE INTERRUPTED FOR NON MOVEMENT AREA BOUNDARY MARKINGS (TYP.). SEE DETAIL A4/XM501.

515. MEET EXISTING VEHICLE ROADWAY MARKINGS. ENSURE PROPOSED MARKINGS ALIGN WITH EXISTING MARKINGS (TYP.).

516. VEHICLE ROADWAY MARKINGS, ITEM P-620, SEE DETAIL B1/XM501.

518. ZIPPER STYLE VEHICLE ROADWAY MARKINGS, ITEM P-620, SEE DETAIL B2/XM501.

520. PAVEMENT SAW-CUT GROOVING, ITEM P-621, SEE DETAIL C1/XM501. COORDINATE ALIGNMENT AND LAYOUT WITH THE RPR AND AIRPORT OPERATIONS. (TYP.)

524. EXISTING ZIPPER STYLE VEHICLE ROADWAY MARKINGS.

525. NON-CONFORMING ZIPPER STYLE VEHICLE ROADWAY MARKINGS TO BE REMOVED (OUTSIDE OF PAVEMENT REHABILITATION LIMITS), ITEM P-620.

527. DOUBLE DASHED TAXIWAY EDGE MARKING, ITEM P-620, SEE DETAIL B4/XM501.

529. MEET EXISTING AIRCRAFT SAFETY CONTAINMENT MARKING. ENSURE PROPOSED MARKINGS ALIGN WITH EXISTING MARKINGS (TYP.).

530. AIRCRAFT SAFETY CONTAINMENT MARKING, SEE DETAIL A1/XM501.

531. EXISTING AIRCRAFT SAFETY CONTAINMENT MARKING.

C&S COMPANIES®

C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · NO. 083424 · LICENSED PROFESSIONAL ENGINEER

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

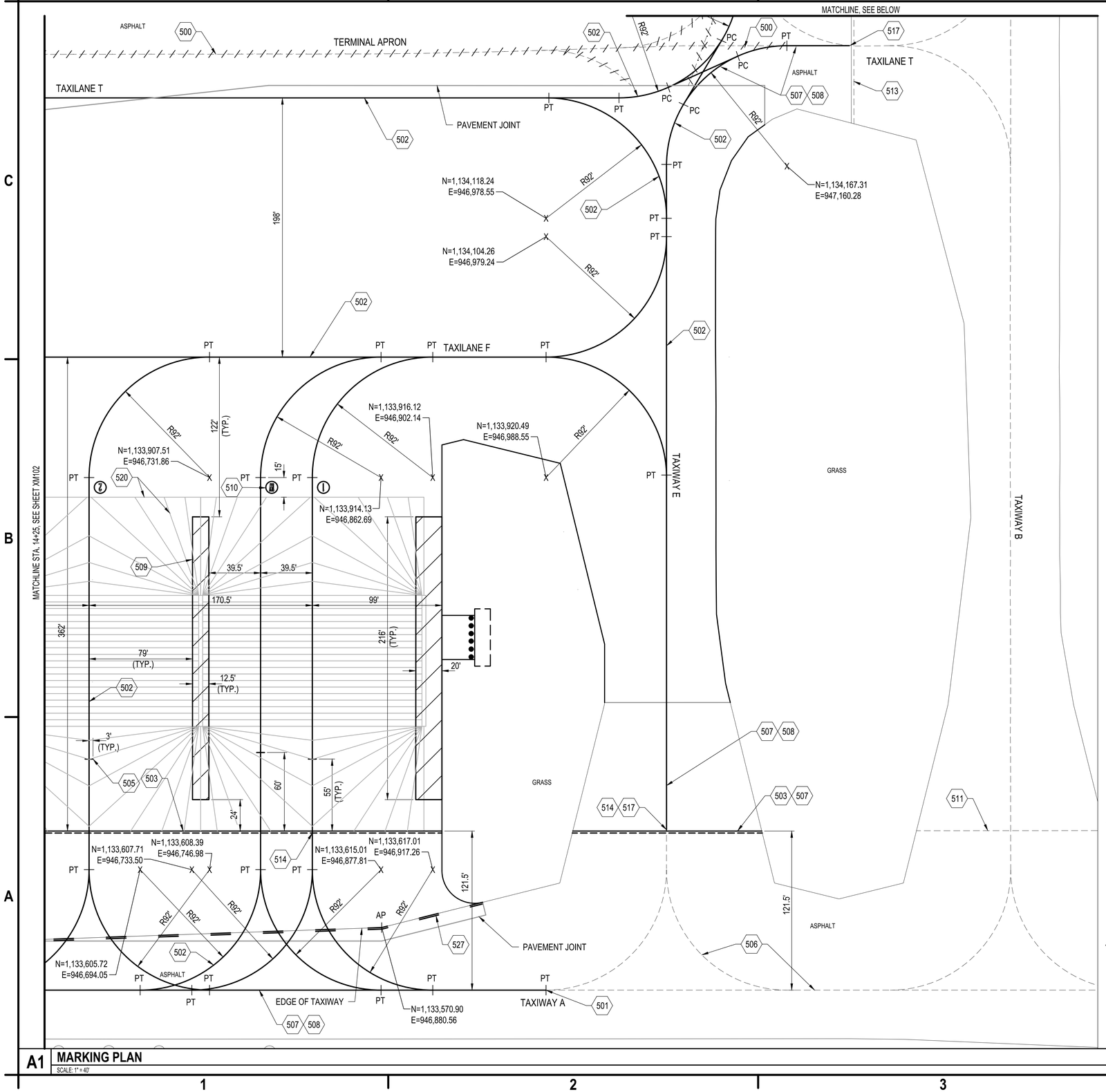
MARKING PLAN

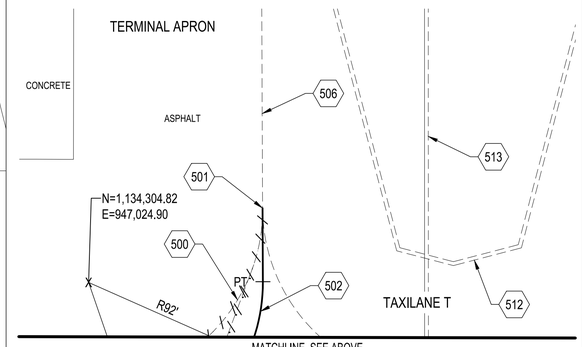
XM102

SHEET NO. 81 OF 113

Copyright ©

Apr 29, 2026 - 3:38pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_XM-Series.dwg





B4 KEYED NOTES
SCALE: NOT TO SCALE

500. NON-CONFORMING TAXIWAY CENTERLINE MARKING TO BE REMOVED (OUTSIDE OF PAVEMENT REHABILITATION LIMITS), ITEM P-620.
501. MEET EXISTING TAXIWAY CENTERLINE MARKING. ENSURE PROPOSED MARKINGS ALIGN WITH EXISTING MARKINGS (TYP.).
502. TAXIWAY CENTERLINE MARKING, ITEM P-620. SEE DETAIL A3/XM501.
503. NON-MOVEMENT AREA BOUNDARY MARKING, THERMOPLASTIC, ITEM P-620. SEE DETAIL A4/XM501.
505. AIRCRAFT DEICING HOLDING POSITION MARKING, 6" WIDE, YELLOW WITH 6" WIDE BLACK BORDER, ITEM P-620.
506. EXISTING TAXIWAY CENTERLINE MARKING (TYP.).
507. EXISTING MARKINGS (OUTSIDE OF PAVEMENT REHABILITATION LIMITS) WHICH ARE BEING REMARKED OR REPLACED WITH THERMOPLASTIC, SHALL BE REMOVED PRIOR TO APPLICATION OF NEW MARKINGS. EXISTING MARKINGS WHICH ARE BEING REMARKED (USE NEW LAYOUT DATA FOR REPLACEMENT MARKINGS) ARE NOT SHOWN FOR CLARITY. ANY AREAS OF REMOVAL ON ASPHALT PAVEMENT WHICH DO NOT ALIGN WITH NEW MARKINGS SHALL BE SEALED IN ACCORDANCE WITH ITEM P-620. REMOVAL METHODS SHALL NOT DAMAGE EXISTING PAVEMENT.
508. REPAINT EXISTING TAXIWAY CENTERLINE MARKING, ITEM P-620. SEE DETAIL A3/XM501.
509. VEHICLE SAFETY ZONE MARKING (VSZ). SEE DETAIL B3/XM501.
510. AIRCRAFT DEICING PAD IDENTIFICATION SURFACE MARKING. SEE DETAIL B1/XM502.
511. EXISTING INTERMEDIATE HOLDING POSITION MARKING.
512. EXISTING DASHED TAXIWAY EDGE MARKING.
513. EXISTING NON MOVEMENT AREA BOUNDARY MARKING.
514. TAXIWAY CENTERLINE MARKINGS ARE INTERRUPTED FOR NON MOVEMENT AREA BOUNDARY MARKINGS (TYP.). SEE DETAIL A4/XM501.
517. ENSURE PROPOSED TAXIWAY CENTERLINE MARKING ALIGNS WITH EXISTING TAXIWAY CENTERLINE MARKING LOCATED ON OPPOSITE SIDE OF NON MOVEMENT AREA BOUNDARY MARKING.
520. PAVEMENT SAW-CUT GROOVING, ITEM P-621, SEE DETAIL C1/XM501. COORDINATE ALIGNMENT AND LAYOUT WITH THE RPR AND AIRPORT OPERATIONS. (TYP.)
527. DOUBLE DASHED TAXIWAY EDGE MARKING, ITEM P-620, SEE DETAIL B4/XM501.

A1 MARKING PLAN
SCALE: 1" = 40'

40 0 40 80FT.
40'

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · CHRISTOPHER D. BRUBACH · LICENSED PROFESSIONAL ENGINEER · NO. 083424

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	068.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

MARKING PLAN

XM103

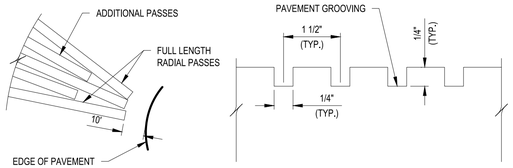
SHEET NO. 82 OF 113

Copyright ©

Apr 29, 2026 - 3:39pm
F:\Project\C068 - Syracuse Regional Airport Authority\C068069001 - Comp Deicing Pad\Design\CADD\Sheet Files\C068069001_XM Series.dwg

SAWCUT GROOVING NOTES:

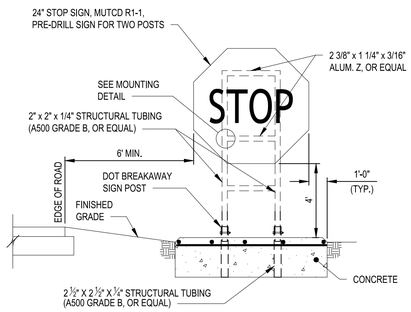
1. GROOVES SHALL BE SAWED RADIALLY TO TAXIWAY CENTERLINE OR PERPENDICULAR TO TAXIWAY CENTERLINE ON STRAIGHT SECTIONS.
2. THE AREA BETWEEN FULL LENGTH RADIAL PASSES SHALL BE GROOVED WITH AS MANY PASSES AS REQUIRED TO FILL THIS AREA.
3. GROOVING SHALL BE PERFORMED AFTER JOINT SEALING OPERATIONS. GROOVES SHALL NOT CROSS JOINTS AT AN ANGLE LESS THAN 45 DEGREES.
4. GROOVING SHALL BE PERFORMED 30 DAYS MIN. FOLLOWING PAVING OPERATIONS.
5. GROOVING SHALL HAVE A CENTER TO CENTER SPACING OF 1 1/2".
6. A DETAILED GROOVING LAYOUT PLAN SHALL BE SUBMITTED TO THE RPR FOR REVIEW PRIOR TO COMMENCING WORK.



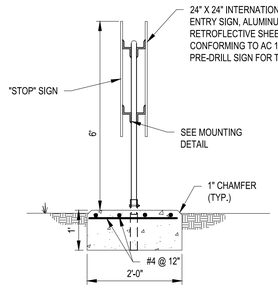
PLAN SECTION

C1 PAVEMENT SAWCUT GROOVING DETAIL

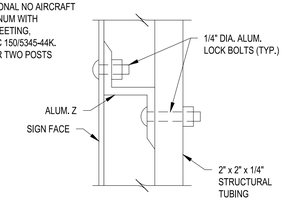
SCALE: NOT TO SCALE



FRONT VIEW



END VIEW



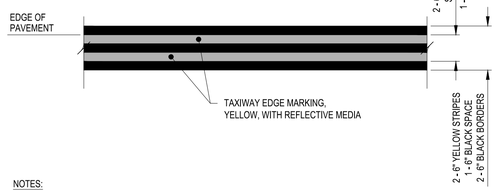
MOUNTING DETAIL

NOTES:

1. FOUNDATION SHALL BE LEVEL.

C2 STOP SIGN ASSEMBLY DETAIL

SCALE: NOT TO SCALE



NOTES:

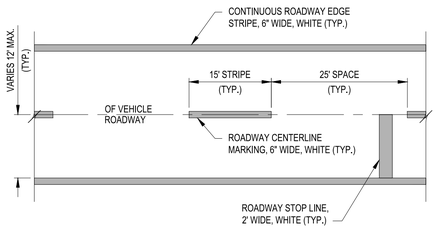
1. CONTINUOUS TAXIWAY EDGE MARKINGS WILL NOT HAVE AN OUTSIDE BLACK BORDER IF THERE IS NO PAVEMENT.
2. REFLECTIVE MEDIA SHOULD NEVER BE USED IN BLACK PAINT.

C4 CONTINUOUS TAXIWAY EDGE MARKING DETAIL

SCALE: NOT TO SCALE

NOTE:

ALL VEHICLE ROADWAY MARKINGS SHALL BE INTERRUPTED BY TAXIWAY MARKINGS.

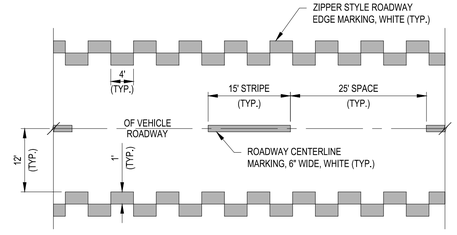


NOTE:

1. ALL VEHICLE ROADWAY MARKINGS SHALL BE INTERRUPTED BY TAXIWAY MARKINGS.

B1 VEHICLE ROADWAY MARKING DETAIL

SCALE: NOT TO SCALE

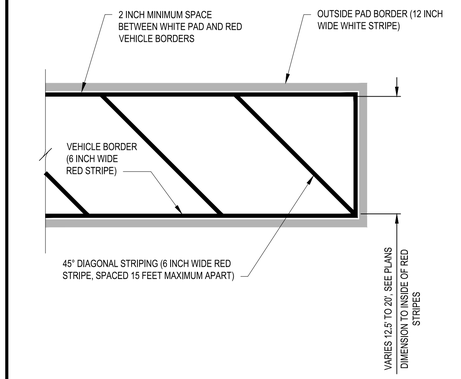


NOTE:

1. ALL VEHICLE ROADWAY MARKINGS SHALL BE INTERRUPTED BY TAXIWAY MARKINGS.

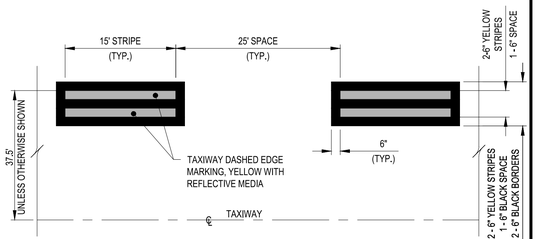
B2 ZIPPER STYLE VEHICLE ROADWAY MARKING DETAIL

SCALE: NOT TO SCALE



B3 VEHICLE SAFETY ZONE MARKING DETAIL

SCALE: NOT TO SCALE

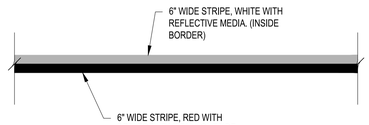


NOTES:

1. OUTER EDGE OF DASHES SHALL BE AT EDGE OF THE DESIGNATED TAXIWAY/TAXILANE.
2. REFLECTIVE MEDIA SHOULD NEVER BE USED IN BLACK PAINT.

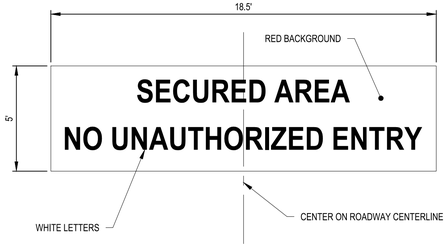
B4 DASHED TAXIWAY EDGE MARKING DETAIL

SCALE: NOT TO SCALE



A1 AIRCRAFT SAFETY CONTAINMENT MARKING DETAIL

SCALE: NOT TO SCALE

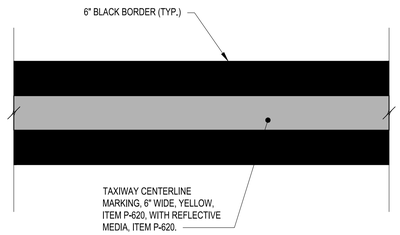


NOTES:

1. VEHICLE ROADWAY SURFACE MARKING SHALL BE THERMOPLASTIC.
2. INSCRIPTIONS FOR GEOGRAPHIC POSITION MARKINGS SHALL BE IN ACCORDANCE WITH APPENDIX B OF FAA AC 150/5340-1, LATEST EDITION. THE DIMENSIONS SHOWN ARE APPROXIMATE ONLY AND MAY VARY.

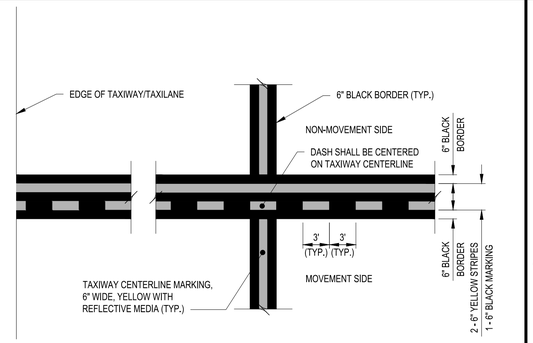
A2 PAINTED VEHICLE ROADWAY SURFACE MARKING DETAIL

SCALE: NOT TO SCALE



A3 TAXIWAY CENTERLINE MARKING DETAIL

SCALE: NOT TO SCALE



NOTES:

1. NON-MOVEMENT AREA BOUNDARY MARKINGS SHALL BE THERMOPLASTIC.
2. ANY EXISTING MARKINGS ENCOUNTERED OR IN CONFLICT WITH NEW MARKINGS SHALL BE REMOVED AS NEEDED PRIOR TO INSTALLING THERMOPLASTIC NON-MOVEMENT AREA BOUNDARY MARKING.

A4 NON-MOVEMENT AREA BOUNDARY MARKING DETAIL

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com



SYR. SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

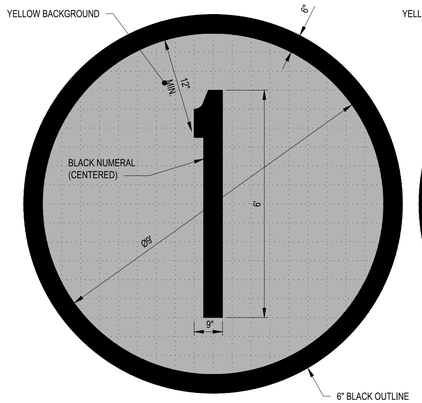
PAVEMENT MARKING DETAILS

XM501

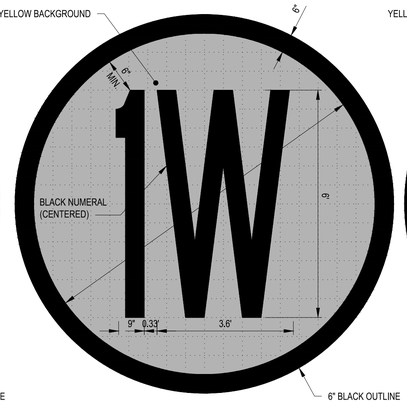
SHEET NO. 83 OF 113

Copyright ©

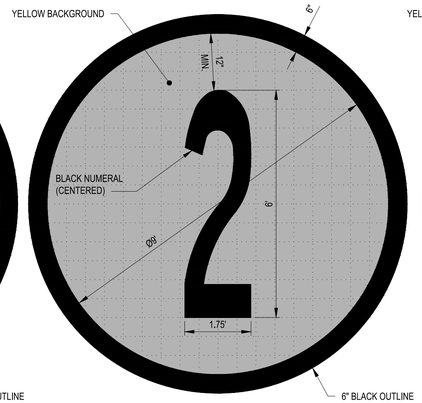
Apr 29, 2026 - 3:38pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Como Deicing Pad\Design\CADD\Sheet Files\O68069001_XM Details.dwg



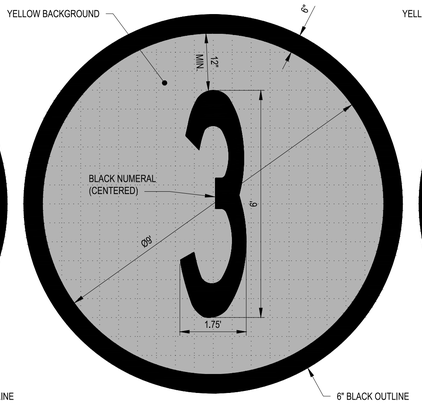
SIGN 1



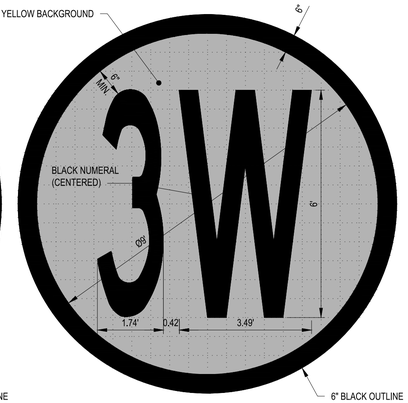
SIGN 1W



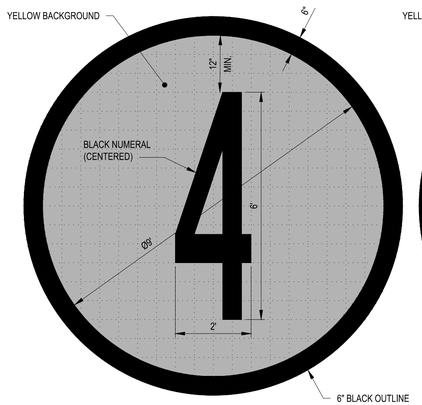
SIGN 2



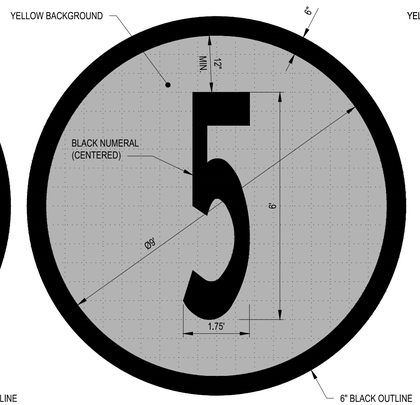
SIGN 3



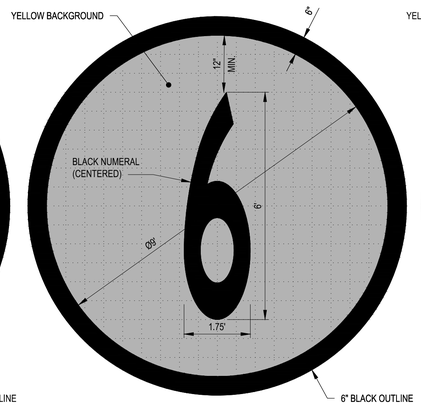
SIGN 3W



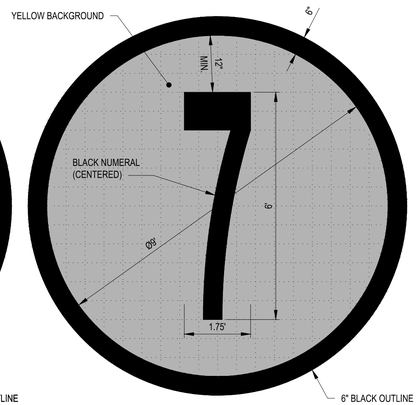
SIGN 4



SIGN 5



SIGN 6

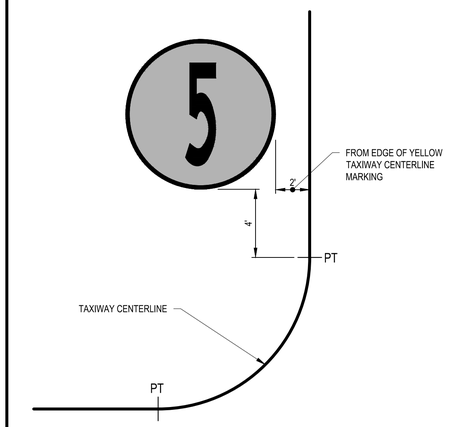


SIGN 7

NOTES:

1. IDENTIFICATION SURFACE MARKINGS SHALL BE THERMOPLASTIC.
2. GRIDS ARE SHOWN FOR LAYOUT PURPOSES ONLY.
3. EACH GRID LINE REPRESENTS 6 INCHES.
4. INSCRIPTIONS FOR GEOGRAPHIC POSITION MARKINGS SHALL BE IN ACCORDANCE WITH APPENDIX B OF FAA AC 150/5340-1, LATEST EDITION. THE DIMENSIONS SHOWN ARE APPROXIMATE ONLY AND MAY VARY.

B1 AIRCRAFT DEICING PAD IDENTIFICATION SURFACE MARKING DETAILS
SCALE: NOT TO SCALE



A4 SURFACE MARKING LOCATION PLAN
SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK
CHRISTOPHER D. BRUBACH
NO. 083424
LICENSED PROFESSIONAL ENGINEER

SYR
SYRACUSE
HANCOCK
INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY
(CDF)
SYRACUSE HANCOCK
INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	C. BRUBACH
CHECKED BY:	D. BAUER

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

AIRCRAFT DEICING PAD IDENTIFICATION PAVEMENT MARKING DETAILS

XM502

SHEET NO. 84 OF 113

Copyright ©

Apr 29, 2026 - 3:38pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Como Deicing Part\Design\CADD\Sheet Files\O68069001_XM Details.dwg

1. THE CONTRACTOR SHALL ENSURE THAT ALL NECESSARY ELECTRICAL CIRCUITS ARE DE ENERGIZED PRIOR TO COMMENCING WORK. A "LOCKOUT/TAGOUT" PROCEDURE SHALL BE IMPLEMENTED AT THE ELECTRICAL VAULT THAT IS ACCEPTABLE TO THE OWNER AND THE CONTRACTOR. THE AIR TRAFFIC CONTROL TOWER (ATCT) PERSONNEL SHALL BE NOTIFIED OF THE "LOCKOUT/TAGOUT" PROCEDURE SO THAT NO CIRCUIT CAN BE ACTIVATED REMOTELY FROM THE ATCT DURING THE CONTRACTORS WORK. THE CONTRACTOR SHALL COORDINATE WITH THE AIRPORT ELECTRICIAN ON A DAILY BASIS FOR AFFECTED CIRCUITS.

2. ONE WEEK PRIOR TO EXCAVATING IN ANY AREA, THE CONTRACTOR SHALL HIRE A PRIVATE UTILITY LOCATING SERVICE TO LOCATE AND MARK OUT ALL UTILITIES. THE CONTRACTOR SHALL MEET WITH AIRPORT OPERATIONS AND THE RPR TO DETERMINE TAXIWAY OR RUNWAY CLOSURE TIMES AND DURATIONS FOR THE LOCATING TASKS. CONTRACTOR SHALL PERFORM SITE INVESTIGATIONS TO VERIFY LOCATION AND DEPTH OF ALL UTILITIES AS NECESSARY. INVESTIGATION TECHNIQUES MAY INCLUDE BY RF TRACING, GROUND PENETRATING RADAR, VACUUM OR AIR PRESSURE POT-HOLING OR BY OTHER MEANS APPROVED BY THE RPR. CONTRACTOR SHALL ACCURATELY RECORD AND MARK THE LOCATION OF ALL UTILITIES. ALL MARKERS SHALL BE APPROVED BY AIRPORT OPERATIONS AND CANNOT PRESENT A HEIGHT OBSTRUCTION OR FOREIGN OBJECT DEBRIS HAZARD TO AIRCRAFT (DISLODGE DUE TO WIND). THE CONTRACTOR SHALL VERIFY THE ROUTING OF ALL EXISTING CABLES AND NOTIFY THE RPR IF DISCREPANCIES EXIST TO THE ROUTING SHOWN ON THE CONTRACT DRAWINGS. ADVANCE NOTICE WILL ALLOW THE RPR TO MODIFY THE DESIGN PRIOR TO CONSTRUCTION. THE COST AND RESPONSIBILITY OF ALL UTILITY INVESTIGATIONS SHALL BE BOURNE BY THE CONTRACTOR AND INCLUDED IN THE CONTRACT COST.

3. ALL AIRFIELD LIGHTING CIRCUITS SHALL BE MAINTAINED BY THE CONTRACTOR DURING OPERATIONAL PERIODS. ALL SIGNS AND LIGHTS SHALL BE ILLUMINATED AT THE END OF EACH WORK SHIFT. TEMPORARY ELECTRICAL JUMPERS WILL BE REQUIRED AND SHALL BE APPROVED BY THE RPR. THE CONTRACTOR SHALL FURNISH, ERECT AND MAINTAIN WHATEVER TEMPORARY CABLES MAY BE NECESSARY TO KEEP THE TAXIWAYS AND RUNWAYS IN OPERATING CONDITION WHEN OPEN FOR AIRCRAFT.

4. THE CONTRACTOR SHALL PROVIDE FINAL RED LINE AS BUILT DRAWINGS UPON COMPLETION OF THE PROJECT. RED LINE AS-BUILT DRAWINGS SHALL IDENTIFY LOCATIONS OF ALL PERMITTED IN-LINE SPLICES. IDENTIFICATION OF CABLE SPLICES AT LIGHT AND SIGN L-823 CABLE CONNECTOR KITS ARE NOT REQUIRED TO BE SHOWN.

5. THE CONTRACTOR SHALL BE AWARE THAT ABANDONED DIRECT BURIED CABLES AND LIGHT BASE FOUNDATIONS MAY BE ENCOUNTERED WHILE TRENCHING AND EXCAVATION. ALL EXCAVATED CABLES AND LIGHT BASES SHALL BE REMOVED AND DISPOSED OF OFF SITE AT THE CONTRACTOR EXPENSE. ALL VOIDS SHALL BE PROPERLY BACKFILLED WITH ON SITE SOIL.

6. THE ACTUAL LOCATION AND ELEVATION OF ALL UTILITIES SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION.

7. SELECTIVE GRADING AROUND LIGHTS AND SIGNS SHALL BE REQUIRED AS DIRECTED BY THE RPR. THE COST SHALL BE INCLUDED IN THE RESPECTIVE ELECTRICAL PAY ITEM.

8. ALL ELECTRICAL WORK SHALL CONFORM TO FEDERAL AVIATION ADMINISTRATION SPECIFICATIONS AND APPLICABLE LOCAL, STATE AND NATIONAL ELECTRICAL CODES.

9. THE ELECTRICAL CHARACTERISTICS OF PROPOSED EQUIPMENT SHALL BE VERIFIED TO BE COMPATIBLE WITH EXISTING EQUIPMENT MANUFACTURER PRIOR TO INSTALLATION.

10. ABANDONED CABLES MAY EXIST IN THE VICINITY OF THE PROPOSED WORK. IF ENCOUNTERED, CONTRACTOR SHALL VERIFY THAT THEY ARE ABANDONED PRIOR TO REMOVAL. IF THEY ARE NOT ABANDONED, CABLES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.

11. ITEMS OF SPECIFIC MANUFACTURE SHALL BE INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURER'S PRINTED INSTRUCTIONS AND OR MANUFACTURER'S REPRESENTATIVE DIRECTIONS.

12. ALL GROUND CONNECTIONS SHALL BE MADE USING EXOTHERMIC CONNECTIONS.

13. ALL CABLE CONNECTIONS SHALL BE MADE AT LIGHT UNITS, JUNCTION CANS, PULL BOXES, MANHOLES OR SIGNS UNLESS DIRECTED OTHERWISE. CABLE SPLICING ALONG THE CONDUIT RUNS OR WITHIN CONDUITS IS NOT ALLOWED. ALL CABLES SHALL BE CONTINUOUS WITHOUT SPLICES, INCLUDING HOME RUN CIRCUITS, UNLESS OTHERWISE APPROVED.

14. ALL ELECTRICAL EQUIPMENT REMOVED WHICH IS DESIRED BY THE OWNER TO BE SALVAGED SHALL BE TURNED OVER TO THE OWNER. THE EQUIPMENT SHALL BE STOCKPILED AT A LOCATION DESIGNATED BY THE OWNER IN PROPER WORKING CONDITION. ALL OTHER MATERIALS SHALL BE SPOILED OFF AIRPORT PROPERTY AT A PROPER DISPOSAL SITE AT THE CONTRACTOR'S EXPENSE.

15. PROVIDE WATERTIGHT TERMINATION AND END CAP FOR ALL BURIED CONDUIT ENDS.

16. ALL TAXIWAY EDGE LIGHTS SHALL BE LOCATED 10 FEET OFF THE DEFINED PAVEMENT EDGE UNLESS OTHERWISE NOTED OR DIRECTED. THE CONTRACTOR SHALL ALIGN ALL LIGHTS ON TANGENT SECTIONS SUCH THAT THEY FORM A STRAIGHT LINE. LIGHTS AROUND RADIUS SHALL BE EVENLY SPACED. THE CONTRACTOR SHALL NOT SOLELY RELAY ON THE CAD FILES FOR LAYOUT AND SHALL CONFIRM AND VALIDATE THE SPACING AND SETBACK REQUIREMENTS PRIOR TO FINAL INSTALLATION.

17. ALL LIGHT BASES SHALL HAVE A MINIMUM OF TWO CONDUIT STUBS SPACED 180 DEGREES APART. ANOTHER STUB AT 90 DEGREES IS REQUIRED FOR DRAIN PIPES AT THE LOCATIONS IDENTIFIED ON THE PLANS. CAP CONDUIT STUB IF IT IS NOT OCCUPIED. ADDITIONAL CONDUIT STUBS MAY BE REQUIRED, SEE PLANS FOR LOCATIONS.

18. ANY EQUIPMENT AND MATERIALS THAT ARE TEMPORARILY REMOVED, AND TO BE RE-USED, SHALL BE STORED IN A SAFE LOCATION AND PROTECTED FROM THE ENVIRONMENT. DAMAGE TO ANY STORED EQUIPMENT AND MATERIAL THAT IS SCHEDULED TO BE REINSTALLED SHALL BE REPLACED IN-KIND BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.

19. SOME EXISTING MANHOLES, JUNCTION CANS, PULL BOXES, CONDUITS AND DUCT BANKS WHERE WORK IS SCHEDULED TO OCCUR MAY CONTAIN ADDITIONAL ENERGIZED CABLES. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT MEN AND EQUIPMENT AS WELL AS TO MAINTAIN EXISTING CIRCUITS ASSOCIATED WITH ACTIVE AND OPEN PAVEMENTS.

20. THE CONTRACTOR IS ENCOURAGED TO USE PRECAST LIGHT BASES, SIGN FOUNDATIONS AND ELECTRICAL STRUCTURES WHERE POSSIBLE.

21. THE CONTRACTOR SHALL MARK OUT ALL PROPOSED PROJECT FEATURES (LIGHTS, SIGNS, SURFACE SENSORS) FOR THE RPR'S APPROVAL PRIOR TO EXCAVATION AND FOUNDATION INSTALLATION. LAYOUT SHALL BE MADE BY A LICENSED LAND SURVEYOR. OFFSET PINS MAY BE INSTALLED TO TRIANGULATE TO THE PROPOSED FEATURE AFTER EXCAVATION.

22. IN THE EVENT ANY OBSTRUCTIONS AND/OR UTILITIES NOT SHOWN ON THE PLANS ARE ENCOUNTERED DURING CONSTRUCTION, AND ARE DEEMED TO BE CONFLICTS TO THE NEW WORK, ALL WORK SHALL STOP (ON THAT ITEM) AND THE RPR NOTIFIED PRIOR TO PROCEEDING WITH WORK. WORK MAY PROCEED ON OTHER WORK TASKS TO MAINTAIN SCHEDULE.

23. ROUTING OF CONDUIT IS DIAGRAMMATIC AND CONCEPTUAL IN NATURE AND NOT INTENDED TO SHOW ALL REQUIRED OFFSETS AND DETAILS. EXACT ROUTING WILL BE DETERMINED IN THE FIELD AND MUST BE APPROVED BY THE RPR.

24. NO IN-LINE SPLICES SHALL BE PERMITTED ON AIRFIELD CABLES UNLESS COORDINATED IN ADVANCE AND APPROVED OR SHOWN ON THE PLANS. THIS INCLUDES HOMERUN CIRCUITS.

25. IN AREAS WHERE PROPOSED CONDUIT IS DESIGNED TO BE INSTALLED AT A LOCATION WHERE EXISTING CONDUIT IS TO BE ABANDONED, THE CONTRACTOR SHALL REMOVE THE EXISTING CONDUIT. CONDUIT REMOVAL SHALL BE CONSIDERED INCIDENTAL TO THE INSTALLATION OF THE PROPOSED CONDUIT.

26. THE CONTRACTOR SHALL PROVIDE A MINIMUM OF 10 FEET OF COILED CABLE SLACK IN EVERY ELECTRICAL STRUCTURE AND LIGHT BASE. THE SLACK WILL BE USED TO BRING THE TRANSFORMER AND CONNECTORS A MINIMUM OF 3 FEET ABOVE THE GROUND SURFACE FOR MAINTENANCE AND ALLOW FOR FUTURE CABLE SPLICE REPAIRS. PAYMENT WILL BE MADE UNDER ITEM L-108, LINEAR FOOT.

27. THE RETURN CABLE CONNECTED TO EVERY LIGHT TRANSFORMER SHALL BE WRAPPED IN RED TAPE AS APPROVED BY THE RPR.

28. FINE GRADING SHALL INCLUDE CREATING A SMOOTH STABLE UNIFORM SURFACE WITH TOPSOIL TO SUPPORT TURF GROWTH. ALL AREAS SHALL BE RAKED OR OTHERWISE CLEARED OF STONES AND OTHER MATERIAL LARGER THAN 1" IN ANY DIAMETER. SURFACES MUST MEET TSA/RSA STANDARDS AND SAFELY ACCOMMODATE THE AIRPORTS MOWING EQUIPMENT

29. THE LOCATION OF JUNCTION CANS AND CONDUITS MAY BE FIELD ADJUSTED TO AVOID CONFLICTS AS APPROVED BY THE RPR AND ENGINEER.

30. SEPARATE MEASUREMENT AND PAYMENT WILL BE MADE FOR CABLE REMOVAL AND PAID UNDER ITEM L-110. THE LINEAR FOOT PAYMENT ITEM IS MEASURED BY CONDUIT, REGARDLESS OF THE NUMBER OF CABLES WITHIN THE CONDUIT. CONDUITS MAY BE INDIVIDUAL OR MULTIPLE CONSTRAINED WITHIN A DUCT BANK.

31. THE FINAL GRADE SHALL BE SMOOTH, FREE OF RUTS, DEPRESSIONS OR DROP OFFS. THE TOPSOIL SHALL MEET THE FINISHED GRADE OF ALL LIGHTS, SIGNS AND OTHER FEATURES AND BE PLACED WITH NO VERTICAL DROPS ALLOWED. TOPSOIL SHALL BE GRADED SLIGHTLY AWAY FROM ELECTRICAL FEATURES INCLUDING LIGHTS AND SIGNS WITH A MAXIMUM ALLOWABLE SLOPE OF 3.0 PERCENT, IN COMPLIANCE WITH RUNWAY AND TAXIWAY SAFETY AREA GRADING REQUIREMENTS. THE FINISH SURFACE SHALL BE LEFT IN A MANNER TO SAFELY ACCOMMODATE THE OWNERS FINISH MOWING EQUIPMENT AS APPROVED BY THE OWNER. AREAS THAT SETTLE OUT FROM TRENCH SETTLEMENT OVER THE ONE-YEAR WARRANTY PERIOD SHALL BE RE-TOPSOILED, SEEDED AND MULCHED TO RESTORE THE INTENDED GRADE.

32. ALL CONDUIT CONNECTIONS TO EXISTING LIGHT UNITS, DUCT BANKS OR SIGNS SHALL BE MADE WITH INDUSTRY STANDARD UL LISTED WATERTIGHT CONNECTORS. ALL NECESSARY SWEEPS SHALL BE MADE WITH PRE-FORMED SWEEPS OR CONDUIT BENT ON-SITE USING APPROVED CONDUIT HEATING EQUIPMENT (HOT BOX). ALL CONNECTIONS SHALL BE INCIDENTAL TO ITEM L-110 PAYMENT ITEMS.

33. THE CONTRACTOR SHALL VERIFY ALL INPUT VOLTAGES, AMPERAGE AND OTHER ELECTRICAL CHARACTERISTICS FOR REPLACEMENT TRANSFORMERS, REGULATORS, ETC. PRIOR TO ORDERING THE EQUIPMENT.

34. IT IS THE INTENT OF THIS CONTRACT TO HAVE A WELL DRAINED, WATER FREE UNDERGROUND ELECTRICAL SYSTEM INCLUDING ALL ELECTRICAL STRUCTURES. ALTHOUGH WATERTIGHT CONNECTORS ARE SPECIFIED, THE JOINTS AND COUPLINGS WILL LEAK IN WATER AND THEREFORE IS CLASSIFIED AS A "WET SYSTEM". ELECTRICAL DRAINS HAVE BEEN DESIGNED INTO THE PROJECT TO DRAIN INCOMING WATER. ADDITIONAL DRAINS, ABOVE AND BEYOND THOSE SHOWN ON THE PLANS, MAY BE REQUIRED TO MEET THIS REQUIREMENT AS RECOMMENDED BY THE CONTRACTOR AND APPROVED BY THE RPR. PAYMENT FOR ELECTRICAL DRAINS SHALL BE MADE UNDER ITEM L-110.

35. AIRFIELD GUIDANCE SIGNS ASSOCIATED WITH PAVEMENTS TO BE TEMPORARILY CLOSED, AS SHOWN ON THE CONSTRUCTION SAFETY AND PHASING DRAWINGS SHALL EITHER BE ENTIRELY REMOVED OR COVERED. COVERS SHALL BE SECURELY FASTENED TO THE SIGNS TO WITHSTAND JET BLAST AND WIND AS APPROVED BY THE ENGINEER. COVERS SHALL BE OF SUFFICIENT THICKNESS AND WEIGHT TO COMPLETELY BLOCK THE SIGN VISIBILITY. COVERS SHALL BE HEAVY WEIGHT PLASTIC OR A BLACK GEOTEXTILE FABRIC. IN ADDITION, THE SIGNS SHALL BE SWITCHED OFF (IF A SWITCH IS PRESENT) OR DISCONNECTED FROM THE CIRCUIT AT THE ISOLATION TRANSFORMER. METHOD OF SECUREMENT SHALL NOT DAMAGE THE SIGN OR LEAVE ANY TAPE/ ADHESIVE RESIDUE.

36. SRAA AIRPORT OPERATIONS RESERVES THE RIGHT TO SALVAGE ANY PORTION OF THE EXISTING LIGHTING SYSTEM COMPONENTS SCHEDULED FOR DEMOLITION. SRAA WILL MARK AND INFORM THE CONTRACTOR OF WHAT EQUIPMENT THEY WISH TO SALVAGE PRIOR TO CONSTRUCTION, WITH A PREFERENCE ON THAT IN BEST OPERATING CONDITION. THERE IS NO GUARANTEE ON THE QUANTITY OF EQUIPMENT OR MATERIAL REQUESTED FOR SALVAGE. THE CONTRACTORS DEMOLITION PRICING SHALL INCLUDE COST PROVISIONS TO COVER SPOILING EVERYTHING OFF SITE, CAREFULLY REMOVING AND STOCKPILING EVERYTHING FOR SALVAGE, OR A COMPOSITE BLEND OF THE TWO CIRCUMSTANCES. SRAA MAY ELECT TO SALVAGE THE FOLLOWING EQUIPMENT: CONSTANT CURRENT REGULATORS, EDGE LIGHT ASSEMBLIES (LIGHT UNIT, LIGHT POST, TRANSFORMER, LIGHT BASE COVER), GUIDANCE SIGN ASSEMBLIES (SIGN HOUSING, PANELS, LEGS, FLOOR FLANGES), CABLE, ELECTRICAL POWER AND CONTROL EQUIPMENT. THE CONTRACTOR SHALL SEPARATE USEABLE EQUIPMENT FROM UNUSABLE EQUIPMENT. THE EQUIPMENT TO BE SALVAGED SHALL BE CAREFULLY REMOVED BY THE CONTRACTOR, TRANSPORTED AND STOCKPILED AT A LOCATION DESIGNATED BY SRAA IN PROPER WORKING CONDITION. ALL OTHER MATERIALS SHALL BE SPOILED OFF AIRPORT PROPERTY AT A PROPER DISPOSAL SITE AT THE CONTRACTOR EXPENSE.

37. A NOMINAL QUANTITY OF SPARE LIGHTING AND SIGNAGE PARTS SHALL BE TURNED OVER TO SRAA AT THE COMPLETION OF THE PROJECT, NEW AND UNPACKAGED. THE LIST OF REQUESTED SPARE PARTS IS SHOWN ON THE ELECTRICAL DETAILS.

38. ALL TAXIWAY GUIDANCE SIGNS SHALL BE LOCATED 50' OFF THE DEFINED EDGE OF PAVEMENT UNLESS OTHERWISE NOTED.

39. ALL CONDUIT AND WIRING SCHEDULES SHALL BE VERIFIED BEFORE INSTALLATION.

40. THE ELECTRICAL CONTRACTOR SHALL COORDINATE WITH OTHER CONTRACTORS,THE INSTALLATION OF ALL EQUIPMENT.

41. THE CONTRACTOR SHALL PROVIDE RACEWAYS, WIRING, AND CONNECTIONS FOR ALL CONTROL CIRCUITS AND INTERLOCK.

42. ALL TAPS SHALL BE PROVIDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE.

43. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS BEFORE STARTING WORK. IF ONLY A PORTION OF AN EXISTING CIRCUIT IS BEING REMOVED FOR DEMOLITION, CONTINUITY SHALL BE MAINTAINED TO THE REST OF THE REMAINING CIRCUIT.

44. THE CONTRACTOR SHALL COORDINATE ALL WORK WITH OWNER AND ENGINEER AND GIVE 72 HOUR NOTICE PRIOR TO SHUTDOWNS.

A1 GENERAL ELECTRICAL NOTES - AIRFIELD LIGHTING
SCALE: NOT TO SCALE

C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

FRANCESCA K. NEILEY — 090684 — PROFESSIONAL ENGINEER — STATE OF NEW YORK — 04/29/2026

SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	068.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	F. NEILEY/ C. BRUBACH
CHECKED BY:	S. SHOVA

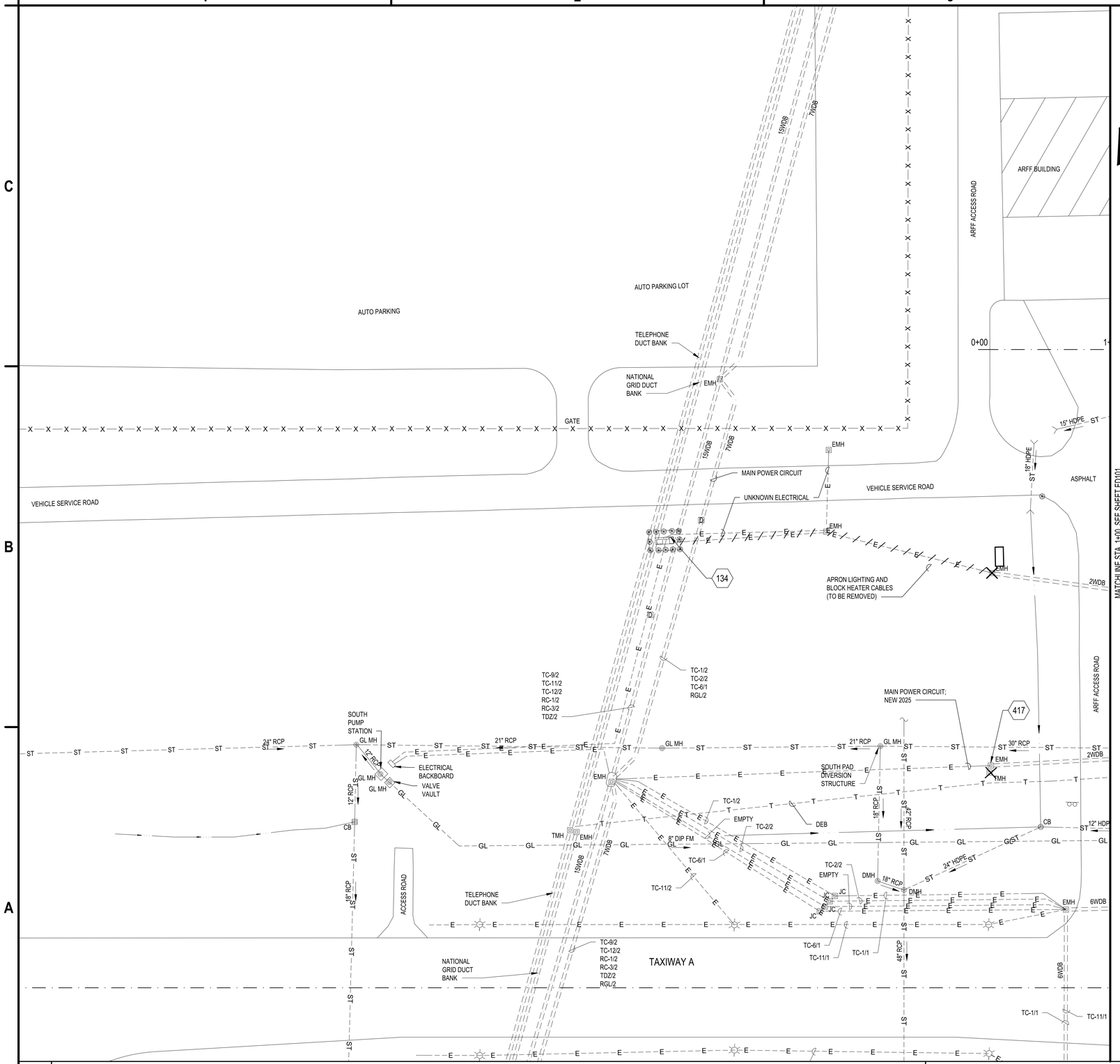
NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

GENERAL ELECTRICAL NOTES

EI001

SHEET NO. 85 OF 113

Apr 29, 2026 - 3:39pm
F:\Projects\C068 - Syracuse Regional Airport Authority\C068069001 - Comp Deicing Pad\Design\CADD\Sheet Files\C068069001_EI Series.dwg



A1 ELECTRICAL DEMOLITION PLAN
SCALE: 1" = 40'

134. LIMIT OF CONDUIT/CABLE REMOVAL/ABANDONMENT.

417. PULL BACK EXISTING MAIN POWER CIRCUIT CABLES TO THIS POINT AND REDIRECT CABLES TO NEW SWITCHGEAR WITHOUT ADDING ADDITIONAL SPLICES.

B4 KEYED NOTES
SCALE: NOT TO SCALE

- EXISTING EDGE LIGHT TO BE REMOVED, ITEM L-125
- EXISTING SIGN TO BE REMOVED, ITEM L-125
- EMH — EXISTING ELECTRICAL MANHOLE TO BE REMOVED, ITEM L-115
- TMH — EXISTING TELEPHONE MANHOLE TO BE REMOVED, ITEM L-115
- JC — EXISTING JUNCTION CAN TO BE REMOVED, ITEM L-115
- DB / E / T — CONCRETE ENCASED ELECTRICAL DUCT BANK(S) AND/OR CONDUIT(S) TO REMAIN AND ABANDONED IN PLACE. REMOVE CONDUIT(S) IF ENCOUNTERED BY INCIDENTAL PROJECT EXCAVATION, INCIDENTAL TO UNCLASSIFIED AND/OR PAVEMENT EXCAVATION (TYP.). REMOVE AND DISCARD ALL CABLES ASSOCIATED WITH CIRCUITS TO BE REMOVED. CONFIRM AND REMOVE ALL PREVIOUSLY ABANDONED CABLES. LINEAR FOOT PAYMENT SHALL BE MADE PER CONDUIT (NOT BY CABLE), REGARDLESS OF THE NUMBER OF CABLES CONTAINED WITHIN THE CONDUIT, ITEM L-110.

A4 KEYED LEGEND
SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · FRANCESCA K. NEILEY · 099684 · PROFESSIONAL ENGINEER
04/29/2026

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
REVISIONS		

PROJECT NO:	068.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	F. NEILEY/ C. BRUBACH
CHECKED BY:	S. SHOVA

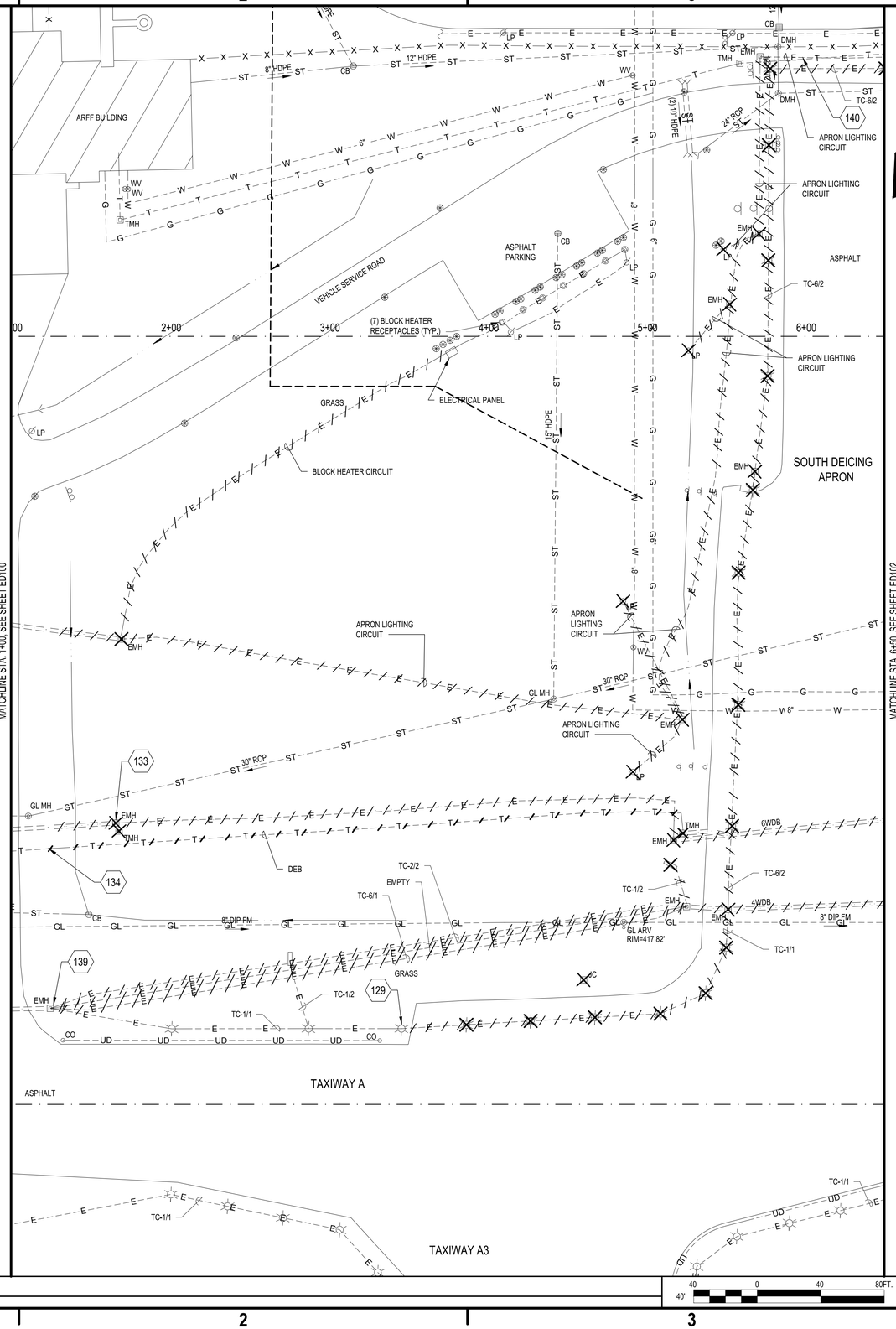
NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

ELECTRICAL DEMOLITION PLAN

ED100

SHEET NO. 86 OF 113

Apr 29, 2026 - 3:39pm
F:\Project\C068 - Syracuse Regional Airport Authority\C068069001 - Comp Deicing Pad\Design\CADD\Sheet Files\C068069001_ED Series.dwg



129. LIMIT OF CABLE REMOVAL AT EXISTING LIGHT UNIT, GUIDANCE SIGN, JUNCTION CAN OR ABANDONED SIGN BASE. DISCONNECT PRIMARY CABLE FROM ISOLATION TRANSFORMER L-823 CONNECTOR.
133. CUT BACK EXISTING CONDUIT/DUCT BANK AND PULL BACK EXISTING CABLE AS NECESSARY TO INSTALL PROPOSED ELECTRICAL PULLBOX. PULL BACK SUFFICIENT CABLES SO THAT EXISTING CABLES CAN BE REDIRECTED TO THE NEW SWITCHGEAR WITHOUT INTRODUCING ANY NEW SPLICES. INCIDENTAL TO ITEMS L-108 AND L-110.
134. LIMIT OF CONDUIT/CABLE REMOVAL/ABANDONMENT.
139. LIMIT OF CABLE REMOVAL IN EXISTING ELECTRICAL MANHOLE.
140. REMOVE CABLE FROM EXISTING CONDUIT/DUCT BANK SCHEDULED FOR RE-USE, INCIDENTAL TO ITEM L-108 (TYP.)

B4 KEYED NOTES

SCALE: NOT TO SCALE

EXISTING EDGE LIGHT TO BE REMOVED, ITEM L-125

EXISTING SIGN TO BE REMOVED, ITEM L-125

EMH — EXISTING ELECTRICAL MANHOLE TO BE REMOVED, ITEM L-115

TMH — EXISTING TELEPHONE MANHOLE TO BE REMOVED, ITEM L-115

JC — EXISTING JUNCTION CAN TO BE REMOVED, ITEM L-115

DB / E / T — CONCRETE ENCASED ELECTRICAL DUCT BANK(S) AND/OR CONDUIT(S) TO REMAIN AND ABANDONED IN PLACE. REMOVE CONDUIT(S) IF ENCOUNTERED BY INCIDENTAL PROJECT EXCAVATION, INCIDENTAL TO UNCLASSIFIED AND/OR PAVEMENT EXCAVATION (TYP.). REMOVE AND DISCARD ALL CABLES ASSOCIATED WITH CIRCUITS TO BE REMOVED. CONFIRM AND REMOVE ALL PREVIOUSLY ABANDONED CABLES. LINEAR FOOT PAYMENT SHALL BE MADE PER CONDUIT (NOT BY CABLE), REGARDLESS OF THE NUMBER OF CABLES CONTAINED WITHIN THE CONDUIT, ITEM L-110.

A4 KEYED LEGEND

SCALE: NOT TO SCALE

A1 ELECTRICAL DEMOLITION PLAN

SCALE: 1" = 40'

40 0 40 80FT.
40'

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · FRANCESCA K. NEILEY · 090684 · PROFESSIONAL ENGINEER · 04/29/2026

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	F. NEILEY/ C. BRUBACH
CHECKED BY:	S. SHOVA

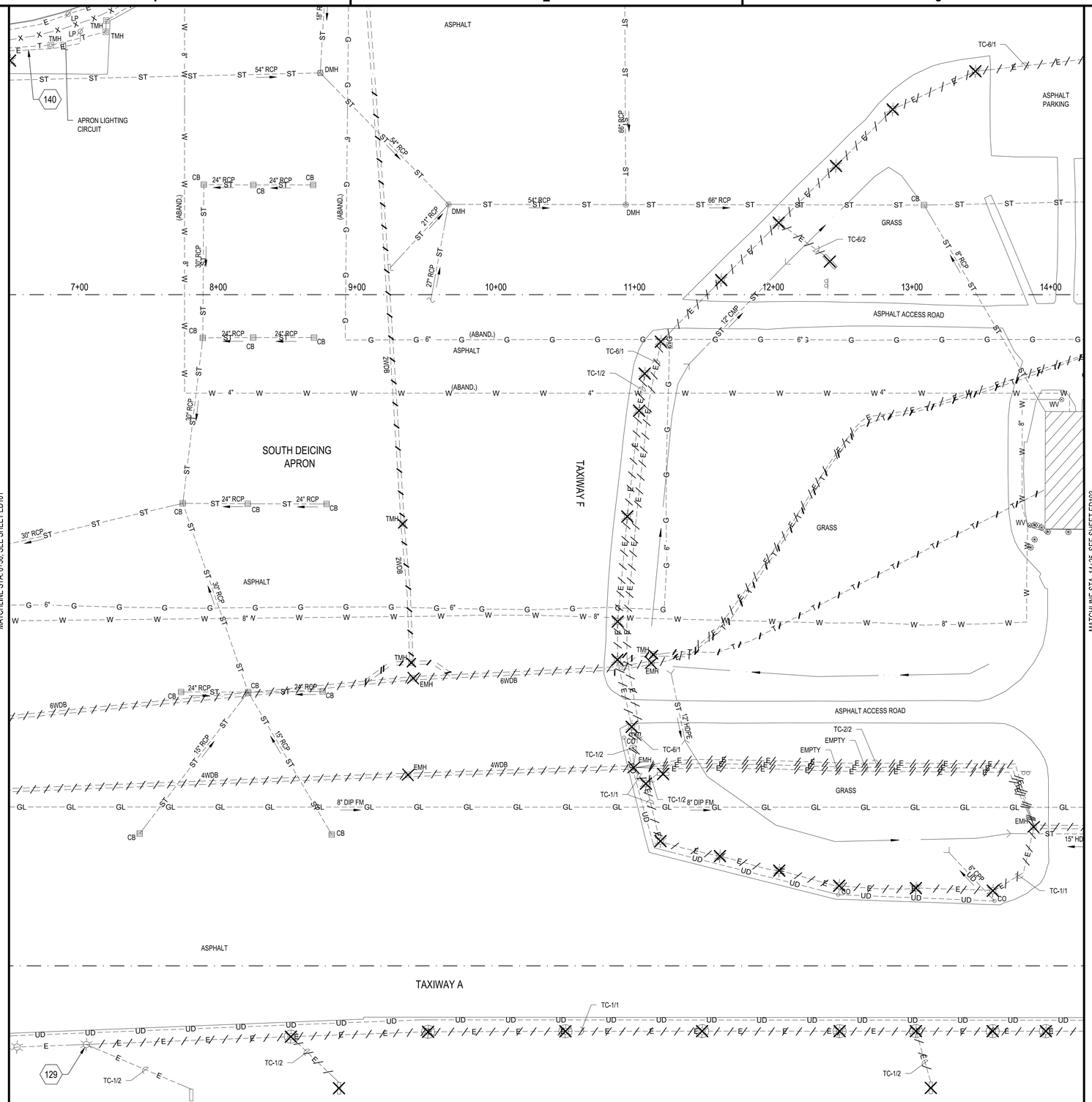
NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

ELECTRICAL DEMOLITION PLAN

ED101

SHEET NO. 87 OF 113

Apr 29, 2026 - 9:38am
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_ED Series.dwg



A1 ELECTRICAL DEMOLITION PLAN
SCALE: 1" = 40'

40' 40 0 40 80FT.

129. LIMIT OF CABLE REMOVAL AT EXISTING LIGHT UNIT, GUIDANCE SIGN, JUNCTION CAN OR ABANDONED SIGN BASE. DISCONNECT PRIMARY CABLE FROM ISOLATION TRANSFORMER L-823 CONNECTOR.

140. REMOVE CABLE FROM EXISTING CONDUIT/DUCT BANK SCHEDULED FOR RE-USE, INCIDENTAL TO ITEM L-108 (TYP.)

B4 KEYED NOTES
SCALE: NOT TO SCALE

- EXISTING EDGE LIGHT TO BE REMOVED, ITEM L-125
- EXISTING SIGN TO BE REMOVED, ITEM L-125
- EMH — EXISTING ELECTRICAL MANHOLE TO BE REMOVED, ITEM L-115
- JC — EXISTING JUNCTION CAN TO BE REMOVED, ITEM L-115
- DB / E / V — CONCRETE ENCASED ELECTRICAL DUCT BANK(S) AND/OR CONDUIT(S) TO REMAIN AND ABANDONED IN PLACE. REMOVE CONDUIT(S) IF ENCOUNTERED BY INCIDENTAL PROJECT EXCAVATION, INCIDENTAL TO UNCLASSIFIED AND/OR PAVEMENT EXCAVATION (TYP.). REMOVE AND DISCARD ALL CABLES ASSOCIATED WITH CIRCUITS TO BE REMOVED. CONFIRM AND REMOVE ALL PREVIOUSLY ABANDONED CABLES. LINEAR FOOT PAYMENT SHALL BE MADE PER CONDUIT (NOT BY CABLE), REGARDLESS OF THE NUMBER OF CABLES CONTAINED WITHIN THE CONDUIT, ITEM L-110.
- REMOVE ELEVATED LIGHT AND BASE, SALVAGE LIGHT AND ALL OTHER ITEMS ASSOCIATED WITH THE EDGE LIGHTS FOR REINSTALLATION ON NEW LIGHT BASE (TYP.), ITEM L-125. TURN OVER EXCESS SALVAGED LIGHTS TO OWNER.

A4 KEYED LEGEND
SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · FRANCESCA K. NEILEY · 099684 · PROFESSIONAL ENGINEER
04/29/2026

SYR. SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
REVISIONS		

PROJECT NO:	068.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	F. NEILEY/ C. BRUBACH
CHECKED BY:	S. SHOVA

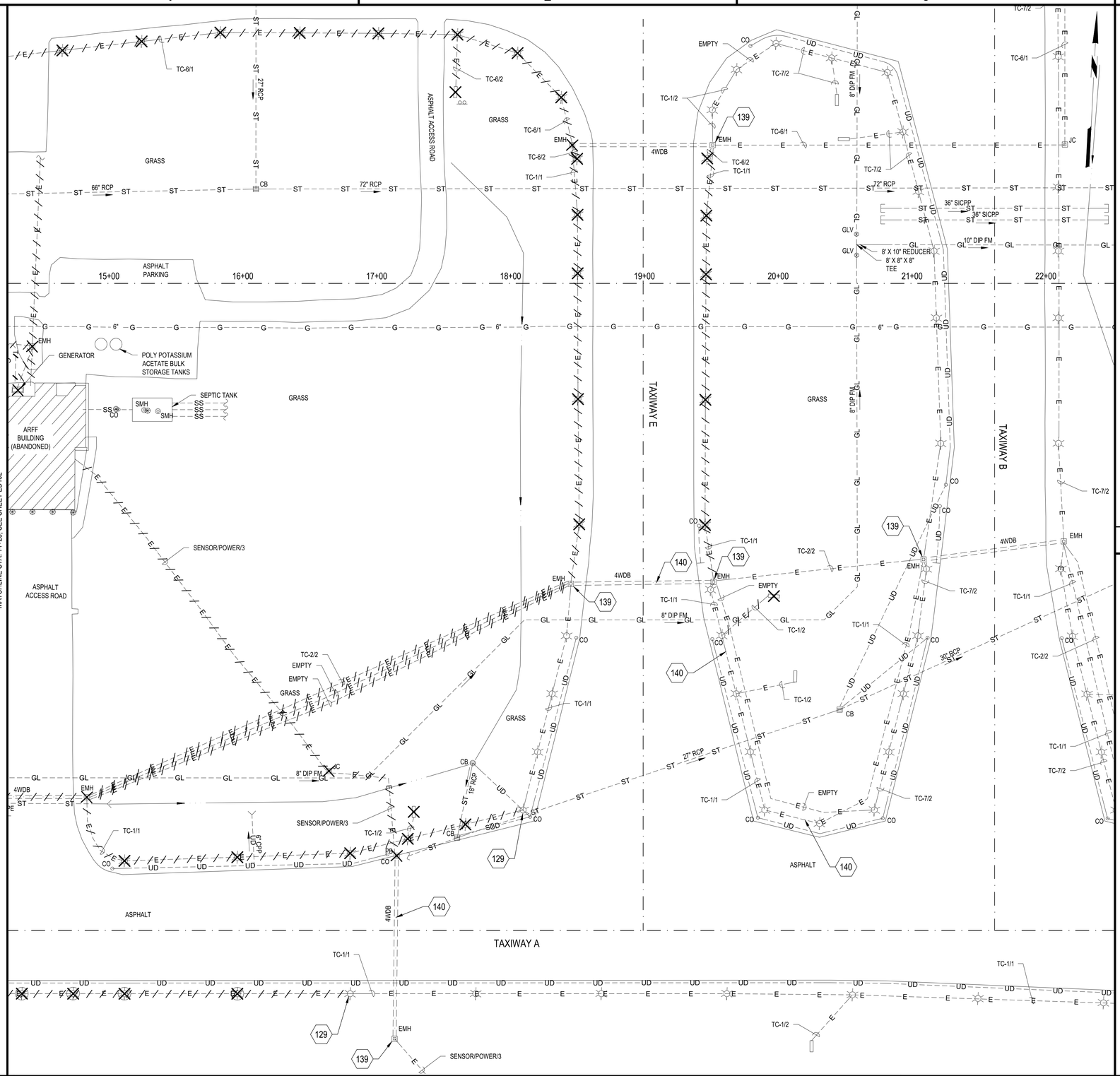
NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

ELECTRICAL DEMOLITION PLAN

ED102

SHEET NO. 88 OF 113

Apr 29, 2026 - 3:39pm
F:\Project\C068 - Syracuse Regional Airport Authority\C068069001 - Comp Deicing Pad\Design\CADD\Sheet Files\C068069001_ED Series.dwg



129. LIMIT OF CABLE REMOVAL AT EXISTING LIGHT UNIT, GUIDANCE SIGN, JUNCTION CAN OR ABANDONED SIGN BASE. DISCONNECT PRIMARY CABLE FROM ISOLATION TRANSFORMER L-823 CONNECTOR.
139. LIMIT OF CABLE REMOVAL IN EXISTING ELECTRICAL MANHOLE.
140. REMOVE CABLE FROM EXISTING CONDUIT/DUCT BANK SCHEDULED FOR RE-USE, INCIDENTAL TO ITEM L-108 (TYP.)

B4 KEYED NOTES

SCALE: NOT TO SCALE

A4 KEYED LEGEND

SCALE: NOT TO SCALE

- EXISTING EDGE LIGHT TO BE REMOVED, ITEM L-125
- EXISTING SIGN TO BE REMOVED, ITEM L-125
- EMH — EXISTING ELECTRICAL MANHOLE TO BE REMOVED, ITEM L-115
- JC — EXISTING JUNCTION CAN TO BE REMOVED, ITEM L-115
- DB — CONCRETE ENCASED ELECTRICAL DUCT BANK(S) AND/OR CONDUIT(S) TO REMAIN AND ABANDONED IN PLACE. REMOVE CONDUIT(S) IF ENCOUNTERED BY INCIDENTAL PROJECT EXCAVATION, INCIDENTAL TO UNCLASSIFIED AND/OR PAVEMENT EXCAVATION (TYP.). REMOVE AND DISCARD ALL CABLES ASSOCIATED WITH CIRCUITS TO BE REMOVED. CONFIRM AND REMOVE ALL PREVIOUSLY ABANDONED CABLES. LINEAR FOOT PAYMENT SHALL BE MADE PER CONDUIT (NOT BY CABLE), REGARDLESS OF THE NUMBER OF CABLES CONTAINED WITHIN THE CONDUIT, ITEM L-110.
- REMOVE ELEVATED LIGHT AND BASE, SALVAGE LIGHT AND ALL OTHER ITEMS ASSOCIATED WITH THE EDGE LIGHTS FOR REINSTALLATION ON NEW LIGHT BASE (TYP.), ITEM L-125. TURN OVER EXCESS SALVAGED LIGHTS TO OWNER.

A1 ELECTRICAL DEMOLITION PLAN

SCALE: 1" = 40'

40 0 40 80FT.
40'

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

FRANCESCA K. NEILEY — STATE OF NEW YORK — 099084 — PROFESSIONAL ENGINEER — 04/29/2026

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	068.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	F. NEILEY/ C. BRUBACH
CHECKED BY:	S. SHOVA

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

ELECTRICAL DEMOLITION PLAN

ED103

SHEET NO. 89 OF 113

Apr 29, 2026 - 3:39pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Como Deicing Part\Design\CADD\Sheet Files\O68069001_ED Series.dwg



A1 ELECTRICAL SITE PLAN

SCALE: 1" = 40'

40 0 40 80FT.
40'

216. HEATED ENCLOSURE FOR RPZ AND WATER METER, ITEM D-707, SEE DETAIL A1/CU512.

401. CONNECT PROPOSED CONDUIT TO EXISTING CONDUIT OR LIGHT BASE USING NEC APPROVED CONNECTORS, INCIDENTAL TO ITEM L-110. (TYP.)

403. NEW MAIN POWER FEED INSTALLED BY SRAA IN 2025. (4) 4/0/AWG OKONITE OKOGUARD URO-J, 1/C 15 KV COPPER CABLES WITH 100% INSULATION LEVEL AND 1/3 NEUTRAL, 400 AMP MAIN BREAKER AT 4,160V.

406. PROPOSED CONDUIT SHALL BE CONNECTED TO EXISTING ELECTRICAL STRUCTURE, CORE DRILL AND EPOXY GROUT CONDUIT IN PLACE, INCIDENTAL TO ITEM L-110 (TYP.)

411. CONNECT CABLES TO EXISTING SERVICE DISCONNECT, RACK MOUNTED, AT EXISTING RWIS RPU SYSTEM.

414. INSTALL NEW CABLES, IN EXISTING DUCT BANK OR CONDUIT.

C4 KEYED NOTES

SCALE: NOT TO SCALE

PS1 — E — ELECTRICAL CABLE(S), WITH CIRCUIT NUMBER AND NUMBER OF CABLES, ITEM L-108. INSTALLED IN PVC CONDUIT IN TURF OR PAVEMENT, ITEM L-110. SEE CONDUIT TRENCHING DETAILS SHEET EL502. SEE ES601 FOR CABLE AND CONDUIT TYPE, QUANTITY AND SIZE.

FO — 2-INCH DIA. COMMUNICATION CONDUIT WITH 12-STRAND SINGLE MODE, ARMORED FIBER OPTIC CABLE(S) AND 3-CELL MAXCELL INNERDUCT.

C — 1-INCH DIA. COMMUNICATIONS CONDUIT WITH COMMUNICATIONS CABLE. REFER TO ES507 FOR CONDUIT AND CABLE DETAILS

LP-A — AREA FLOOD LIGHT, POLE AND FOUNDATION (22' HEIGHT). PROVIDE NLS #NV-2-T4-96L-1-40K-UNV OR APPROVED EQUAL. PROVIDE NLS LIGHTING #RSAP-22-4-120-9BC-SGL-BRZ-3430-BAA OR APPROVED EQUAL.

SHEET NOTES:

A. SEPARATE LINEAR FOOT PAYMENT SHALL BE MADE FOR THE FOLLOWING CIRCUITS:
- H BOX (HOT BOX HEATER)
- FIBER
- DFTS FEEDER

B. ALL OTHER CIRCUITS SHOWN ON THIS SHEET SHALL BE INCLUDED IN THE APPLICABLE LUMP SUM ITEM.

CIRCUIT KEY:

MAIN POWER CKT = MAIN POWER FROM ELECTRICAL VAULT TO THE DEICING FACILITY EQUIPMENT SHELTER
SHELTER MDP = 10' X 16' EQUIPMENT SHELTER POWER PANEL "MDP"
PS1 = PUMP STATION #1 POWER PANEL
PS2 = PUMP STATION #2 POWER PANEL
PAD LP (EX) = EXISTING DEICING PAD OVERHEAD LIGHTING
OBS = OVERHEAD LIGHTING OBSTRUCTION LIGHTS
RPU2 = RWIS SURFACE SENSOR REMOTE PROCESSING UNIT #2 POWER
RPU3 = RWIS SURFACE SENSOR REMOTE PROCESSING UNIT #3 POWER
BHR = VEHICLE BLOCK HEATER PANEL RECEPTACLES POWER
DFTS = DEICING FACILITY TANK STORAGE POWER PANEL
DFTS PUMPS LP = DEICING FACILITY TANK STORAGE OVERHEAD LIGHTING POWER
DFTS PUMPS = DEICING FACILITY TANK STORAGE PUMPS POWER
HBOX = WATER VALVE HOT BOX POWER

DB CL = AIRCRAFT DEICING BAY SEMI-FLUSH IN-PAVEMENT LIGHT POWER
TC-1 = TAXIWAY "A" MIDFIELD AIRFIELD EDGE LIGHT CIRCUIT
TC-2 = TAXIWAY "A" EAST AIRFIELD EDGE LIGHT CIRCUIT
TC-6 = APRON AIRFIELD EDGE LIGHT CIRCUIT
TC-7 = TAXIWAY "M" AIRFIELD EDGE LIGHT CIRCUIT
TC-11 = TAXIWAY "A" WEST AIRFIELD EDGE LIGHT CIRCUIT
- ALL TC & DB CIRCUIT CABLES: NO. 8 AWG, 5KV, 1/C AIRFIELD LIGHTING CABLE(S)ITEM L-108, INSTALLED IN 2-INCH DIA. CONDUIT, ITEM L-110

"/#" INDICATES THE NUMBER OF CABLES ASSOCIATED WITH THE IDENTIFIED CIRCUIT

A4 KEYED LEGEND / SHEET NOTES

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · FRANCESCA K. NEILEY · 099684 · PROFESSIONAL ENGINEER · 04/29/2026

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	F. NEILEY/ C. BRUBACH
CHECKED BY:	S. SHOVA

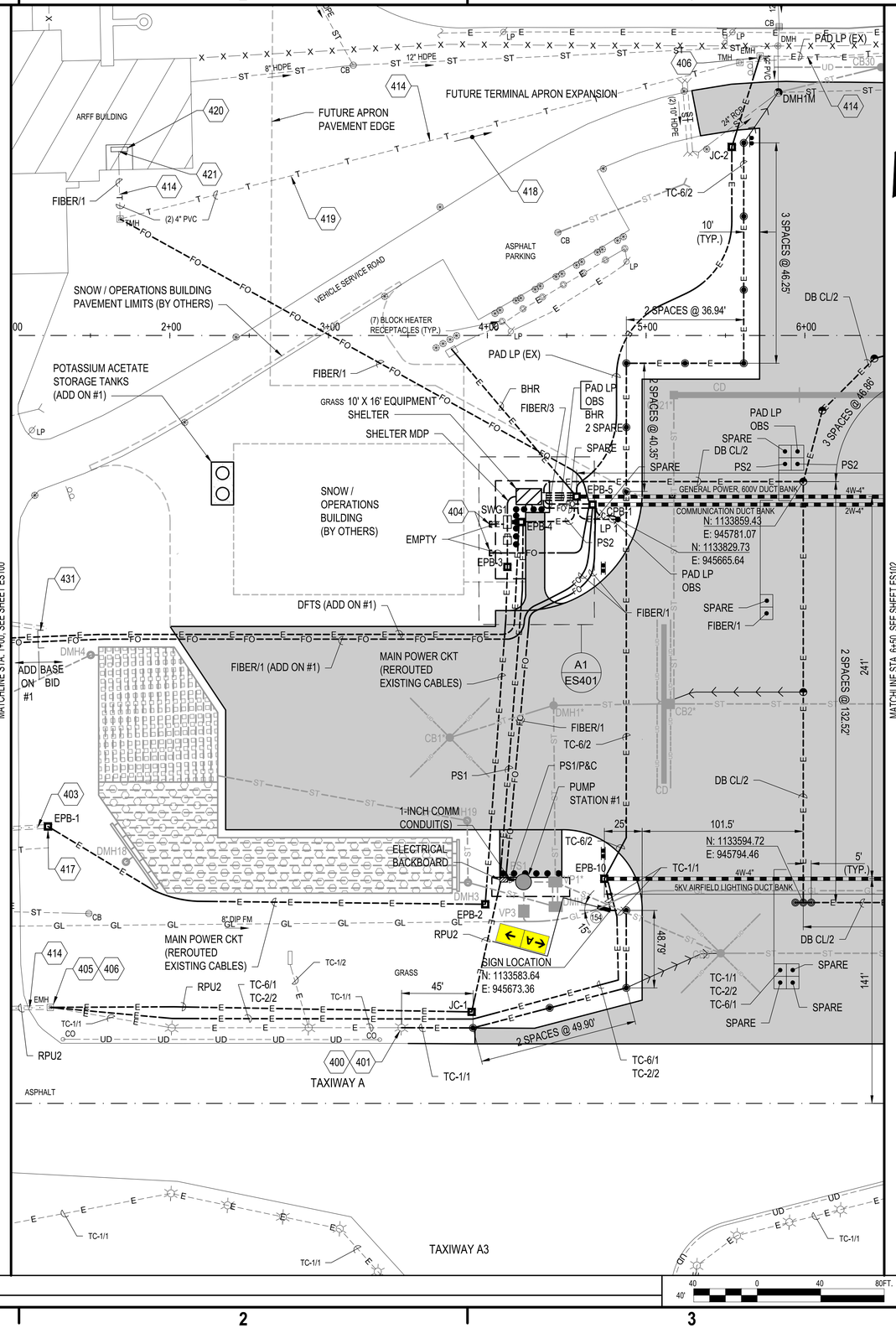
NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

ELECTRICAL SITE PLAN (ADD ON #1)

ES100

SHEET NO. 90 OF 113

Apr 29, 2026 - 9:38pm
P:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CAD\Sheet Files\O68069001_ES Series.dwg



A1 ELECTRICAL SITE PLAN
SCALE: 1" = 40'

400. CONNECT PRIMARY CABLE TO TRANSFORMER AT LIGHT UNIT, JUNCTION CAN OR GUIDANCE SIGN (TYP.).
401. CONNECT PROPOSED CONDUIT TO EXISTING CONDUIT OR LIGHT BASE USING NEC APPROVED CONNECTORS, INCIDENTAL TO ITEM L-110. (TYP.)
403. NEW MAIN POWER FEED INSTALLED BY SRAA IN 2025. (4) 4/0/AWG OKONITE OKOGUARD URO-J, 1/C 15 KV COPPER CABLES WITH 100% INSULATION LEVEL AND 1/3 NEUTRAL, 400 AMP MAIN BREAKER AT 4,160V.
404. CONDUIT CAPPED FOR FUTURE CONNECTION.
405. SPLICE PROPOSED CABLE(S) TO EXISTING CABLE(S) IN ELECTRICAL MANHOLE.
406. PROPOSED CONDUIT SHALL BE CONNECTED TO EXISTING ELECTRICAL STRUCTURE, CORE DRILL AND EPOXY GROUT CONDUIT IN PLACE, INCIDENTAL TO ITEM L-110 (TYP.)
414. INSTALL NEW CABLES, IN EXISTING DUCT BANK OR CONDUIT.
417. PULL BACK EXISTING MAIN POWER CIRCUIT CABLES TO THIS POINT AND REDIRECT CABLES TO NEW SWITCHGEAR WITHOUT ADDING ADDITIONAL SPLICES.
418. TO DATA RACK IN TERMINAL BUILDING, 24 PORT ST CONNECTORS.
419. 12 STRAND SM & 12 STRAND MM FIBER OPTIC CABLES; 200 PAIR CAT 3.
420. COMMUNICATION RACKS WITH 24 PORT FIBER PATCH PANEL ST CONNECTORS.
421. TERMINATE CABLE AT EXISTING PATCH PANEL.
431. CAP AND MARK CONDUIT ENDS AT THIS LOCATION IF ADD ON #1 IS NOT AWARDED.

C4 KEYED NOTES
SCALE: NOT TO SCALE

- AIRFIELD GUIDANCE SIGN AND FOUNDATION (DESIGNATED WITH AIRPORT SIGN NUMBER) (TYP.), ITEM L-125. SEE DETAILS AND SIGN SCHEDULE ON SHEET EL504.
- ELEVATED BASE MOUNTED MEDIUM INTENSITY TAXIWAY EDGE LIGHT (LED) IN TURF (TYP.), ITEM L-125, AND L-867B NON-LOAD BEARING LIGHT BASE, ITEM L-125. SEE DETAIL A1/EL501.
- SEMI FLUSH STOP LIGHT (LED) IN PAVEMENT (TYP.), ITEM L-125, AND L-868B LOAD BEARING LIGHT BASE, ITEM L-125. SEE DETAILS ON SHEET EL503.
- EPB — ELECTRICAL PULLBOX (TYP.), ITEM L-115, SEE DETAIL A1/EL505.
- CPB — COMMUNICATION PULLBOX (TYP.), ITEM L-115, SEE DETAIL A1/EL505.
- JC — JUNCTION CAN (TYP.), ITEM L-115, SEE DETAIL C1/EL502.
- 4W-4" — CONCRETE DUCT BANK WITH CIRCUIT DUCT ROUTING, ITEM L-110. SEE DETAIL A4/EL502. NUMBER AND SIZE OF CONDUITS SHOWN ON PLANS.
- PS1/3 — ELECTRICAL CABLE(S), WITH CIRCUIT NUMBER AND NUMBER OF CABLES, ITEM L-108. INSTALLED IN PVC CONDUIT IN TURF OR PAVEMENT, ITEM L-110. SEE CONDUIT TRENCHING DETAILS SHEET EL502. SEE ES601 THROUGH ES603 FOR CABLE AND CONDUIT TYPE, QUANTITY AND SIZE.
- FO — 2-INCH DIA. PVC COMMUNICATION CONDUIT ITEM L-110 INSTALLED IN TURF OR PAVEMENT WITH 12-STRAND SINGLE MODE, ARMORED FIBER OPTIC CABLE(S) AND 3-CELL MAXCELL INNERDUCT, ITEM L-108.
- C — 2-INCH DIA PVC COMMUNICATION CONDUIT.
- 2-INCH DIA. CONDUIT FOR DRAINAGE, ITEM L-110. DRAIN TO STORMWATER SYSTEM. EXACT LOCATIONS TO BE DETERMINED IN THE FIELD. SEE DETAIL A3/EL501.
- LP1 — APRON AREA FLOOD LIGHT, POLE AND FOUNDATION (35' OVERALL HEIGHT), ITEM L-100. SEE DETAILS ON ES504
- SEMI FLUSH TAXIWAY CENTERLINE LIGHT (LED) IN PAVEMENT (TYP.), ITEM L-125, AND L-868B LOAD BEARING LIGHT BASE, ITEM L-125. SEE DETAILS ON SHEET EL503.
- PROTECTIVE BOLLARD, ITEM F-170 (TYP.).

CIRCUIT KEY:
MAIN POWER CKT = MAIN POWER FROM ELECTRICAL VAULT TO THE DEICING FACILITY EQUIPMENT SHELTER
SHELTER MDP = 10' X 16' EQUIPMENT SHELTER POWER PANEL "MDP"
PS1 = PUMP STATION #1 POWER PANEL
PS2 = PUMP STATION #2 POWER PANEL
PAD LP (EX) = EXISTING DEICING PAD OVERHEAD LIGHTING
OBS = OVERHEAD LIGHTING OBSTRUCTION LIGHTS
RPU2 = RWIS SURFACE SENSOR REMOTE PROCESSING UNIT #2 POWER
RPU3 = RWIS SURFACE SENSOR REMOTE PROCESSING UNIT #3 POWER
BHR = VEHICLE BLOCK HEATER PANEL RECEPTACLES POWER
DFTS = DEICING FACILITY TANK STORAGE POWER PANEL
DFTS PUMPS LP = DEICING FACILITY TANK STORAGE OVERHEAD LIGHTING POWER
DFTS PUMPS = DEICING FACILITY TANK STORAGE PUMPS POWER
HBOX = WATER VALVE HOT BOX POWER

DB CL = AIRCRAFT DEICING BAY SEMI-FLUSH IN-PAVEMENT LIGHT POWER
TC-1 = TAXIWAY "A" MIDFIELD AIRFIELD EDGE LIGHT CIRCUIT
TC-2 = TAXIWAY "A" EAST AIRFIELD EDGE LIGHT CIRCUIT
TC-6 = APRON AIRFIELD EDGE LIGHT CIRCUIT
TC-7 = TAXIWAY "M" AIRFIELD EDGE LIGHT CIRCUIT
TC-11 = TAXIWAY "A" WEST AIRFIELD EDGE LIGHT CIRCUIT
- ALL TC & DB CIRCUIT CABLES: NO. 8 AWG, 5KV, 1/C AIRFIELD LIGHTING CABLE(S)ITEM L-108, INSTALLED IN 2-INCH DIA. CONDUIT, ITEM L-110

"/#" INDICATES THE NUMBER OF CABLES ASSOCIATED WITH THE IDENTIFIED CIRCUIT

A4 KEYED LEGEND
SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

FRANCESCA K. NEILEY — NOTARY PUBLIC, STATE OF NEW YORK — NO. 01NE6099684 — QUALIFIED IN ONONDAGA COUNTY — MY COMMISSION EXPIRES 05 PROFESSIONAL ENGINEER — 04/29/2026

SYR. SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

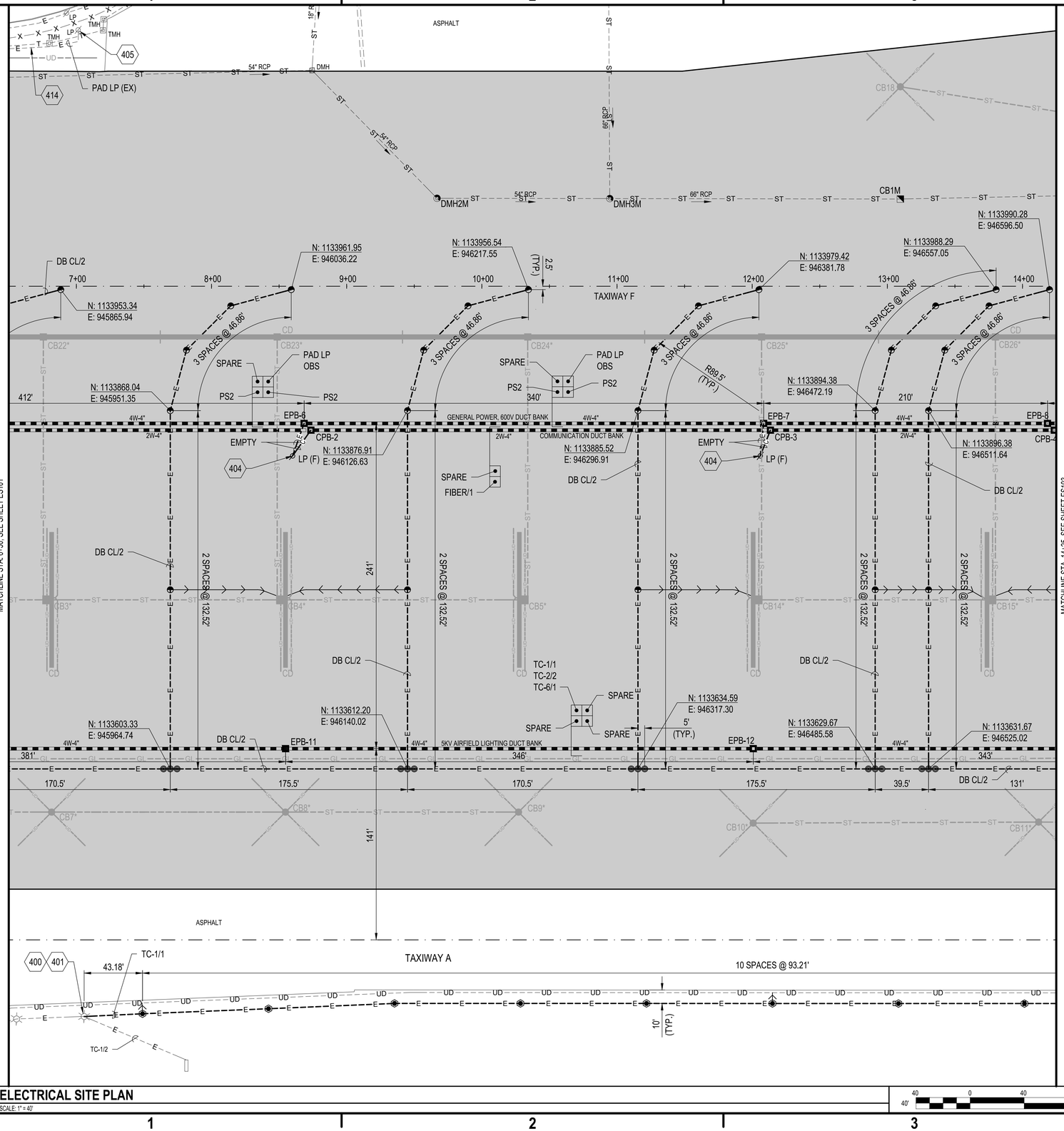
PROJECT NO:	068.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	F. NEILEY/ C. BRUBACH
CHECKED BY:	S. SHOVA

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

ELECTRICAL SITE PLAN

ES101
SHEET NO. 91 OF 113

Apr 29, 2026 - 3:36pm
F:\Projects\C68 - Syracuse Regional Airport Authority\068069001 - Comp Deicing Pad\Design\CADD\Sheet Files\068069001_ES Series.dwg



A1 ELECTRICAL SITE PLAN
SCALE: 1" = 40'

40 0 40 80FT.
40'

400. CONNECT PRIMARY CABLE TO TRANSFORMER AT LIGHT UNIT, JUNCTION CAN OR GUIDANCE SIGN (TYP.).

401. CONNECT PROPOSED CONDUIT TO EXISTING CONDUIT OR LIGHT BASE USING NEC APPROVED CONNECTORS, INCIDENTAL TO ITEM L-110. (TYP.)

404. CONDUIT CAPPED FOR FUTURE CONNECTION.

405. SPLICE PROPOSED CABLE(S) TO EXISTING CABLE(S) IN ELECTRICAL MANHOLE.

414. INSTALL NEW CABLES, IN EXISTING DUCT BANK OR CONDUIT.

C4 KEYED NOTES
SCALE: NOT TO SCALE

- AIRFIELD GUIDANCE SIGN AND FOUNDATION (DESIGNATED WITH AIRPORT SIGN NUMBER) (TYP.), ITEM L-125. SEE DETAILS AND SIGN SCHEDULE ON SHEET EL504.
- ELEVATED BASE MOUNTED MEDIUM INTENSITY TAXIWAY EDGE LIGHT (LED) IN TURF (TYP.), ITEM L-125, AND L-867B NON-LOAD BEARING LIGHT BASE, ITEM L-125. SEE DETAIL A1/EL501.
- SEMI FLUSH STOP LIGHT (LED) IN PAVEMENT (TYP.), ITEM L-125, AND L-868B LOAD BEARING LIGHT BASE, ITEM L-125. SEE DETAILS ON SHEET EL503.
- EPB ELECTRICAL PULLBOX (TYP.), ITEM L-115, SEE DETAIL A1/EL505.
- CPB COMMUNICATION PULLBOX (TYP.), ITEM L-115, SEE DETAIL A1/EL505.
- JC JUNCTION CAN (TYP.), ITEM L-115, SEE DETAIL C1/EL502.
- 4W-4" CONCRETE DUCT BANK WITH CIRCUIT DUCT ROUTING, ITEM L-110. SEE DETAIL A4/EL502. NUMBER AND SIZE OF CONDUITS SHOWN ON PLANS.
- PS1/3 ELECTRICAL CABLE(S), WITH CIRCUIT NUMBER AND NUMBER OF CABLES, ITEM L-108. INSTALLED IN PVC CONDUIT IN TURF OR PAVEMENT, ITEM L-110. SEE CONDUIT TRENCHING DETAILS SHEET EL502. SEE ES601 THROUGH ES603 FOR CABLE AND CONDUIT TYPE, QUANTITY AND SIZE.
- C 2-INCH DIA. PVC COMMUNICATIONS CONDUIT
- 2-INCH DIA. CONDUIT FOR DRAINAGE, ITEM L-110. DRAIN TO STORMWATER SYSTEM. EXACT LOCATIONS TO BE DETERMINED IN THE FIELD. SEE DETAIL A3/EL-501.
- LP (F) FUTURE APRON AREA FLOOD LIGHT, POLE AND FOUNDATION.
- SEMI FLUSH TAXIWAY CENTERLINE LIGHT (LED) IN PAVEMENT (TYP.), ITEM L-125, AND L-868B LOAD BEARING LIGHT BASE, ITEM L-125. SEE DETAILS ON SHEET EL503.
- REINSTALL EXISTING ELEVATED BASE MOUNTED MEDIUM INTENSITY TAXIWAY EDGE LIGHT ON NEW LIGHT BASE IN TURF (TYP.), ITEM L-125. SEE DETAIL A1/EL501.

CIRCUIT KEY:
MAIN POWER CKT = MAIN POWER FROM ELECTRICAL VAULT TO THE DEICING FACILITY EQUIPMENT SHELTER
SHELTER MDP = 10' X 16' EQUIPMENT SHELTER POWER PANEL "MDP"
PS1 = PUMP STATION #1 POWER PANEL
PS2 = PUMP STATION #2 POWER PANEL
PAD LP (EX) = EXISTING DEICING PAD OVERHEAD LIGHTING
OBS = OVERHEAD LIGHTING OBSTRUCTION LIGHTS
RPU2 = RWIS SURFACE SENSOR REMOTE PROCESSING UNIT #2 POWER
RPU3 = RWIS SURFACE SENSOR REMOTE PROCESSING UNIT #3 POWER
BHR = VEHICLE BLOCK HEATER PANEL RECEPTACLES POWER
DFTS = DEICING FACILITY TANK STORAGE POWER PANEL
DFTS PUMPS LP = DEICING FACILITY TANK STORAGE OVERHEAD LIGHTING POWER
DFTS PUMPS = DEICING FACILITY TANK STORAGE PUMPS POWER
HBOX = WATER VALVE HOT BOX POWER

DB CL = AIRCRAFT DEICING BAY SEMI-FLUSH IN-PAVEMENT LIGHT POWER
TC-1 = TAXIWAY "A" MIDFIELD AIRFIELD EDGE LIGHT CIRCUIT
TC-2 = TAXIWAY "A" EAST AIRFIELD EDGE LIGHT CIRCUIT
TC-6 = APRON AIRFIELD EDGE LIGHT CIRCUIT
TC-7 = TAXIWAY "M" AIRFIELD EDGE LIGHT CIRCUIT
TC-11 = TAXIWAY "A" WEST AIRFIELD EDGE LIGHT CIRCUIT

- ALL TC & DB CIRCUIT CABLES: NO. 8 AWG, 5KV, 1/C AIRFIELD LIGHTING CABLE(S)ITEM L-108, INSTALLED IN 2-INCH DIA. CONDUIT, ITEM L-110

"/#" INDICATES THE NUMBER OF CABLES ASSOCIATED WITH THE IDENTIFIED CIRCUIT

A4 KEYED LEGEND
SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK FRANCESCA K. NEILEY 095099 LICENSED PROFESSIONAL ENGINEER
04/29/2026

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	F. NEILEY/ C. BRUBACH
CHECKED BY:	S. SHOVA

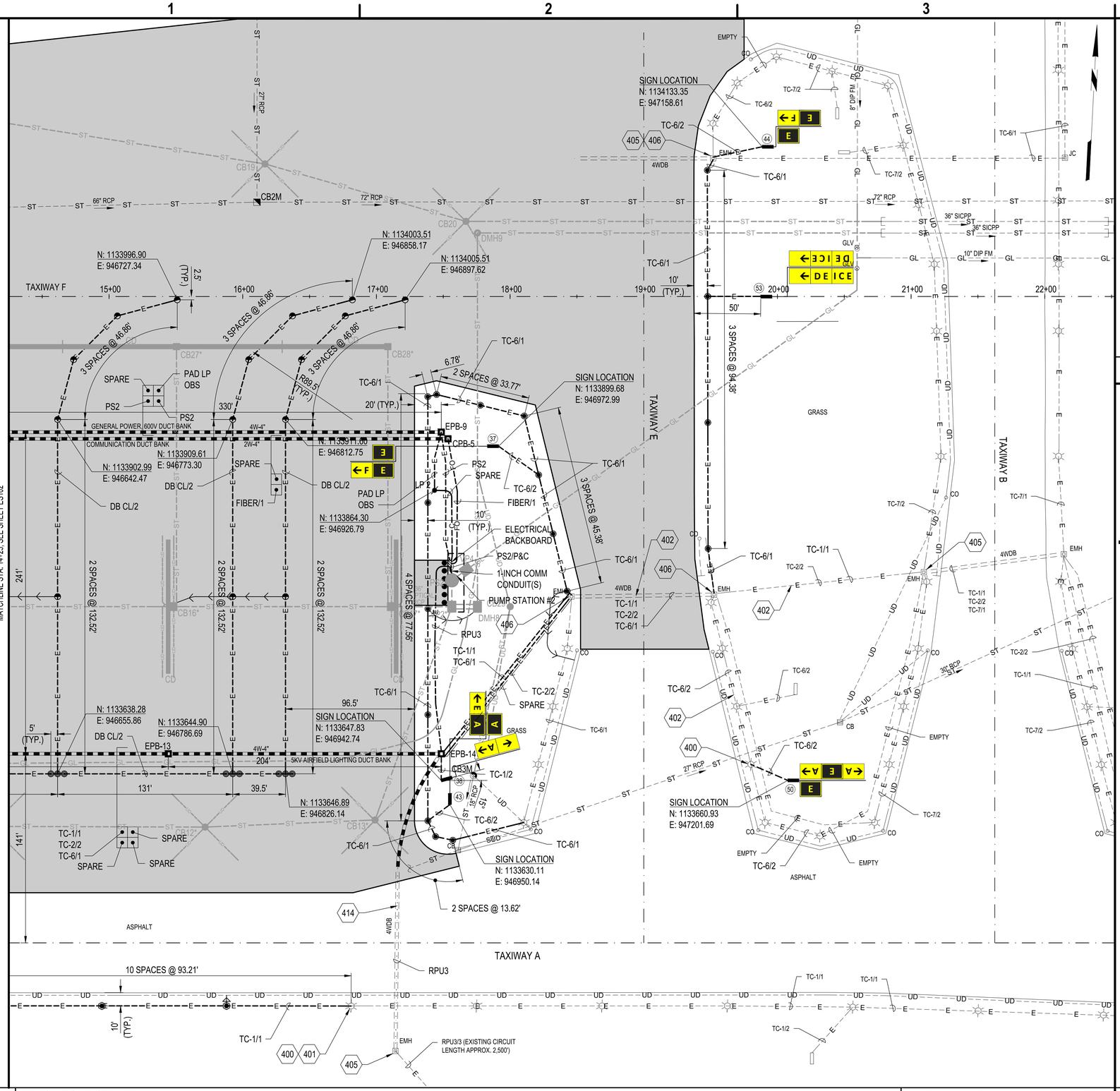
NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

ELECTRICAL SITE PLAN

ES102

SHEET NO. 92 OF 113

Apr 29, 2026 - 3:39pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_ES Series.dwg



400. CONNECT PRIMARY CABLE TO TRANSFORMER AT LIGHT UNIT, JUNCTION CAN OR GUIDANCE SIGN (TYP.).

401. CONNECT PROPOSED CONDUIT TO EXISTING CONDUIT OR LIGHT BASE USING NEC APPROVED CONNECTORS, INCIDENTAL TO ITEM L-110. (TYP.)

402. NO. 8 AWG, 5KV, 1/C AIRPORT LIGHTING CABLE(S), ITEM L-108, IN EXISTING DUCT BANK OR CONDUIT.

405. SPLICE PROPOSED CABLE(S) TO EXISTING CABLE(S) IN ELECTRICAL MANHOLE.

406. PROPOSED CONDUIT SHALL BE CONNECTED TO EXISTING ELECTRICAL STRUCTURE, CORE DRILL AND EPOXY GROUT CONDUIT IN PLACE, INCIDENTAL TO ITEM L-110 (TYP.)

414. INSTALL NEW CABLES, IN EXISTING DUCT BANK OR CONDUIT.

C4 KEYED NOTES

SCALE: NOT TO SCALE

- AIRFIELD GUIDANCE SIGN AND FOUNDATION (DESIGNATED WITH AIRPORT SIGN NUMBER) (TYP.), ITEM L-125. SEE DETAILS AND SIGN SCHEDULE ON SHEET EL504.
- ELEVATED BASE MOUNTED MEDIUM INTENSITY TAXIWAY EDGE LIGHT (LED) IN TURF (TYP.), ITEM L-125, AND L-867B NON-LOAD BEARING LIGHT BASE, ITEM L-125. SEE DETAIL A1/EL501.
- SEMI FLUSH STOP LIGHT (LED) IN PAVEMENT (TYP.), ITEM L-125, AND L-868B LOAD BEARING LIGHT BASE, ITEM L-125. SEE DETAILS ON SHEET EL503.
- EPB — ELECTRICAL PULLBOX (TYP.), ITEM L-115, SEE DETAIL A1/EL505.
- CPB — COMMUNICATION PULLBOX (TYP.), ITEM L-115, SEE DETAIL A1/EL505.
- JC — JUNCTION CAN (TYP.), ITEM L-115, SEE DETAIL C1/EL502.
- 4W-4" — CONCRETE DUCT BANK WITH CIRCUIT DUCT ROUTING, ITEM L-110. SEE DETAIL A4/EL502. NUMBER AND SIZE OF CONDUITS SHOWN ON PLANS.
- PS1/3 — ELECTRICAL CABLE(S), WITH CIRCUIT NUMBER AND NUMBER OF CABLES, ITEM L-108. INSTALLED IN PVC CONDUIT IN TURF OR PAVEMENT, ITEM L-110. SEE CONDUIT TRENCHING DETAILS SHEET EL502. SEE ES601 THROUGH ES603 FOR CABLE AND CONDUIT TYPE, QUANTITY AND SIZE.
- FO — 2-INCH DIA. PVC COMMUNICATION CONDUIT ITEM L-110 INSTALLED IN TURF OR PAVEMENT WITH 12-STRAND SINGLE MODE, ARMORED FIBER OPTIC CABLE(S) AND 3-CELL MAXCELL INNERDUCT, ITEM L-108.
- C — 2-INCH DIA. PVC COMMUNICATIONS CONDUIT.
- 2-INCH DIA. CONDUIT FOR DRAINAGE, ITEM L-110. DRAIN TO STORMWATER SYSTEM. EXACT LOCATIONS TO BE DETERMINED IN THE FIELD. SEE DETAIL A3/EL-501.
- LP2 — APRON AREA FLOOD LIGHT, POLE AND FOUNDATION (35' OVERALL HEIGHT), ITEM L-100. SEE DETAILS ON ES504
- SEMI FLUSH TAXIWAY CENTERLINE LIGHT (LED) IN PAVEMENT (TYP.), ITEM L-125, AND L-868B LOAD BEARING LIGHT BASE, ITEM L-125. SEE DETAILS ON SHEET EL503.
- REINSTALL EXISTING ELEVATED BASE MOUNTED MEDIUM INTENSITY RUNWAY EDGE LIGHT ON NEW LIGHT BASE IN TURF (TYP.), ITEM L-125. SEE DETAIL A1/EL501.
- PROTECTIVE BOLLARD, ITEM F-170 (TYP.).

CIRCUIT KEY:

MAIN POWER CKT = MAIN POWER FROM ELECTRICAL VAULT TO THE DEICING FACILITY EQUIPMENT SHELTER
SHELTER MDP = 10' X 16' EQUIPMENT SHELTER POWER PANEL "MDP"
PS1 = PUMP STATION #1 POWER PANEL
PS2 = PUMP STATION #2 POWER PANEL
PAD LP (EX) = EXISTING DEICING PAD OVERHEAD LIGHTING
OBS = OVERHEAD LIGHTING OBSTRUCTION LIGHTS
RPU2 = RWIS SURFACE SENSOR REMOTE PROCESSING UNIT #2 POWER
RPU3 = RWIS SURFACE SENSOR REMOTE PROCESSING UNIT #3 POWER
BHR = VEHICLE BLOCK HEATER PANEL RECEPTACLES POWER
DFTS = DEICING FACILITY TANK STORAGE POWER PANEL
DFTS PUMPS LP = DEICING FACILITY TANK STORAGE OVERHEAD LIGHTING POWER
DFTS PUMPS = DEICING FACILITY TANK STORAGE PUMPS POWER
HBOX = WATER VALVE HOT BOX POWER

DB CL = AIRCRAFT DEICING BAY SEMI-FLUSH IN-PAVEMENT LIGHT POWER
TC-1 = TAXIWAY "A" MIDFIELD AIRFIELD EDGE LIGHT CIRCUIT
TC-2 = TAXIWAY "A" EAST AIRFIELD EDGE LIGHT CIRCUIT
TC-6 = APRON AIRFIELD EDGE LIGHT CIRCUIT
TC-7 = TAXIWAY "M" AIRFIELD EDGE LIGHT CIRCUIT
TC-11 = TAXIWAY "A" WEST AIRFIELD EDGE LIGHT CIRCUIT

- ALL TC & DB CIRCUIT CABLES: NO. 8 AWG, 5KV, 1/C AIRFIELD LIGHTING CABLE(S)ITEM L-108, INSTALLED IN 2-INCH DIA. CONDUIT, ITEM L-110

"/#" INDICATES THE NUMBER OF CABLES ASSOCIATED WITH THE IDENTIFIED

A1 ELECTRICAL SITE PLAN

SCALE: 1" = 40'

40 0 40 80FT.
40'

A4 KEYED LEGEND

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · FRANCESCA K. NEILEY · 099684 · PROFESSIONAL ENGINEER
04/29/2026

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	068.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	F. NEILEY/ C. BRUBACH
CHECKED BY:	S. SHOVA

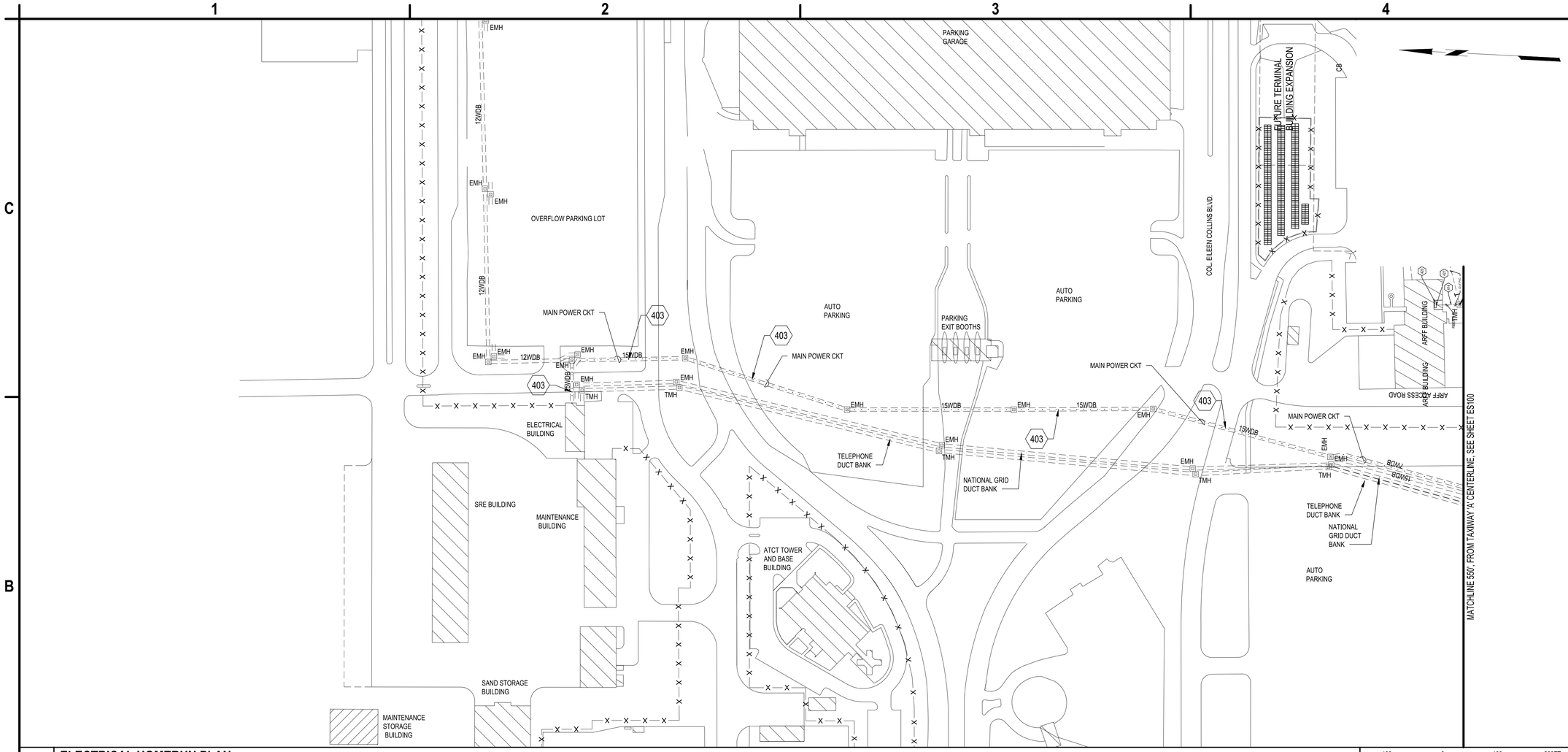
NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

ELECTRICAL SITE PLAN

ES103

SHEET NO. 93 OF 113

Apr 29, 2026 - 3:36pm
F:\Projects\C68 - Syracuse Regional Airport Authority\068069001 - Comp Deicing Pad\Design\CADD\Sheet Files\068069001_ES Series.dwg



B1 ELECTRICAL HOMERUN PLAN

SCALE: 1" = 100'

100' 100 0 100 200FT.

403. NEW MAIN POWER FEED INSTALLED BY SRAA IN 2025. (4) 4/0/AWG OKONITE OKOGUARD URO-J, 1/C 15 KV COPPER CABLES WITH 100% INSULATION LEVEL AND 1/3 NEUTRAL, 400 AMP MAIN BREAKER AT 4,160V.

A2 KEYED NOTES

SCALE: NOT TO SCALE

NOTE:
THERE IS NO PROPOSED WORK ON THIS SHEET AND IS INCLUDED FOR INFORMATIONAL PURPOSES ONLY.

CIRCUIT KEY:
MAIN POWER CKT = MAIN POWER FROM ELECTRICAL VAULT TO THE DEICING FACILITY EQUIPMENT SHELTER
SHELTER MDP = 10' X 16' EQUIPMENT SHELTER POWER PANEL "MDP"
PS1 = PUMP STATION #1 POWER PANEL
PS2 = PUMP STATION #2 POWER PANEL
PAD LP (EX) = EXISTING DEICING PAD OVERHEAD LIGHTING
OBS = OVERHEAD LIGHTING OBSTRUCTION LIGHTS
RPU2 = RWIS SURFACE SENSOR REMOTE PROCESSING UNIT #2 POWER
RPU3 = RWIS SURFACE SENSOR REMOTE PROCESSING UNIT #3 POWER
BHR = VEHICLE BLOCK HEATER PANEL RECEPTACLES POWER
DFTS = DEICING FACILITY TANK STORAGE POWER PANEL
DFTS PUMPS LP = DEICING FACILITY TANK STORAGE OVERHEAD LIGHTING POWER
DFTS PUMPS = DEICING FACILITY TANK STORAGE PUMPS POWER
HBOX = WATER VALVE HOT BOX POWER

DB CL = AIRCRAFT DEICING BAY SEMI-FLUSH IN-PAVEMENT LIGHT POWER
TC-1 = TAXIWAY "A" MIDFIELD AIRFIELD EDGE LIGHT CIRCUIT
TC-2 = TAXIWAY "A" EAST AIRFIELD EDGE LIGHT CIRCUIT
TC-6 = APRON AIRFIELD EDGE LIGHT CIRCUIT
TC-7 = TAXIWAY "M" AIRFIELD EDGE LIGHT CIRCUIT
TC-11 = TAXIWAY "A" WEST AIRFIELD EDGE LIGHT CIRCUIT
- ALL TC & DB CIRCUIT CABLES: NO. 8 AWG, 5KV, 1/C AIRFIELD LIGHTING CABLE(S)ITEM L-108, INSTALLED IN 2-INCH DIA. CONDUIT, ITEM L-110

"/#" INDICATES THE NUMBER OF CABLES ASSOCIATED WITH THE IDENTIFIED CIRCUIT

A3 KEYED LEGEND

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · FRANCESCA K. NEILEY · 099684 · PROFESSIONAL ENGINEER · 04/29/2026

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	F. NEILEY/ C. BRUBACH
CHECKED BY:	S. SHOVA

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

ELECTRICAL HOMERUN PLAN

ES104

SHEET NO. 94 OF 113

Apr 29, 2026 - 3:39pm
P:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_ES Series.dwg

404. CONDUIT CAPPED FOR FUTURE CONNECTION.

407. COMMUNICATION & POWER JUNCTION BOX(ES), INCIDENTAL TO ITEM L-109. SEE DETAIL A2/ES501.

408. DEICING FACILITY EQUIPMENT SHELTER (10' X 16' X 8'), ITEM L-109. SEE DETAILS ON SHEETS ES501, ES502 THROUGH ES503.

409. LIMITS OF CRUSHED STONE MAINTENANCE AREA, 6-INCH DEPTH WITH GEOTEXTILE SEPARATION FABRIC, INCIDENTAL TO ITEM L-109.

410. ELECTRICAL EQUIPMENT SHELTER ACCESS ROAD, SEE DETAIL C1/CG501.

412. PAD MOUNTED TRANSFORMER. SEE TRANSFORMER PAD DETAIL A4/ES506.

413. PAD MOUNTED SWITCHGEAR. SEE TRANSFORMER PAD DETAIL A4/ES506.

416. CONCRETE PAD/STEP, INCIDENTAL TO ITEM L-109. SEE DETAIL A3/ES503.

C4 KEYED NOTES

SCALE: NOT TO SCALE

- PROTECTIVE BOLLARD (TYP.), ITEM F-170, SEE DETAIL C4/CU510.
- EPB — ELECTRICAL PULLBOX (TYP.), ITEM L-115, SEE DETAIL A1/EL505.
- CPB — COMMUNICATION PULLBOX (TYP.), ITEM L-115, SEE DETAIL A1/EL505.
- 4W-4" — CONCRETE DUCT BANK WITH CIRCUIT DUCT ROUTING, ITEM L-110. SEE DETAIL A4/EL502. NUMBER AND SIZE OF CONDUITS SHOWN ON PLANS.
- PS1/3 — E — ELECTRICAL CABLE(S), WITH CIRCUIT NUMBER AND NUMBER OF CABLES, ITEM L-108. INSTALLED IN PVC CONDUIT IN TURF OR PAVEMENT, ITEM L-110. SEE CONDUIT TRENCHING DETAILS SHEET EL502. SEE ES601 FOR CABLE AND CONDUIT TYPE, QUANTITY AND SIZE.
- FO — 2-INCH DIA. COMMUNICATION CONDUIT WITH 12-STRAND SINGLE MODE ARMORED FIBER OPTIC CABLE(S) AND 3 CELL MAXCELL INNERDUCT.
- C — 2-INCH DIA. PVC COMMUNICATIONS CONDUIT.
- LP — APRON AREA FLOOD LIGHT, POLE AND FOUNDATION (40' HEIGHT).

CIRCUIT KEY:

MAIN POWER CKT = MAIN POWER FROM ELECTRICAL VAULT TO THE DEICING FACILITY EQUIPMENT SHELTER
SHELTER MDP = 10' X 16' EQUIPMENT SHELTER POWER PANEL "MDP"
PS1 = PUMP STATION #1 POWER PANEL
PS2 = PUMP STATION #2 POWER PANEL
PAD LP = DEICING PAD OVERHEAD LIGHTING
OBS = OVERHEAD LIGHTING OBSTRUCTION LIGHTS
RPU2 = RWIS SURFACE SENSOR REMOTE PROCESSING UNIT #2 POWER
RPU3 = RWIS SURFACE SENSOR REMOTE PROCESSING UNIT #3 POWER
BHR = VEHICLE BLOCK HEATER PANEL RECEPTACLES POWER
DFTS/3 = DEICING FACILITY TANK STORAGE POWER PANEL
DFTS PUMPS LP = DEICING FACILITY TANK STORAGE OVERHEAD LIGHTING POWER
DFTS PUMPS = DEICING FACILITY TANK STORAGE PUMPS POWER

DB CL = AIRCRAFT DEICING BAY SEMI-FLUSH IN-PAVEMENT LIGHT POWER
TC-1 = TAXIWAY "A" MIDFIELD AIRFIELD EDGE LIGHT CIRCUIT
TC-2 = TAXIWAY "A" EAST AIRFIELD EDGE LIGHT CIRCUIT
TC-6 = APRON AIRFIELD EDGE LIGHT CIRCUIT
TC-7 = TAXIWAY "M" AIRFIELD EDGE LIGHT CIRCUIT
TC-11 = TAXIWAY "A" WEST AIRFIELD EDGE LIGHT CIRCUIT
- ALL TC CIRCUIT CABLES: NO. 8 AWG, 5KV, 1/C AIRFIELD LIGHTING CABLE(S)ITEM L-108, INSTALLED IN 2-INCH DIA. CONDUIT, ITEM L-110

"/#" INDICATES THE NUMBER OF CABLES ASSOCIATED WITH THE IDENTIFIED CIRCUIT

A1 DEICING FACILITY EQUIPMENT SHELTER PLAN

SCALE: 1" = 5'

A4 KEYED LEGEND

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK — FRANCESCA K. NEILEY — 099684 — PROFESSIONAL ENGINEER — 04/29/2026

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	F. NEILEY/ C. BRUBACH
CHECKED BY:	S. SHOVA

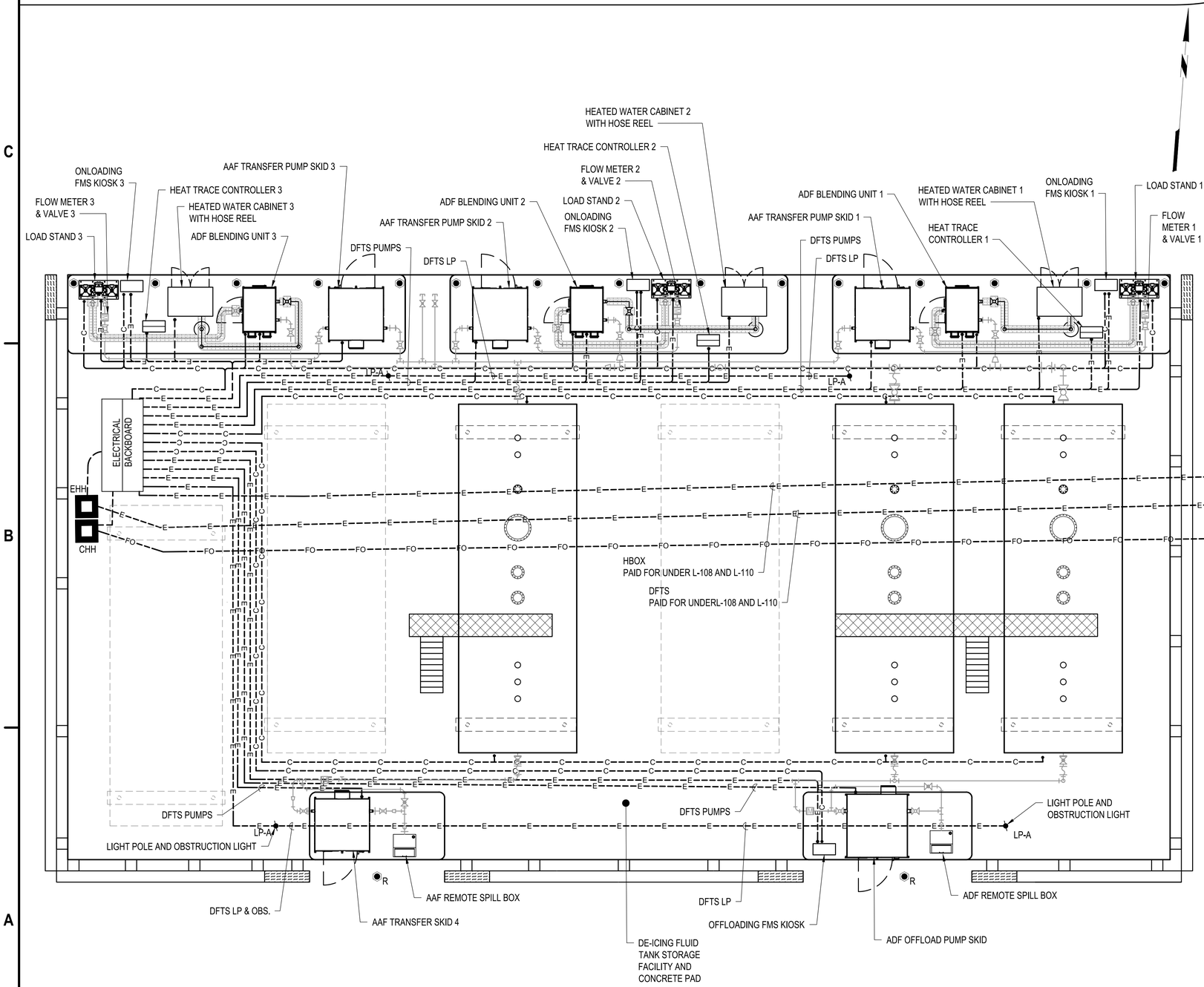
NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

DEICING FACILITY EQUIPMENT SHELTER PLAN

ES401

SHEET NO. 95 OF 113

Apr 29, 2026 - 3:30pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_ES401.dwg



A1 FLUID STORAGE AREA - ABOVEGROUND EQUIPMENT AND CONDUIT
SCALE: 1" = 5'

5' 0 5 10FT.

C4 KEYED NOTES
SCALE: NOT TO SCALE

	PROTECTIVE BOLLARD (TYP.), ITEM L-125, SEE DETAIL C4/CU510.
EHH	ELECTRICAL HANDHOLE, QUAZITE (TYP.), ITEM L-115, SEE DETAILS A3/EL505.
CHH	COMMUNICATION HANDHOLE, QUAZITE (TYP.), ITEM L-115, SEE DETAILS A3/EL505.
DFTS —E—	ELECTRICAL CABLE(S), WITH CIRCUIT ID. INSTALLED IN CONDUIT IN TURF OR PAVEMENT, ITEM L-110. SEE ES601 TO ES603 FOR CABLE AND CONDUIT TYPE, QUANTITY AND SIZE.
—C—	1-INCH DIA. COMMUNICATIONS CONDUIT WITH COMMUNICATIONS CABLE. REFER TO ES507 FOR CONDUIT AND CABLE DETAILS
—FO—	2-INCH DIA. COMMUNICATION CONDUIT WITH 12-STRAND SINGLE MODE, ARMORED FIBER OPTIC CABLE(S) AND 3 CELL MAXCELL INNERDUCT.
LPA	AREA FLOOD LIGHT, POLE AND FOUNDATION (22' HEIGHT). PROVIDE NLS #NV-2-T4-96L-1-40K-UNV OR APPROVED EQUAL. PROVIDE NLS LIGHTING #RSAP-22-4-120-9BC-SGL-BRZ-3430-BAA OR APPROVED EQUAL. FAA-APPROVED OBSTRUCTION LIGHT AT 2 LOCATIONS.

CIRCUIT KEY:

DFTS = DEICING FACILITY TANK STORAGE POWER PANEL
DFTS LP = DEICING FACILITY TANK STORAGE OVERHEAD LIGHTING POWER
OBS = OBSTRUCTION LIGHT POWER
DFTS PUMPS = DEICING FACILITY TANK STORAGE PUMPS POWER
HBOX = WATER VALVE HOT BOX POWER

SHEET NOTES:

1. ALL ELECTRICAL EQUIPMENT CABLE AND CONDUIT ON THIS SHEET SHALL BE INCLUDED IN LUMP SUM IN L-109 UNLESS OTHERWISE NOTED.
2. ALL UNDERGROUND CONDUITS SHALL BE PVC. ALL ABOVEGROUND CONDUITS SHALL BE PVC-COATED RGS.

A4 LEGEND AND SHEET NOTES
SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · FRANCESCA K. NEILEY · 099684 · PROFESSIONAL ENGINEER · 04/29/2026

SYR. SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	F. NEILEY/ C. BRUBACH
CHECKED BY:	S. SHOVA

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

DE-ICING FLUID TANK STORAGE FACILITY PLAN (ADD ON #1)

ES402
SHEET NO. 96 OF 113

Apr 29, 2026 - 3:39pm
P:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_ES401.dwg

ITEM NUMBER	QUANTITY REQUIRED	UNIT OF MEASURE	PART NUMBER	PART DESCRIPTION
1	1	EA	DUPONT/VERTEX PLASTICS	SHELTER WITH FIXTURES (10' X 16' X 9'-2" HIGH)
2	1	EA	DUPONT/VERTEX PLASTICS	FULL METAL DOOR, 3' X 6'-2"
3	1	EA	DUPONT/VERTEX PLASTICS	HOOD, DOOR
4	1	EA	DUPONT/VERTEX PLASTICS	HOOD, HVAC
5	2	EA	--	THERMOSTAT, FOR SPLIT HVAC AND BASEBOARD HEATER
6	2	EA	--	PLATE, ELECT GND - 6" X 12" X 1/4"
7	1	EA	MITSUBISHI MSZ-GL15NA MUZ-GL15NA	SPLIT HVAC SYSTEM WITH HEAT PUMP 18,000 BTU HEATING, 14,000 BTU COOLING, 240V, STAINLESS STEEL HEAVY DUTY WALL BRACKET
9	1	EA	RAYOVOSS 120-2S-N1-3-06-A OR 120-2S-M1-3-06	SURGE ARRESTOR, 100 AMP 12 1/2" X 5 1/2" X 10 1/2"
10	1	EA	SQUARE D NQOD20L100CU	100A BREAKER PANEL DP, 24 CIRCUITS, WITH BOLT ON BREAKERS 14 1/2" X 6" X 23" 240V, 1-PHASE, 3-WIRE (120/240V)
11	1	EA	SQUARE D H223N	MAIN DISCONNECT, 100A 240V FUSES, 10" X 8" X 18 1/4" HEAVY DUTY, NEMA 1
12	--	FT	SQUARE D	CONDUIT, RACEWAY, 4X4" SECTIONS NEMA 1
13	3	EA	--	POWER FEED CONDUIT ENTRY, 2", WITH PLATE, 4" X 4"
14	4	EA	LITHONIA LIGHTING, LBL4	LED LIGHT, 4 FOOT
15	1	EA	LITHONIA LIGHTING, EU2C M6	EMERGENCY LIGHT BATTERY BACKUP, LED
16	1	EA	--	EXTERIOR LIGHT WITH PHOTOCELL LED
17	1	EA	--	JUNCTION BOX 24" X 48" X 9 1/2" (SEE NOTE 8)
18	--	FT	STAINLESS UNISTRUT	CHANNEL BRACKET, CONDUIT MTG, 2' & 4'
19	2	EA	--	GROUND WIRE KIT, 4 AWG
20	1	EA	HOFFMAN	TELECOMMUNICATIONS ENCLOSURE
21	1	EA	LEGRAND Q-SERIES	WALL MOUNT FIBER OPTIC TERMINATION PANEL
22	1	EA	LEGRAND Q-SERIES	WALL MOUNT FIBER OPTIC TERMINATION PANEL
23	1	EA	--	BASEBOARD HEATER, 1500W, 240V
24	2	EA	--	DUPLEX RECEPTACLE, 120V, 20 AMP
25	1	EA	--	INCOMING SHELTER MAIN POWER PANEL 'SHELTER MDP'
26	1	EA	--	30 KVA TRANSFORMER
27	1	EA	--	CONSTANT CURRENT REGULATOR WITH ACE MODULE, 7.5KW
28	1	EA	--	LINC CONTROLLER
29	1	EA	--	ALCMS IN WALL MOUNT ENCLOSURE (30"H X 30"W X 12"D)
30	1	EA	--	CCR 5KV SERIES CUT OUT
31	1	EA	--	APRON LIGHTING CONTACTOR

B1 EQUIPMENT SHELTER KEYED MATERIAL NOTES

SCALE: NOT TO SCALE

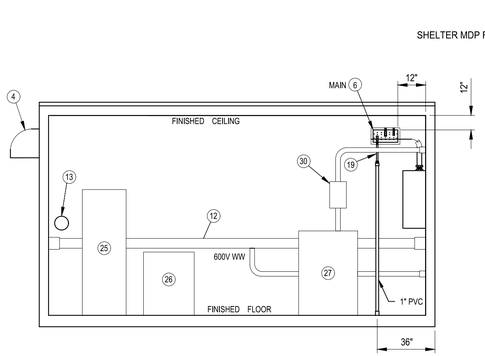
1. SHELTER LAYOUT MAY VARY FROM SCHEMATIC LAYOUT SHOWN. THE CONTRACTOR SHALL PROVIDE DETAILED WIRING DIAGRAMS INCLUDING CONDUITS, RACEWAYS, AND ELECTRICAL BOXES FOR THE EQUIPMENT BUILDING FOR SHOP DRAWING REVIEW.
2. ALL ELECTRICAL EQUIPMENT SHALL BE IDENTIFIED WITH A NAME PLATE SHOWING THE FUNCTIONAL NAME OF THE UNIT, VOLTAGE, PHASES, AND OTHER PERTINENT INFORMATION. NAME PLATES SHALL BE RIGID PLASTIC, STAMPED, EMBOSSED, OR ENGRAVED WITH 3/8 INCH. MINIMUM LETTER CHARACTERS. SECURE WITH TWO STAINLESS STEEL SCREWS OR WEATHERPROOF ADHESIVE.
3. SEAL ALL EXTERIOR CONDUIT OPENINGS WITH DUCT SEAL OR CAP IF UNUSED.
4. VERIFY LOCATION OF CONDUIT STUB-UPS WITH SHELTER LAYOUT.
5. ALL PART NUMBERS / MANUFACTURERS SPECIFIED ARE EXAMPLES ONLY, APPROVED EQUAL COMPONENTS WILL BE CONSIDERED.
6. MINIMUM DESIGN CRITERIA: FLOOR LOAD: 200 PSF, WALL LOAD: 150 MPH WIND, ROOF LOAD: 70 PSF, U FACTOR: 0.07 BTU/HR. SF F, COLOR: WHITE (INSIDE AND OUTSIDE)
7. THE TWO STAGE THERMOSTAT HAS ONE SET OF CONTACTS THAT OPERATES AT 3 DEGREES FAHRENHEIT HIGHER THAN THE OTHER.
8. THE CONTRACTOR MAY ELECT TO PROVIDE THREE SEPARATE NEMA 4X STAINLESS STEEL JUNCTION BOXES; TWO FOR POWER AND ONE FOR CONTROL INTO THE SHELTER, RATHER THAN ONE COMPARTMENTALIZED SINGLE INTERFACE BOX.
9. FLOOR FINISH: 1/8" VINYL TILE FEDERAL SPECIFICATION #SS-T-312B ARMSTRONG #51836, ADHESIVE #S-515.
10. ALL WIRING IS #12 THWN UNLESS OTHERWISE NOTED COLOR CODED LINE A-BLACK, LINE B-RED NEUTRAL WHITE AND EQUIPMENT GROUND GREEN. TAPE WIRENUTS AND LABEL WIRES IN BOXES.
11. ALL CONDUIT IS 3/4" EMT UNLESS OTHERWISE NOTED.
12. EMT CONNECTORS SHALL BE COMPRESSION TYPE WITH INSULATED THROAT.
13. RECEPTACLES & LIGHT SWITCHES SHALL ALSO BE GROUNDED BY THE INSTALLATION OF A GREEN PIGTAIL ON THE JUNCTION BOX WHERE THE GREEN WIRE GROUND IS CONNECTED.
14. ALL HARDWARE CORROSION-RESISTANT, SKIDS HOT-DIP GALVANIZED.
15. FIBERGLASS-REINFORCED CONTINUOUS POLYESTER-URETHANE CONSTRUCTION WITH JOINTS ONLY AT FLOOR, WOOD BLOCKING IN WALLS AND CEILING FOR EQUIPMENT ATTACHMENT.
16. INCOMING POWER, 5 KV LIGHTING, COMMUNICATION, AND GENERAL 600V POWER CIRCUITS SHALL NOT BE INTERMIXED IN THE SAME WIREWAYS AND CONDUITS.

A1 SHELTER NOTES

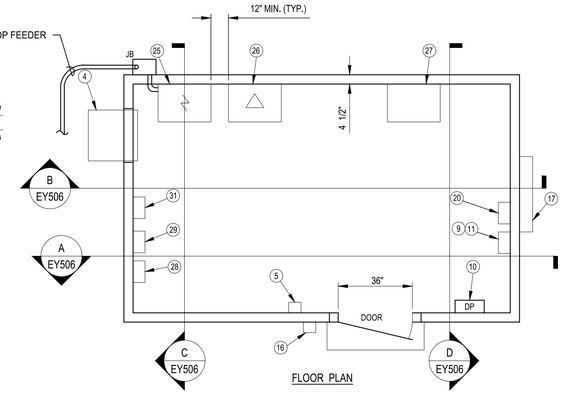
SCALE: NOT TO SCALE

B2 EQUIPMENT SHELTER INTERIOR DETAILS (10' X 16')

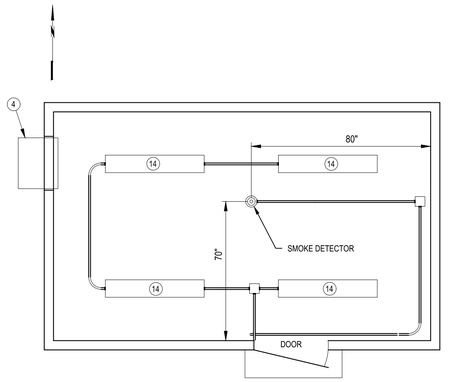
SCALE: NOT TO SCALE



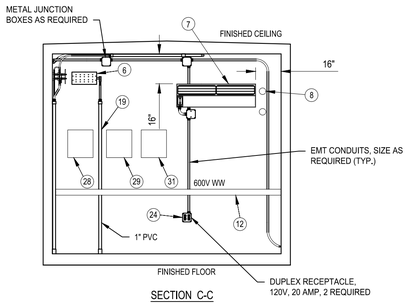
SECTION B-B



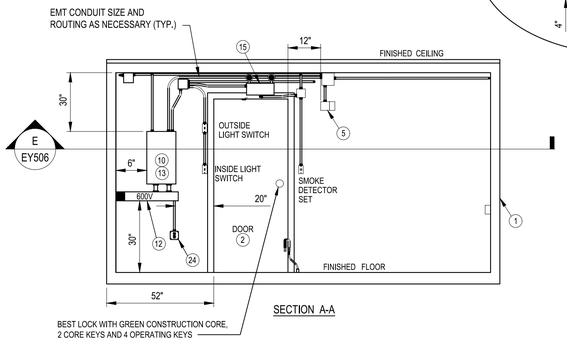
FLOOR PLAN



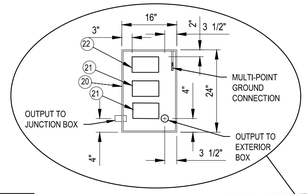
SECTION E-E

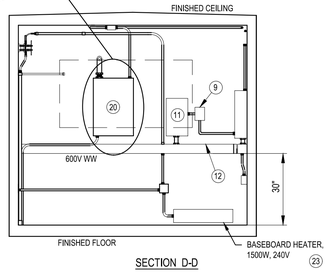


SECTION C-C



SECTION A-A

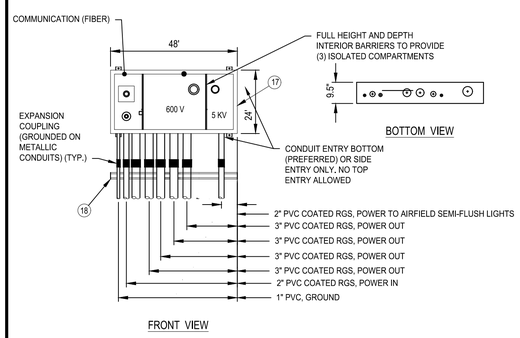




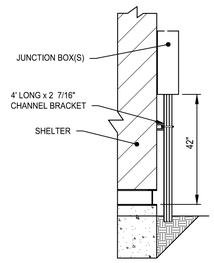
SECTION D-D

B3 EQUIPMENT SHELTER KEYED MATERIAL NOTES

SCALE: NOT TO SCALE



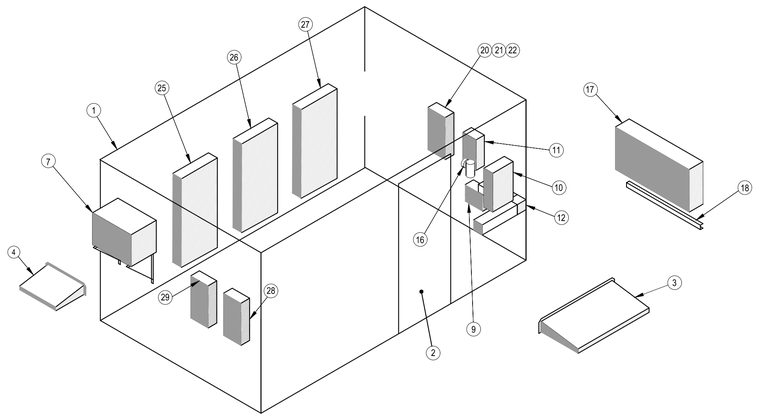
FRONT VIEW



SIDE VIEW

A2 SHELTER JUNCTION BOX DETAIL

SCALE: NOT TO SCALE



A3 EQUIPMENT SHELTER SCHEMATIC DETAIL

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

FRANCESCA K. NEILEY — NOTARY PUBLIC, STATE OF NEW YORK — No. 01NE6099684 — QUALIFIED IN ONONDAGA COUNTY — 15 PROFESSIONAL ENGINEER
04/29/2026

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	F. NEILEY/ C. BRUBACH
CHECKED BY:	S. SHOVA

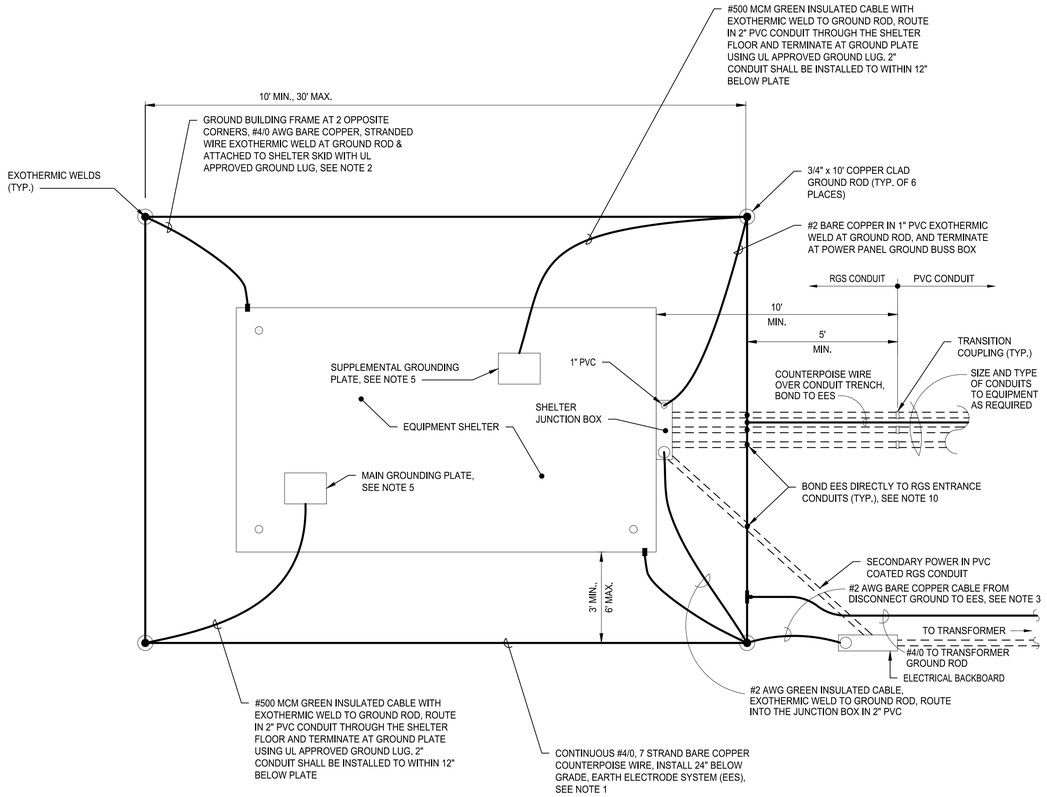
NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

EQUIPMENT SHELTER LAYOUT DETAILS

ES501

SHEET NO. 97 OF 113

Apr 29, 2026 - 3:40pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_ES Details.dwg



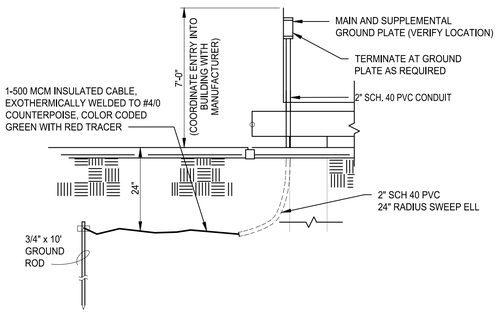
B1 EQUIPMENT SHELTER GROUNDING DIAGRAM

SCALE: NOT TO SCALE

1. EARTH ELECTRODE SYSTEM (EES), CONTINUOUS #4/0 BARE COPPER STRANDED WIRE, 2'-0" BELOW GRADE AND 3' TO 6' LATERALLY FROM BUILDING, PLUS 4 EACH 3/4" x 10' COPPER-CLAD GROUND RODS. CONNECT TO #4/0 WITH EXOTHERMIC WELD.
2. #4/0 BARE COPPER STRANDED WIRE TO CONNECT BUILDING METAL FRAME TO EES AT TWO OPPOSITE BUILDING CORNERS. RUN CABLE ALONG FOUNDATION PIER AND ATTACH TO BUILDING FRAME WITH UL APPROVED GROUNDING CLAMP. USE EXOTHERMIC WELD AT EES.
3. THE GROUNDING ELECTRODE CONDUCTORS FOR THE SERVICE ENTRANCE SWITCH SHALL BE MINIMUM NO. 6 AWG, AND SHALL BE CONNECTED TO A GROUND ROD IN THE EES BY EXOTHERMIC WELD AND TO THE NEUTRAL AND GROUND BUSS IN THE SERVICE ENTRANCE SWITCH BY FAA APPROVED GROUNDING CONNECTOR. THIS SHALL BE THE ONLY PLACE WHERE NEUTRAL AND GROUND ARE CONNECTED EXCEPT SERVICE TRANSFORMER SECONDARY SIDE.
4. THE MAIN AND SUPPLEMENTAL GROUND PLATES (8"(W) x 12"(L) x 3/4"(D)) SHALL BE CONNECTED TO THE EES WITH ONE 500 MCM GREEN INSULATED CABLE BY EXOTHERMIC WELD AND BY HYDRAULICALLY CRIMPED GROUNDING CONNECTOR AT THE PLATE. ALL EQUIPMENT GROUNDING SHALL TERMINATE ON THE GROUND PLATES. COORDINATE ACTUAL GROUND PLATE LOCATION WITH SHELTER PROVIDED. ROUTE IN 2" PVC CONDUIT THROUGH THE SHELTER FLOOR AND TERMINATE AT PLATE. THE CONDUIT SHALL BE INSTALLED TO 12" BELOW THE GROUND PLATES. ALL TERMINATIONS AT GROUND PLATES SHALL BE HYDRAULICALLY CRIMPED USING A 12 TON CONCENTRIC CRIMPING TOOL. LUGS MUST BE 2-HOLE. 2 CRIMP WITH STAINLESS STEEL HARDWARE FOR GROUND PLATE CONNECTIONS. USE BELLEVILLE STAINLESS STEEL WASHERS FOR GROUND PLATE CONNECTIONS.
5. USE #2 AWG GREEN INSULATED CABLE FROM SHELTER EQUIPMENT (HVAC, JUNCTION BOX) TO EES. INSTALL IN PVC WHERE EXTENDING ABOVE GRADE.
6. ALL UNDERGROUND METALLIC CONDUIT SHALL BE CONNECTED TO THE EES BY EXOTHERMIC WELD WHERE THEY INTERSECT OR WITH #2 BARE COPPER JUMPERS WITH EXOTHERMIC WELDS. REPAIR ALL PVC COATINGS.
7. ALL TERMINATIONS AT BULKHEAD AND/OR GROUND PLATES SHALL BE HYDRAULICALLY CRIMPED 2-HOLE LUGS.
8. #2 AWG BARE COPPER IN 1" PVC EXOTHERMIC WELD AT GROUND ROD AND TERMINATE AT POWER PANEL GROUND BUSS BOX.

A1 EQUIPMENT SHELTER GROUNDING NOTES

SCALE: NOT TO SCALE



A2 GROUND PLATE GROUNDING DETAIL

SCALE: NOT TO SCALE

STRUCTURAL NOTES:

1. CODES AND REFERENCE STANDARDS: 2025 NYS BUILDING CODE W/ ASCE7-22 SUPPLEMENT
2. STRUCTURAL LOADING DESIGN DATA:

A. ROOF LIVE LOAD:	50 PSF
B. FLOOR LIVE LOAD:	
FIRST FLOOR :	200 PSF
C. RAIN INTENSITY:	2.38 IN./HR
D. WIND LOAD (3-SEC. GUST):	
ULTIMATE WIND SPEED:	102 MPH
RISK CATEGORY:	I
EXPOSURE CATEGORY:	C
INTERNAL PRESSURE COEFFICIENT:	±0.18
WIND-BORNE DEBRIS REGION:	NA
E. SNOW LOAD	
GROUND SNOW LOAD (ULTIMATE):	63 PSF
FLAT-ROOF SNOW LOAD (ULTIMATE):	53 PSF
SNOW EXPOSURE FACTOR (Ce):	1.0
THERMAL FACTOR (Ct):	1.2
DRIFT LOADS CALCULATED PER ASCE 7-22	
F. SEISMIC LOAD:	
RISK CATEGORY:	I
SEISMIC IMPORTANCE FACTOR:	1.25
SS:	.17
S1:	.046
SITE CLASS:	D
Sds:	.14
Sd1:	.065
SEISMIC DESIGN CATEGORY:	A
ANALYSIS PROCEDURE USED:	EQUIVALENT LATERAL FORCE
BASIC SEISMIC FORCE-RESISTING SYSTEM:	STEEL SYSTEM NOT SPECIFICALLY DETAILED FOR SEISMIC
RESPONSE MODIFICATION COEFFICIENT, R:	3.0
SEISMIC RESPONSE COEFFICIENT, Cs:	.0604
SEISMIC BASE SHEAR, V:	.54 KIPS

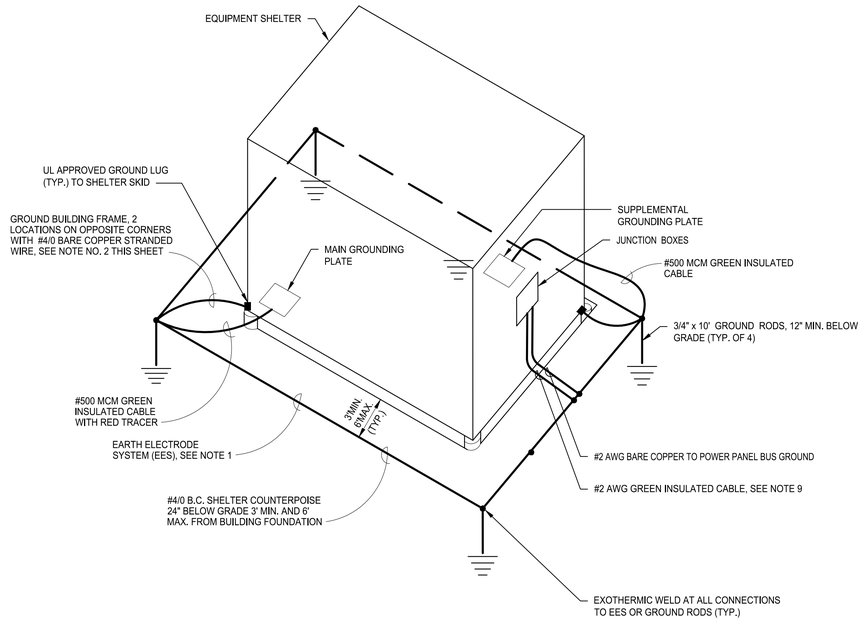
3. THE CONTRACTOR IS RESPONSIBLE FOR THE SURVEY AND FIELD VERIFYING ALL EXISTING CONDITIONS.
4. WORK ON STRUCTURAL DRAWINGS REPRESENTS FINAL CONDITIONS. CONTRACTOR SHALL BE RESPONSIBLE FOR THE STRUCTURAL STABILITY OF ALL INTERMEDIATE CONDITIONS DURING CONSTRUCTION.
5. THE CONTRACTOR SHALL COORDINATE THE ARCHITECTURAL, PLUMBING, HVAC, AND ELECTRICAL DRAWINGS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION NOT INDICATED ON THE STRUCTURAL DRAWINGS, SUCH INFORMATION INCLUDES, AS A MINIMUM, EMBEDDED SLEEVES AND INSERTS, MISCELLANEOUS DETAILS, SPECIAL FLOOR FINISHES, DOOR THRESHOLDS, SLOPES TO DRAINS, NAILERS, OPENINGS IN STRUCTURAL ELEMENTS, ETC.
6. IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE ERECTION PROCEDURE AND SEQUENCE TO ENSURE THE SAFETY OF THE STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF WHATEVER TEMPORARY BRACING, GUYS, TIE-DOWNS, AND/OR SHORING MAY BE NECESSARY. SUCH MATERIAL SHALL BE REMOVED AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AFTER THE COMPLETION OF THE PROJECT.
7. IT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PROCEDURES. THE STRUCTURAL ENGINEER OF RECORD IS NOT RESPONSIBLE FOR MEANS AND METHODS OF CONSTRUCTION OR FOR RELATED SAFETY PROCEDURES.
8. DO NOT SCALE DRAWING DIMENSIONS. IN THE EVENT OF A GRID LINE DIMENSION CONFLICT, THE ARCHITECTURAL DRAWINGS SHALL GOVERN.
9. THE CONTRACTOR SHALL SUBMIT COMPLETE SHOP DRAWINGS FOR ALL PARTS OF THE WORK INCLUDING DESCRIPTION OF DEMOLITION, TEMPORARY BRACING, CONSTRUCTION METHODS AND SEQUENCING, WHERE APPLICABLE NO PERFORMANCE OF WORK SHALL COMMENCE WITHOUT REVIEW OF THE SHOP DRAWINGS BY THE ENGINEER.
10. FABRICATION PRIOR TO THE RECEIPT OF AN APPROVED SHOP DRAWINGS SHALL BE AT THE CONTRACTOR'S OWN RISK AND THAT INSTALLATION OF ANY WORK PRIOR TO RECEIPT OF AN APPROVED SHOP DRAWING SHALL BE STRICTLY PROHIBITED.

B3 STRUCTURAL GENERAL NOTES

SCALE: NOT TO SCALE

FOUNDATION NOTES:

1. DEWATER, EXCAVATE, FILL AND COMPACT SOIL IN PREPARATION FOR SLAB ON GRADE, WALLS, AND FOUNDATION IN ACCORDANCE WITH THE RECOMMENDATIONS PRESENTED IN THE GEOTECHNICAL REPORT PREPARED BY RENAISSANCE GEOTECHNICAL ENGINEERING REPORT NUMBER 24.0038 DATED JANUARY 10, 2025.
2. ALL EXCAVATIONS SHALL BE DEWATERED TO MAINTAIN GROUNDWATER AT LEAST 24" BELOW FOOTING BEFORE PLACING OF CONCRETE.
3. SLOPE THE EXTERIOR GRADE AWAY FROM THE STRUCTURE. REFER TO CIVIL PLANS FOR DETAILS.
4. PROVIDE TEMPORARY OR PERMANENT SUPPORTS, SHORING, SHEETING OR BRACING SO THAT NO HORIZONTAL MOVEMENT OR VERTICAL SETTLEMENT OCCURS TO ADJACENT STRUCTURES, STREETS, SOILS OR UTILITIES ADJACENT TO OR WITHIN THE PROJECT SITE.
5. BACKFILL SHALL BE PLACED IN COMPACTED LIFTS PER THE EARTHWORK SPECIFICATIONS.
6. NO FOUNDATION CONCRETE SHALL BE PLACED IN WATER.
7. COMPONENTS OF ANY SUPPORT OF EXCAVATION SYSTEM SHALL REMAIN IN PLACE UNTIL ALL PERMANENT STRUCTURAL SYSTEMS AT AND BELOW GROUND ARE IN PLACE.
8. THE GEOTECHNICAL REPORT NAMED ABOVE IS AVAILABLE TO THE CONTRACTOR UPON REQUEST TO THE OWNER. THE ARCHITECT AND ENGINEER WILL NOT BE RESPONSIBLE FOR THE ACCURACY OR APPLICABILITY OF SUCH DATA THEREIN.
9. NO RESPONSIBILITY IS ASSUMED BY THE ENGINEER FOR THE VALIDITY OF THE SUBSURFACE CONDITIONS DESCRIBED ON THE DRAWINGS, SPECIFICATIONS, TEST BORINGS, OR TEST PITS. THESE DATA ARE INCLUDED ONLY TO ASSIST THE CONTRACTOR DURING BIDDING AND SUBSEQUENT CONSTRUCTION. THEY REPRESENT CONDITIONS ONLY AT THE SPECIFIC LOCATIONS AT THE TIME DATA WAS COLLECTED.
10. MAXIMUM ALLOWABLE SOIL BEARING PRESSURE = 1500 PSF
11. FOOTINGS TO BEAR ON NATURAL UNDISTURBED SOIL OR COMPACTED FILL PER THE GEOTECHNICAL ENGINEER'S RECOMMENDATIONS TO EXHIBIT A DENSITY OF AT LEAST 95 PERCENT OF THE MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D 1557 (MODIFIED PROCTOR).
12. GEOTECHNICAL ENGINEER MUST REVIEW THE FINAL SITE AND GRADING PLANS TO VALIDATE ALL RECOMMENDATIONS SET FORTH IN THE GEOTECHNICAL REPORT AND CONFIRM THEIR FINDINGS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION OF INSPECTIONS OR EXAMINATIONS PRIOR TO CONSTRUCTION COMMENCEMENT.



A3 EQUIPMENT SHELTER GROUNDING DIAGRAM

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK FRANCESCA K. NEILEY 090684 PROFESSIONAL ENGINEER
04/29/2026

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	F. NEILEY/ C. BRUBACH
CHECKED BY:	S. SHOVA

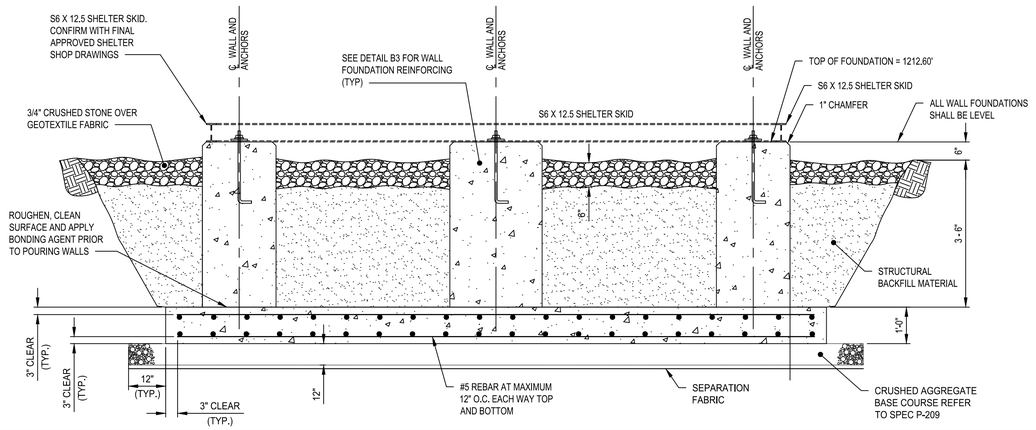
NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

EQUIPMENT SHELTER AND GROUNDING DETAILS

ES502

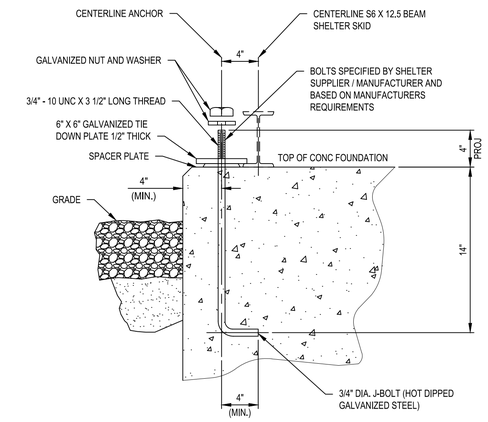
SHEET NO. 98 OF 113

Apr 29, 2026 - 3:40pm
P:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Cnstr Deicing Pad\Design\CADD\Sheet Files\O68069001_ES Details.dwg



C1 EQUIPMENT SHELTER FOUNDATION SECTION

SCALE: NOT TO SCALE



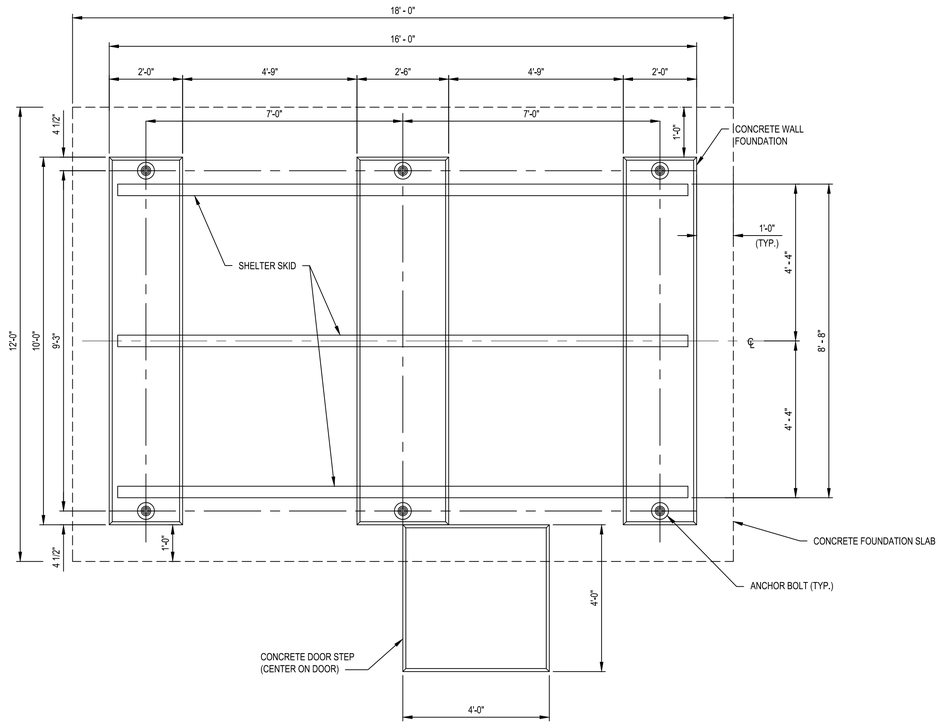
C3 ANCHOR BOLT DETAIL

SCALE: NOT TO SCALE

1. ANCHOR BOLTS SHALL BE HOT DIP GALVANIZED STEEL PER ASTM-A153 AND ASTM-A354. NUTS AND WASHERS SHALL BE HOT DIP GALVANIZED STEEL PER ASTM-A153 AND ASTM-A325.
2. FOUNDATION BARS MUST BE LEVEL.
3. CONCRETE SHALL MEET THE REQUIREMENTS SPECIFIED UNDER ITEM P-610 OF THE CONTRACT SPECIFICATIONS.
4. CONTRACTOR TO COORDINATE ALL FOUNDATION DIMENSIONS WITH ACTUAL SHELTER PROVIDED. NO ADDITIONAL PAYMENT SHALL BE MADE FOR ADDITIONAL CONCRETE AS REQUIRED TO SUPPORT SHELTER PROVIDED.
5. INTERMEDIATE SHELTER SUPPORTS NOT SHOWN FOR CLARITY.
6. PURCHASE OR FABRICATE TIE-DOWN PLATES TO MATCH SHELTER SKID BEAM(S), FLANGE THICKNESS AND CONTOUR. MAINTAIN LEVEL HEX-NUT CONTACT. PROVIDE FULL WIDTH COVERAGE/CONTACT ON BUILDING BEAM FLANGE.
7. CONCRETE STEP DIMENSIONS (RISE/RUN) SHALL BE PER LOCAL BUILDING CODES. PROVIDE/ADJUST HEIGHT AS REQUIRED TO MEET THE SHELTER DOOR ELEVATION.

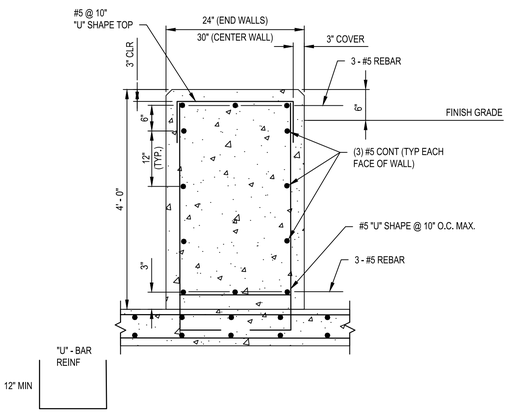
C4 SHELTER FOUNDATION NOTES

SCALE: NOT TO SCALE



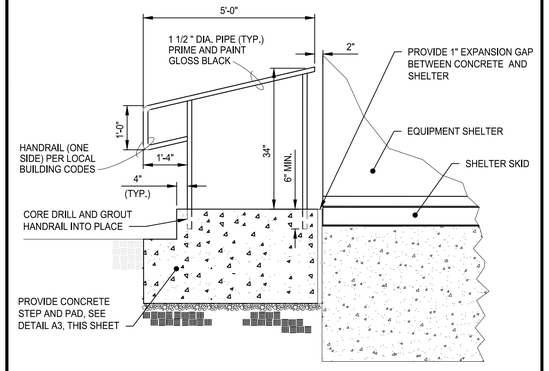
A1 EQUIPMENT SHELTER FOUNDATION PLAN (10' X 16' SHELTER)

SCALE: NOT TO SCALE



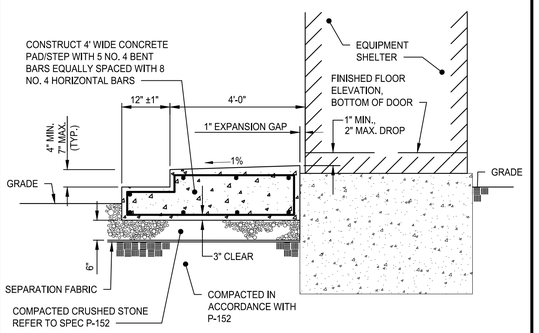
B3 FOUNDATION REINFORCEMENT DETAIL

SCALE: NOT TO SCALE



B4 HANDRAIL DETAIL

SCALE: NOT TO SCALE



A3 CONCRETE STEP AND PAD DETAIL

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · FRANCESCA K. NEILEY · 099684 · PROFESSIONAL ENGINEER
04/29/2026

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	F. NEILEY/ C. BRUBACH
CHECKED BY:	S. SHOVA

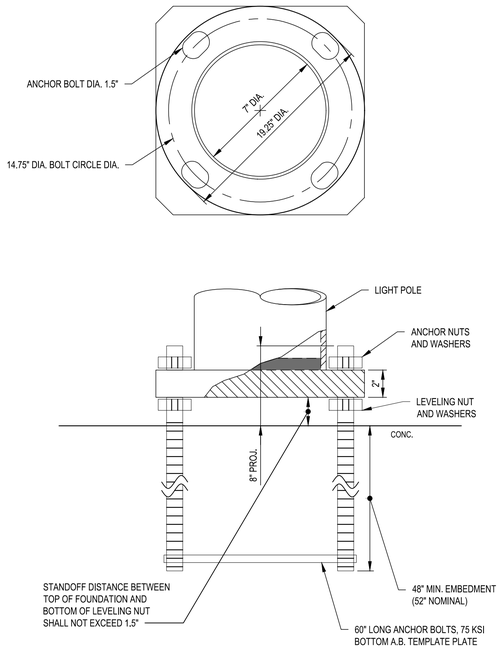
NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

EQUIPMENT SHELTER FOUNDATION DETAILS

ES503

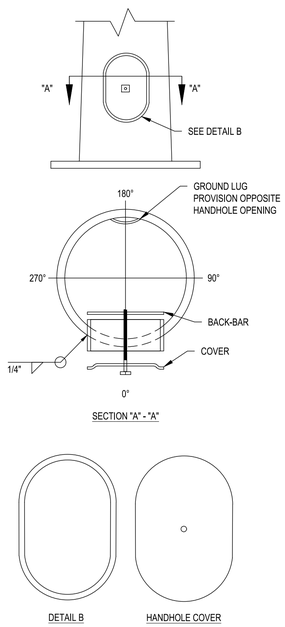
SHEET NO. 99 OF 113

Apr 29, 2026 - 3:40pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_ES Details.dwg



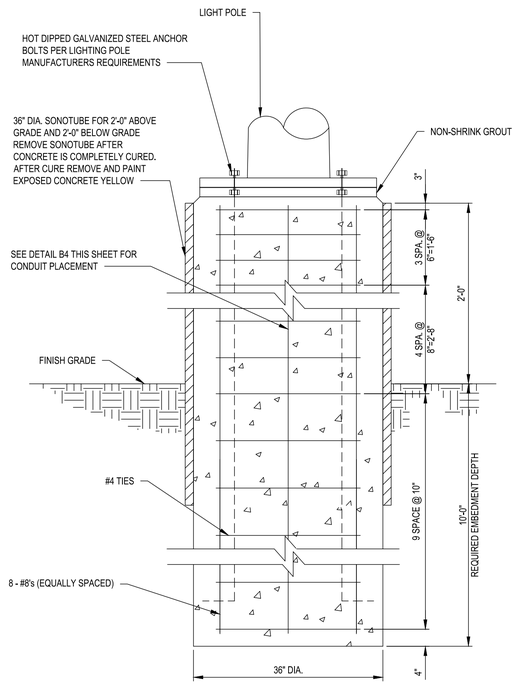
B1 APRON LIGHT POLE BASE PLATE DETAIL

SCALE: NOT TO SCALE



B2 TYPICAL HANDHOLE DETAIL

SCALE: NOT TO SCALE

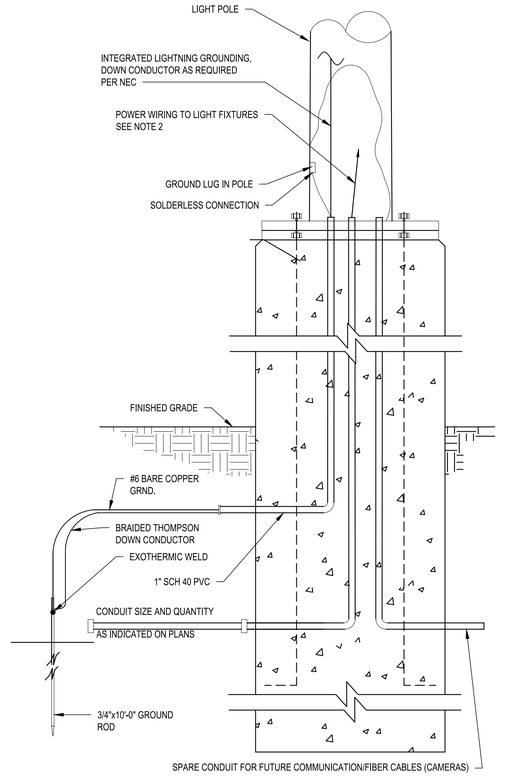


GENERAL NOTES:

1. CONTRACTOR SHALL PROVIDE A SHOP DRAWING OF THE FOUNDATION SEALED AND STAMPED BY A PROFESSIONAL ENGINEER IF THE LIGHT POLE FOUNDATION VARIES FROM THAT SHOWN.

B3 APRON LIGHT FOUNDATION DETAIL

SCALE: NOT TO SCALE

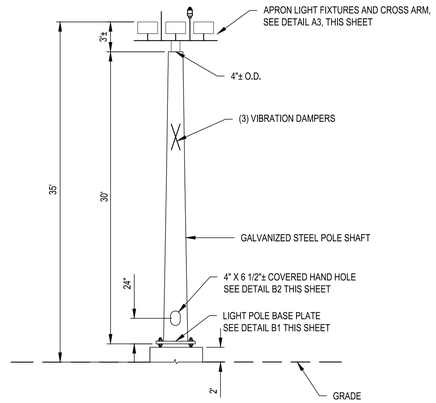


NOTE:

1. ALL ITEMS SHOWN SHALL BE INCIDENTAL TO LIGHT CONSTRUCTION, PER EACH.
2. CABLE SIZE CAN BE REDUCED AT LIGHT POLE BASE TO #10 AWG.

B4 APRON LIGHT ELECTRICAL SERVICE DETAIL

SCALE: NOT TO SCALE

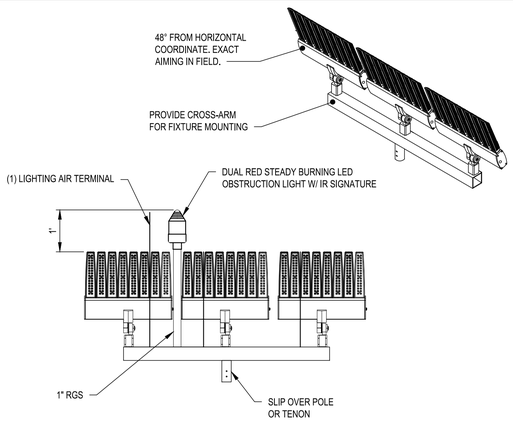


NOTES:

1. PROVIDE MUSCO LIGHTING LSS35A LIGHT POLE OR APPROVED EQUAL.
2. PROVIDE VIBRATION DAMPENING FOR ALL LIGHT POLES.
3. REFER TO DETAIL B2 THIS SHEET FOR HANDHOLE DETAIL AND B1 ON THIS SHEET FOR BASE POLE DETAIL.
4. PROVIDE FOUNDATION SHOP DRAWINGS, SIGNED AND SEALED BY A REGISTERED PROFESSIONAL ENGINEER, FOR REVIEW DURING CONSTRUCTION. FOUNDATIONS SHALL BE DESIGNED BASED ON FINAL SELECTIONS OF POLE, FIXTURES, AND FIXTURE MOUNTING APPARATUS.

A1 APRON LIGHT POLE ASSEMBLY DETAIL

SCALE: NOT TO SCALE

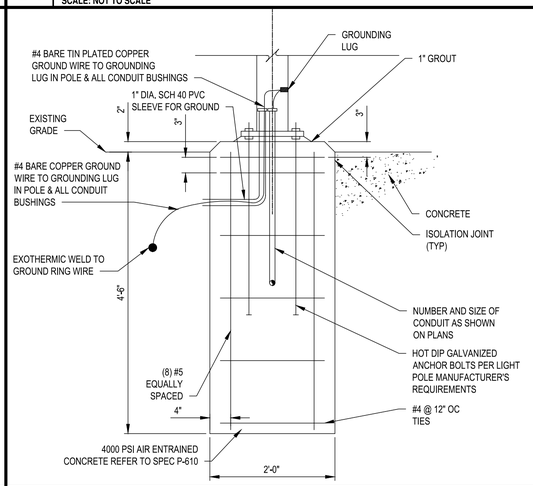


NOTES:

1. BASIS OF DESIGN FOR LIGHT FIXTURES IS MUSCO LIGHTING TLC-LED-550, OR APPROVED EQUAL.

A3 APRON LIGHT FIXTURE AND CROSS ARM DETAIL

SCALE: NOT TO SCALE



A4 GYLCOL TANK STORAGE AREA LIGHT FOUNDATION DETAIL

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · FRANCESCA K. NEILEY · 095099684 · PROFESSIONAL ENGINEER
04/29/2026

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	068.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	F. NEILEY/ C. BRUBACH
CHECKED BY:	S. SHOVA

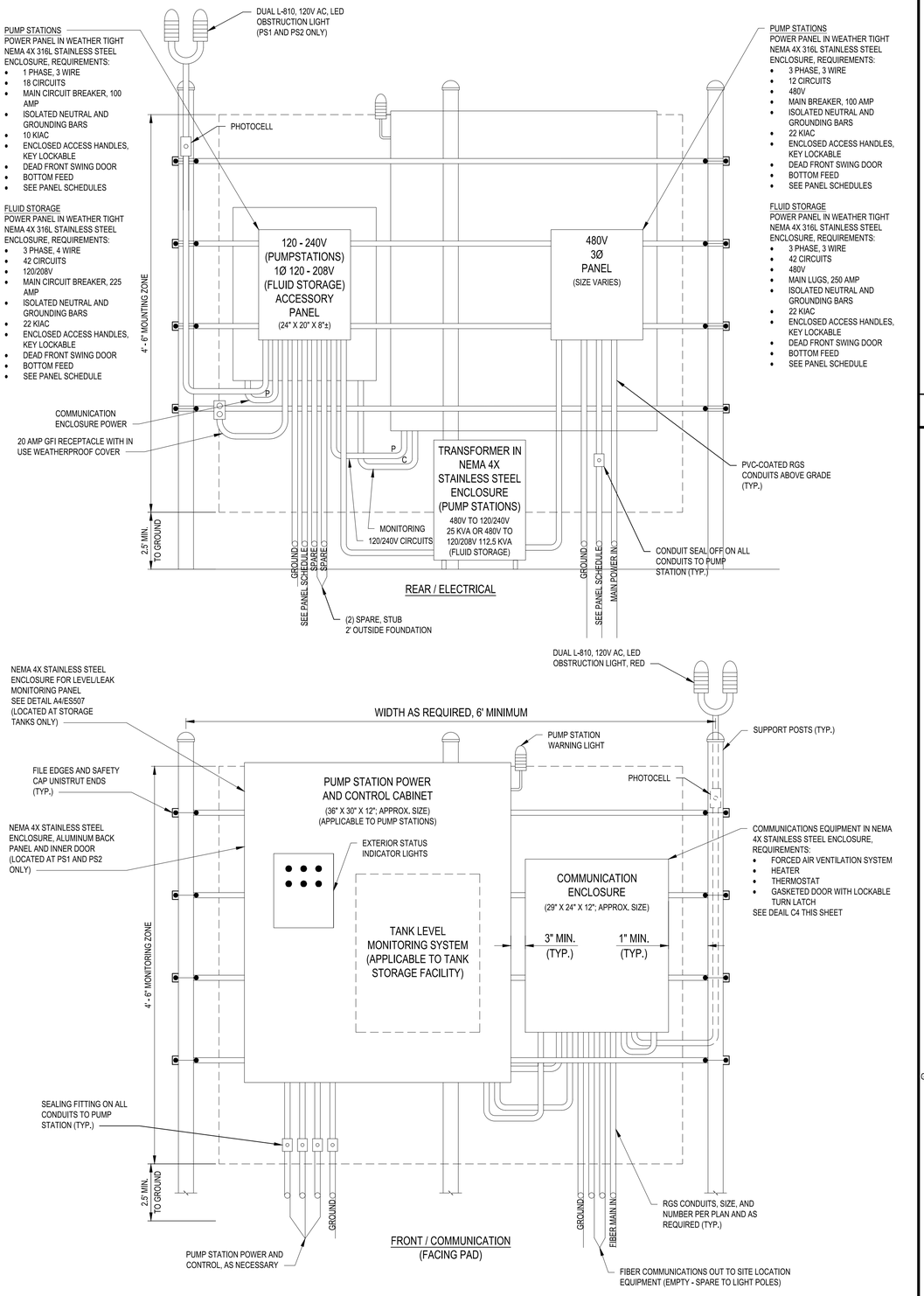
NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

AREA FLOOD LIGHTING DETAILS

ES504

SHEET NO. 100 OF 113

Apr 29, 2026 - 9:40pm
P:\Projects\C068 - Syracuse Regional Airport Authority\068069001 - Comp Deicing Pad\Design\CADD\Sheet Files\068069001_ES Details.dwg



A1 EQUIPMENT RACK LAYOUT DETAIL

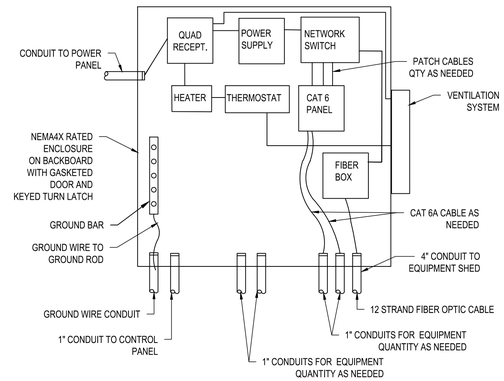
SCALE: NOT TO SCALE

NOTES:

1. ALL ENCLOSURES, SWITCHES AND PANELS SHALL BE LOCKABLE AND SHALL BE KEYED FOR A SINGLE KEY.
2. ALL CONDUIT ON EQUIPMENT RACK IS PVC-COATED RGS.
3. INCREASE SIZE OF RACK TO ACCOMMODATE SUBMITTED EQUIPMENT IF REQUIRED.
4. MOST FREQUENTLY USED COMPONENTS SHALL BE PLACED AT AN IDEAL WORKING ELEVATION ON THE EQUIPMENT RACK FOR USER CONVENIENCE.
5. ALL CONDUITS SHALL ENTER BOTTOM OF EQUIPMENT BOXES, NO TOP ENTRY IS ALLOWED. SIDE ENTRY ONLY IF REQUIRED.
6. DUCT SEAL ALL CONDUITS ENTERING BOXES.
7. ALL POSTS SHALL BE SET VERTICALLY PLUMB, WITHIN A 1° TOLERANCE
8. ALL HARDWARE SHALL BE STAINLESS STEEL.
9. ALL UNDERGROUND CONDUITS SHALL BE A MINIMUM OF 2" DIA. EXITING THE EQUIPMENT RACK. GROUND CONDUITS MAY BE 3/4" SCH. 80 PVC UNLESS OTHERWISE NOTED.

C3 EQUIPMENT RACK NOTES

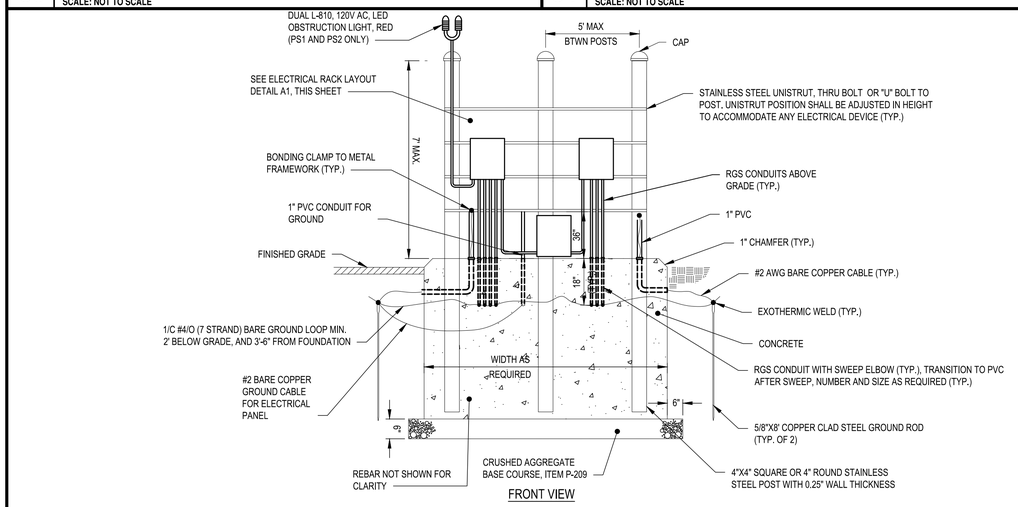
SCALE: NOT TO SCALE



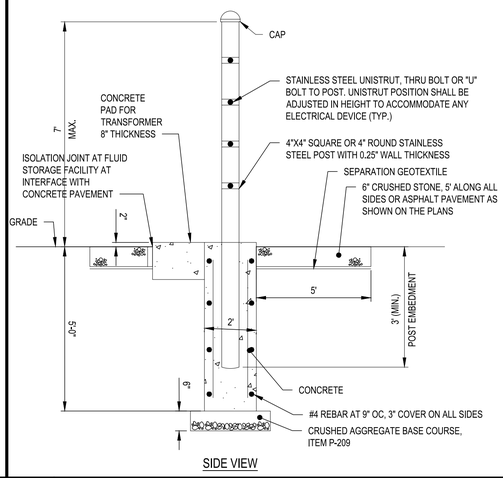
NOTE: NOT ALL EQUIPMENT MAY BE SHOWN/ REQUIRED FOR EACH ENCLOSURE. PROVIDE ALL REQUIRED EQUIPMENT, SIZE ENCLOSURE TO ACCOMMODATE ALL EQUIPMENT, MINIMUM 30" X 30" X 8".

C4 COMMUNICATIONS BACKBOARD ENCLOSURE

SCALE: NOT TO SCALE



FRONT VIEW



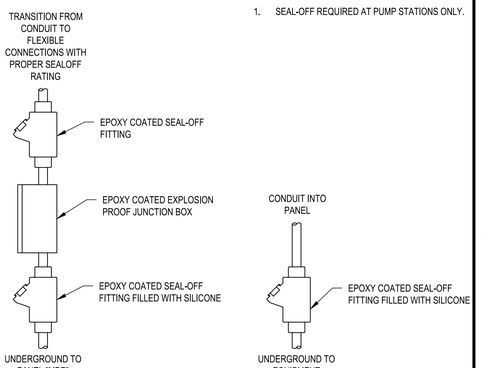
SIDE VIEW

A3 EQUIPMENT RACK DETAIL

SCALE: NOT TO SCALE

NOTES:

1. SEAL-OFF REQUIRED AT PUMP STATIONS ONLY.



A4 CONDUIT SEAL OFF DETAIL

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · FRANCESCA K. NEILEY · 099684 · PROFESSIONAL ENGINEER · 04/29/2026

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	F. NEILEY/ C. BRUBACH
CHECKED BY:	S. SHOVA

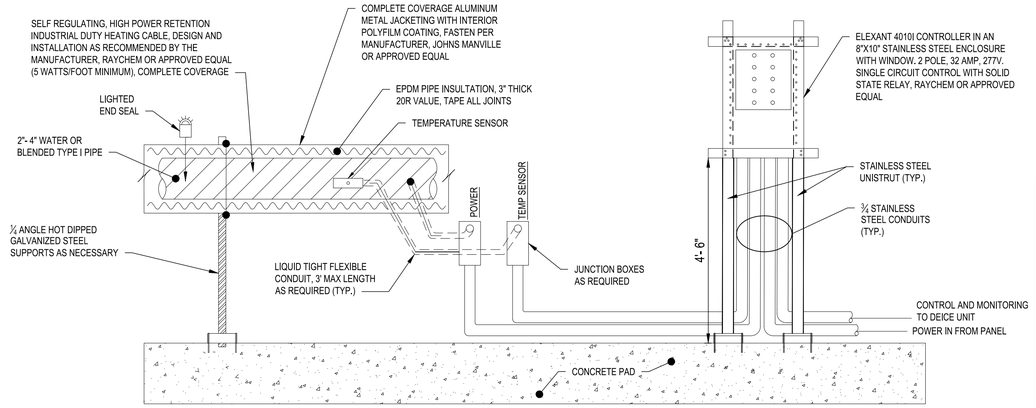
NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

EQUIPMENT RACK DETAILS

ES505

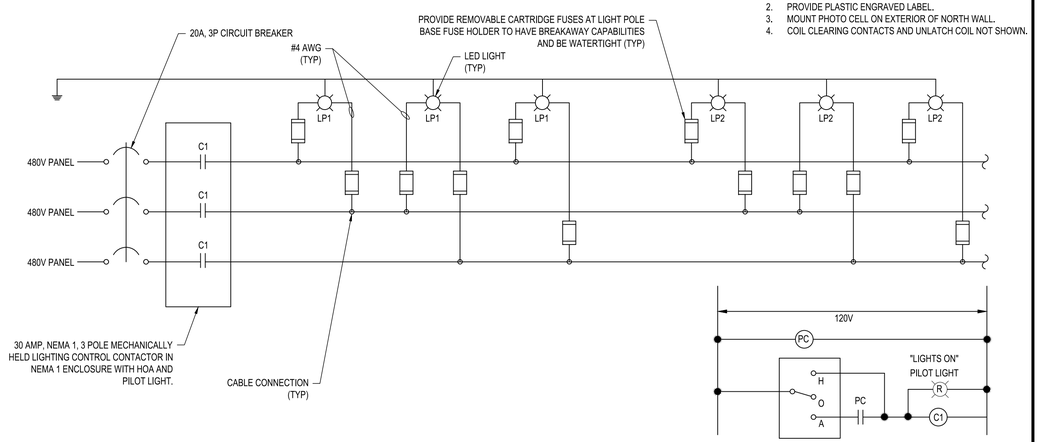
SHEET NO. 101 OF 113

Apr 29, 2026 - 3:40pm
P:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_ES Details.dwg



C1 WATER PIPE ELECTRIC HEAT TRACING SYSTEM DETAIL

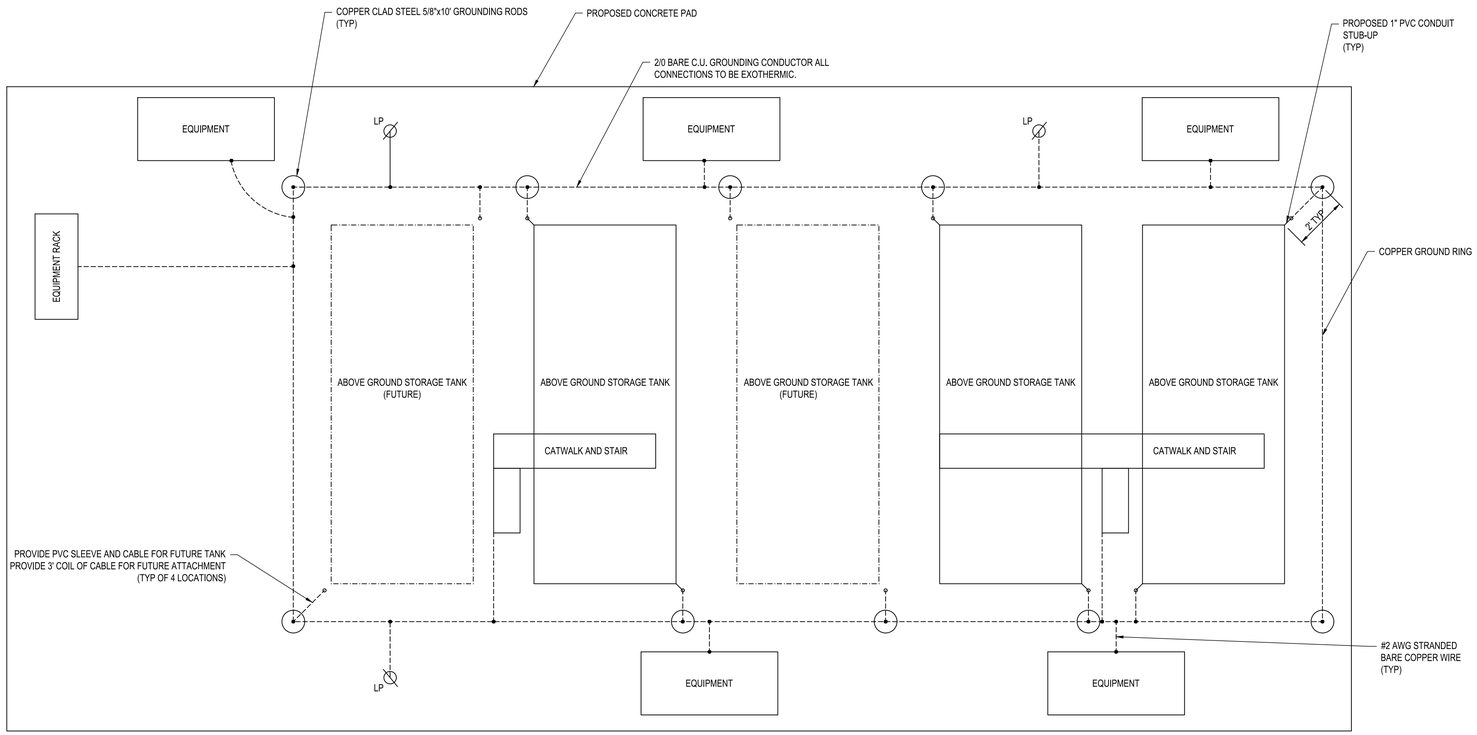
SCALE: NOT TO SCALE



NOTES:
1. INSTALL CONTACTOR IN SHELTER.
2. PROVIDE PLASTIC ENGRAVED LABEL.
3. MOUNT PHOTO CELL ON EXTERIOR OF NORTH WALL.
4. COIL CLEARING CONTACTS AND UNLATCH COIL NOT SHOWN.

C3 APRON LIGHTING WIRING DIAGRAM

SCALE: NOT TO SCALE

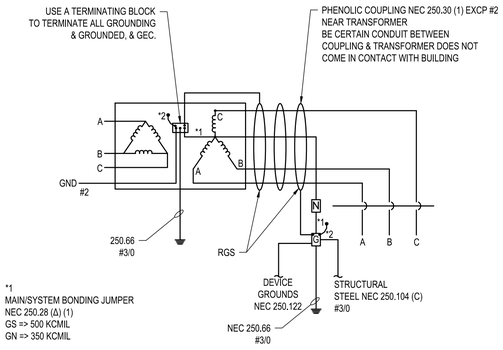


NOTES:

1. GENERAL GROUND REQUIREMENTS SHALL MEET THE REQUIREMENTS OF NFPA 70 AND SHALL INCLUDE BONDING ALL TANK GROUND GRIDS TOGETHER AS WELL AS ALL OTHER INDEPENDENT METALLIC STRUCTURES SUCH AS LIGHT POLES, ALL BACKBOARD EQUIPMENT, SELF SERVICE DEVICES, H-FRAMES, STAIRWAYS, PERMANENTLY INSTALLED EQUIPMENT SKIDS, ETC. THIS SHALL BE CIRCUITED WITH #120 STRANDED BARE CU FOR THE GROUND RING, BONDING TO ANY GROUND RODS, BONDING BETWEEN GROUND RINGS, BONDING TO ALL TANKS AND BONDING ALL EXTERNAL GROUND BARS OR INDIVIDUAL ABOVE GROUND BONDING CONDUCTORS WHICH SHALL BE #2 STRANDED BARE CU. EACH TANK SHALL HAVE AT LEAST TWO BONDING POINTS UNLESS OTHERWISE DIRECTED BY TANK MANUFACTURER, EACH DEVICE OR ENCLOSURE ON AN H-FRAME/CONCRETE PAD SHALL HAVE ITS OWN BONDING CONDUCTOR.
2. ALL OF THE CONNECTIONS UNDERGROUND SHALL BE EXOTHERMIC CONNECTIONS, ALL CONNECTIONS ABOVE GROUND SHALL BE EXOTHERMIC, IRREVERSIBLE, OR IRREVERSIBLE LONG BARREL LUG WITH NEMA DOUBLE LUG CONNECTOR. THE DOUBLE LUG CONNECTOR SHALL BE SECURED WITH STAINLESS STEEL 5/16" BOLT, NUT, WASHER, AND LOCK WASHER. ALL GROUND WIRES BETWEEN DEVICES SHALL BE UNDERGROUND WITH A PVC SLEEVE THROUGH CONCRETE PADS TO AVOID ANY TRIPPING HAZARDS.
3. ALL GROUND RINGS SHALL BE AT LEAST 30" BELOW THE FINAL GRADED SURFACE. ALL OTHER BURIED GROUND CONDUCTORS SHALL BE 24" BELOW THE FINAL GRADED SURFACE. ALL GROUND RINGS SHALL HAVE GROUND RODS 5/8"X 8' PLACE TWO FEET BELOW THE FINISHED SURFACE AND AT DISTANCES SHOWN AND NOT TO BE ANY LESS THAN (2) GROUND RODS FOR ALL GROUND RINGS. ALL GROUND RINGS SHALL BE AT A DISTANCE OF 24"AWAY FROM ALL SUPPORTING PADS OR STRUCTURES ENCIRCLING IT COMPLETELY. ALL BURIED GROUND CONDUCTORS SHALL HAVE A WARNING TAPE PLACED 12" BELOW THE SURFACE WHICH CONTAINS FERROUS TRACE IN IT. CONTRACTOR SHALL SUBMIT A GROUNDING AND BONDING SHOP DRAWING FOR APPROVAL.
4. THE CONTRACTOR SHALL PROVIDE GROUND RESISTANCE TESTING AT ALL METALLIC OBJECTS ,THE GROUND RESISTANCE SHALL BE 10 OHMS OR LESS. IN THE EVENT THAT THE RESISTANCE DOES NOT MEET THIS CRITERIA THE CONTRACTOR SHALL PROVIDE, INSTALL, AND BOND ADDITIONAL GROUND RODS AS WELL AS MAIN CONDUCTORS TO GROUND RODS TO BRING THE GROUNDING RESISTANCE INTO COMPLIANCE. THE GROUND RODS SHALL BE INSTALLED PER THE REQUIREMENTS OF THE NEC. ADDITIONALLY, THE CONTRACTOR SHALL PROVIDE METAL OBJECT GROUNDING RESISTANCE TESTING FOR EACH DEVICE THAT IS GROUNDED AS A SUBMITTAL FOR APPROVAL BY THE ENGINEER.

A1 GLYCOL BULK TANK STORAGE FACILITY GROUNDING DETAIL

SCALE: NOT TO SCALE

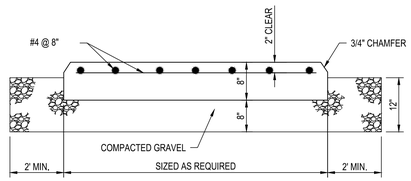


*1
MAIN/SYSTEM BONDING JUMPER
NEC 250.28 (Δ) (1)
GS => 500 KCMIL
GN => 350 KCMIL

*2
SUPPLY SIDE EQUIPMENT BONDING CONDUCTOR
NEC 250.102 #1/0

B4 TRANSFORMER GROUNDING DETAIL

SCALE: NOT TO SCALE



GENERAL NOTES:

1. CONCRETE STRENGTH: 4000PSI @ 28 DAY.
2. REINFORCING STEEL: ATEM A615, GRADE 60.
3. CONCRETE WORK SHALL MEET ALL (ACI) CODES REQUIREMENTS.
4. REMOVE TOP SOIL FROM THE AREA INDICATED IN PLAN.
5. COMPACT SOIL SUBGRADE.
6. PLACE GRAVEL FILL AND COMPACT TO 95% STANDARD PROCTOR
7. INSTALL ANCHOR BOLTS AS RECOMMENDED BY THE EQUIPMENT MANUFACTURER.

A4 SWITCHGEAR & TRANSFORMER CONCRETE PAD DETAIL

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · FRANCESCA K. NEILEY · 099084 · PROFESSIONAL ENGINEER
04/29/2026

SYR. SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	F. NEILEY/ C. BRUBACH
CHECKED BY:	S. SHOVA

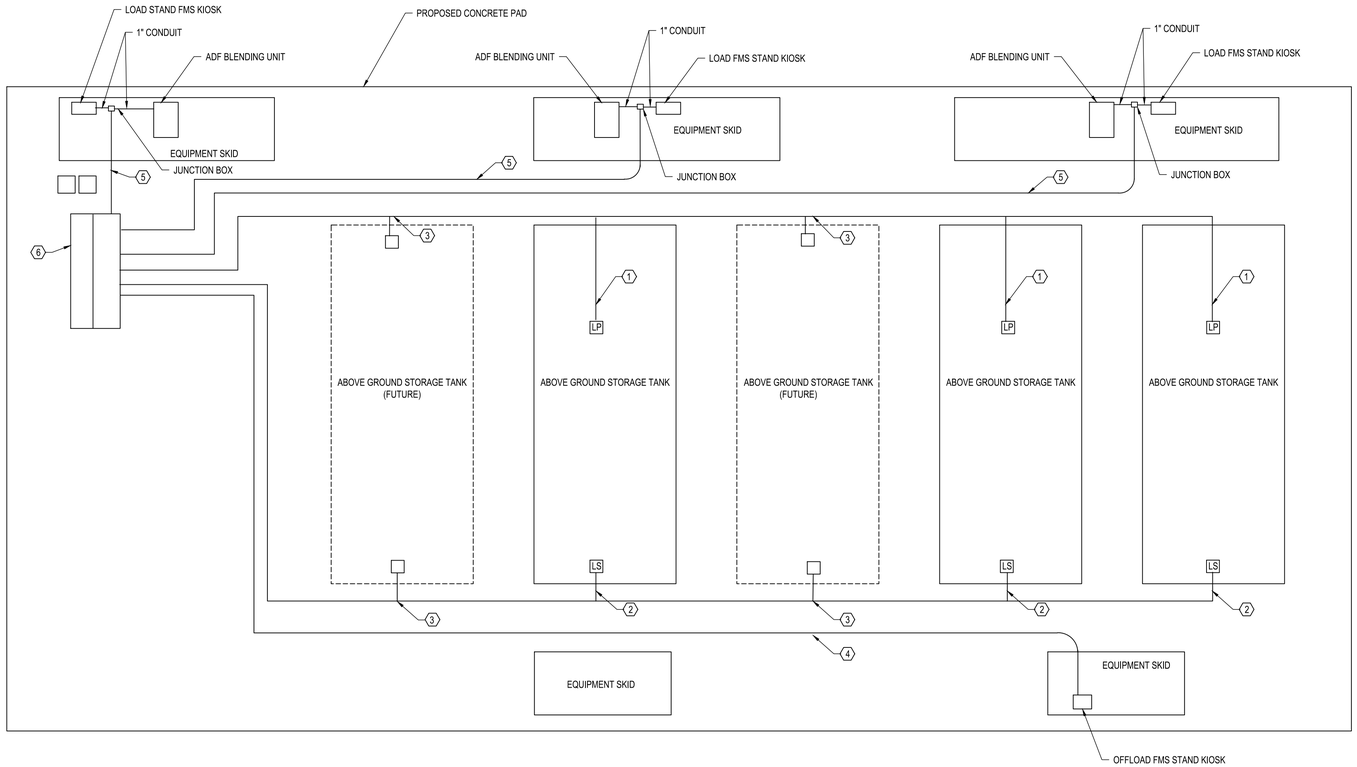
NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

ELECTRICAL EQUIPMENT DETAILS

ES506

SHEET NO. 102 OF 113

Apr 29, 2026 - 3:40pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_ES Details.dwg



KEYED NOTES:

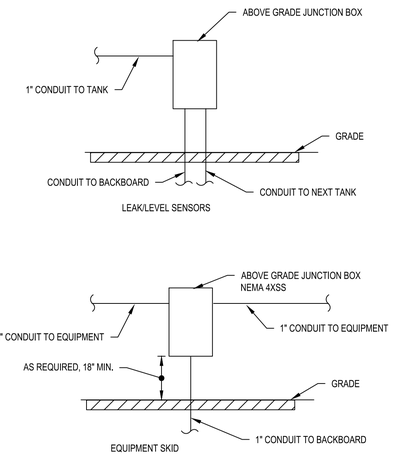
1. 1" CONDUIT WITH CABLING FOR LIQUID LEVEL PROBES TO MONITOR ON ELECTRICAL BACKBOARD. COORDINATE WITH MANUFACTURER FOR CABLE TYPE.
2. 1" CONDUIT WITH CABLING FOR INTERSTITIAL LEAK SENSORS TO MONITOR ON ELECTRICAL BACKBOARD. COORDINATE WITH MANUFACTURER FOR CABLE TYPE.
3. INSTALL JUNCTION IN CONDUIT FOR FUTURE TANK LOCATION.
4. 1" CONDUIT WITH CAT 6 CABLING FOR OFF LOAD KIOSK TO NETWORK SWITCH ON ELECTRICAL BACKBOARD.
5. 1" CONDUIT WITH CAT 6 CABLING FOR LOAD KIOSK AND ADF BLENDING UNIT TO NETWORK SWITCH ON ELECTRICAL BACKBOARD.
6. ELECTRICAL BACKBOARD WITH TELECOM ENCLOSURE AND LEAK/LIQUID LEVEL MONITOR.

SYMBOLS:

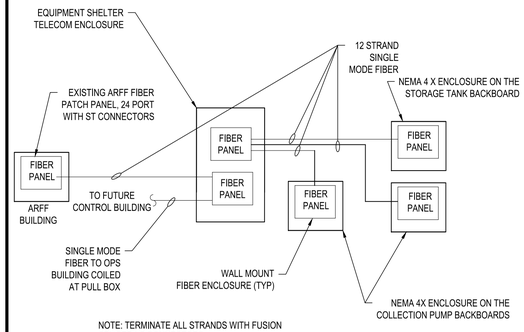
LP LIQUID LEVEL PROBE

LS INTERSTITIAL LEAK SENSOR

A1 TANK TELECOM CONDUIT AND CABLE DETAIL
SCALE: NOT TO SCALE

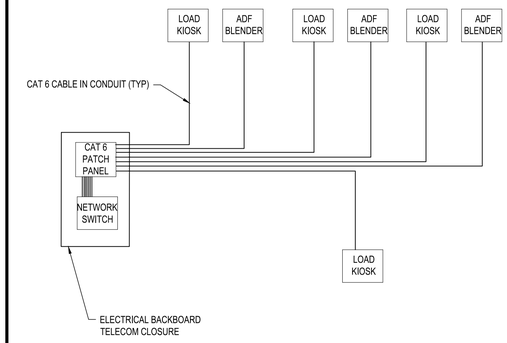


C3 CONDUIT STUB-UP ELEVATION
SCALE: NOT TO SCALE

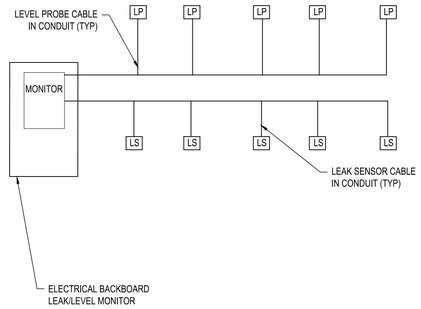


NOTE: TERMINATE ALL STRANDS WITH FUSION SPLICED LC CONNECTORS.

C4 FIBER OPTIC ONE LINE DIAGRAM
SCALE: NOT TO SCALE



B4 ETHERNET ONE-LINE DIAGRAM
SCALE: NOT TO SCALE



A4 LIQUID LEVEL/LEAK DETAIL
SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · FRANCESCA K. MALEY · 099684 · PROFESSIONAL ENGINEER · 04/29/2026

SYR. SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO: O68.069.001
DATE: APRIL 29, 2026
DRAWN BY: D. MASTROPAOLO
DESIGNED BY: W. BARLEY/ C. BRUBACH
CHECKED BY: S. SHOVA

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

TELECOM CABLING AND CONDUIT DETAILS

ES507

SHEET NO. 103 OF 113

Apr 29, 2026 - 3:40pm
P:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_ES Details.dwg

ACCU	AIR COOLED CONDENSING UNIT
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AU	AT UNIT
BFG	BELOW FINISHED GRADE
CT	CURRENT TRANSFORMER
DP	DISTRIBUTION PANEL
EMT	ELECTRIC METALLIC TUBING
FA	FIRE ALARM
FACP	FIRE ALARM CONTROL PANEL
GF	GROUND FAULT INTERRUPTER TYPE
GND	GROUND
JB	JUNCTION BOX
KA	KILO AMP
KV	KILO VOLT
KVA	KILO VOLT AMP
KWHD	KILOW WATT-HOUR DEMAND METER
NC	NORMALLY CLOSED
NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
NO	NORMALLY OPEN
PB	PULL BOX
PT	POTENTIAL TRANSFORMER
REM	REMARKS
RGS	RICID GALVANIZED STEEL CONDUIT
VFD	VARIABLE FREQUENCY DRIVE
WP	WATER PROOF

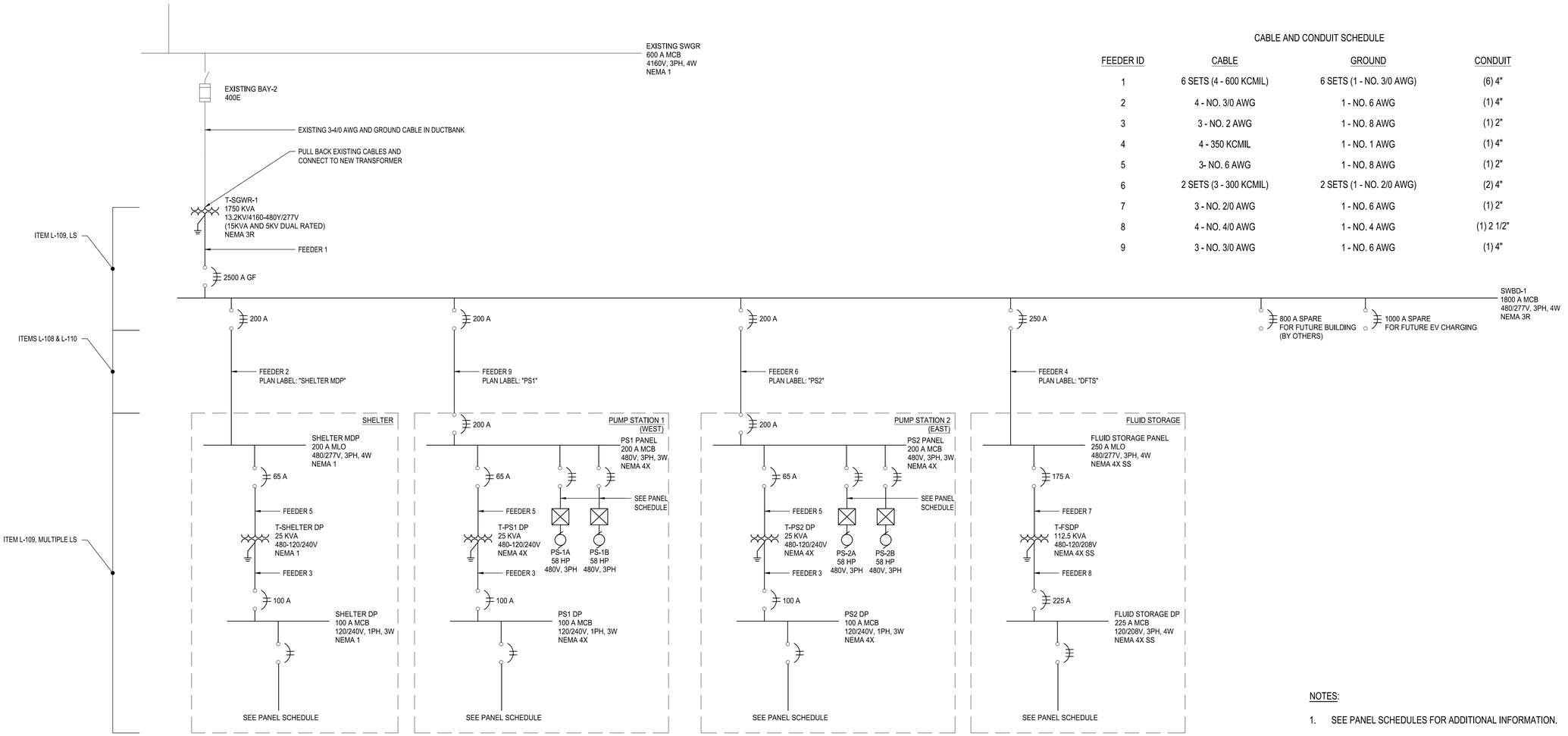
C2 ELECTRICAL ABBREVIATIONS

SCALE: NOT TO SCALE

- SINGLE POLE TOGGLE SWITCH
- DISCONNECT SWITCH (TICKS INDICATE NUMBER OF POLES)
- CIRCUIT BREAKER (TICKS INDICATE NUMBER OF POLES)
- CONTACTS (NORMALLY OPEN)
- CONTACTS (NORMALLY CLOSED)
- FUSE
- GROUND
- (C) CONTACTOR ("M" DENOTES MOTOR CONTACTOR)
- (PC) PHOTO CELL FOR EXTERIOR LIGHTING CONTROL
- CONNECTION POINT OR CABLE SPLICE
- TRANSFORMER
- ELECTRICAL MOTOR
- FUSED DISCONNECT SWITCH
- COMBINATION MOTOR STARTER/CIRCUIT BREAKER DISCONNECT SWITCH
- FUSED DISCONNECT SWITCH
- NON FUSED DISCONNECT SWITCH
- BPS — BOLTED PRESSURE SWITCH w/FUSE
- VFD — VARIABLE FREQUENCY DRIVE

C3 ELECTRICAL SYMBOLS

SCALE: NOT TO SCALE



CABLE AND CONDUIT SCHEDULE

FEEDER ID	CABLE	GROUND	CONDUIT
1	6 SETS (4 - 600 KCMIL)	6 SETS (1 - NO. 3/0 AWG)	(6) 4"
2	4 - NO. 3/0 AWG	1 - NO. 6 AWG	(1) 4"
3	3 - NO. 2 AWG	1 - NO. 8 AWG	(1) 2"
4	4 - 350 KCMIL	1 - NO. 1 AWG	(1) 4"
5	3- NO. 6 AWG	1 - NO. 8 AWG	(1) 2"
6	2 SETS (3 - 300 KCMIL)	2 SETS (1 - NO. 2/0 AWG)	(2) 4"
7	3 - NO. 2/0 AWG	1 - NO. 6 AWG	(1) 2"
8	4 - NO. 4/0 AWG	1 - NO. 4 AWG	(1) 2 1/2"
9	3 - NO. 3/0 AWG	1 - NO. 6 AWG	(1) 4"

NOTES:

1. SEE PANEL SCHEDULES FOR ADDITIONAL INFORMATION.

A1 ELECTRICAL ONE-LINE DIAGRAM

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · FRANCESCA K. NEILEY · 099684 · PROFESSIONAL ENGINEER · 04/29/2026

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	068.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	F. NEILEY/ C. BRUBACH
CHECKED BY:	S. SHOVA

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

SCHEDULES AND ONE-LINE DIAGRAMS

ES601

SHEET NO. 104 OF 113

Apr 29, 2026 - 3:40pm
F:\Projects\C08 - Syracuse Regional Airport Authority\068069001 - Comp Deicing Pad\Design\CADD\Sheet Files\068069001_ES Details.dwg

SWBD-1 PANEL SCHEDULE

2500	AMPS	MAIN BREAKER	2500	AMPS	INSTALLATION	PAD-MOUNT	
480/277	VOLTS	LUGS		AMPS	LOCATION	EXTERIOR	
3	PHASE	GND. BAR	CU		PANEL FEEDER	ELECTRICAL VAULT BAY 2	
4	WIRE	SC RATING	42	KAIC	NOTES:	SEE ONE-LINE DIAGRAM FOR CABLE AND CONDUIT SIZES	
		ENCLOSURE	NEMA 4X				

DESCRIPTION	WIRE	CON	CB. AMPS	CIR #	CIR #	CB. AMPS	CON	WIRE	DESCRIPTION
SHELTER MDP			200/3	1	2	250/3			FLUID STORAGE PANEL
"			"	3	4	"			"
"			"	5	6	"			"
PS-1 PANEL			200/3	7	8	800/3			SPARE (BUILDING)
"			"	9	10	"			"
"			"	11	12	"			"
PS-2 PANEL			200/3	13	14	1000/3			SPARE (EV CHARGERS)
"			"	15	16	"			"
"			"	17	18	"			"
				19	20				
				21	22				
				23	24				
				25	26				
				27	28				
				29	30				
				31	32				
				33	34				
				35	36				
				37	38				
				39	40				
				41	42				

SHELTER MDP PANEL SCHEDULE

200	AMPS	MAIN BREAKER		AMPS	INSTALLATION	SURFACE	
480/277	VOLTS	LUGS	200	AMPS	LOCATION	SHELTER	
3	PHASE	GND. BAR	CU		PANEL FEEDER	SWGR-1	
4	WIRE	SC RATING	42	KAIC	NOTES:		
42	POLE SPACES	ENCLOSURE	NEMA 1				

DESCRIPTION	WIRE	CON	CB. AMPS	CIR #	CIR #	CB. AMPS	CON	WIRE	DESCRIPTION
APRON LIGHTING "PAD LP"	3#3 AWG, 1#1G	2"	30/3	1	2	20/3	3/4"	3#12 AWG, 1#12G	5 KW CCR
"			"	3	4	"			"
"			"	5	6	"			"
EXISTING APRON LIGHTING "PAD LP (EX)"	3#10 AWG	2"	20/3	7	8	65/2	1"	3#6 AWG, 1#8G	T-SHELTER DP
"			"	9	10	"			"
BLOCK HEATER LOAD CENTER "BHR"	3#6 AWG, 1#8G	2"	40/3	11	12				
"			"	13	14				
"			"	15	16				
				17	18				
				19	20				
				21	22				
				23	24				
				25	26				
				27	28				
				29	30				
				31	32				
				33	34				
				35	36				
				37	38				
				39	40				
				41	42				

PS1 PANEL SCHEDULE

200	AMPS	MAIN BREAKER	200	AMPS	INSTALLATION	SURFACE	
480	VOLTS	LUGS		AMPS	LOCATION	PUMP STATION 1	
3	PHASE	GND. BAR	CU		PANEL FEEDER	SWGR-1	
3	WIRE	SC RATING	22	KAIC	NOTES:		
12	POLE SPACES	ENCLOSURE	NEMA 4X				

DESCRIPTION	WIRE	CON	CB. AMPS	CIR #	CIR #	CB. AMPS	CON	WIRE	DESCRIPTION
PUMP 1A	3#2 AWG, 1#8G	2"	100/3	1	2	65/2	1"	3#6 AWG, 1#8G	T-PS1 DP
"			"	3	4	"			"
"			"	5	6				
PUMP 1B	3#2 AWG, 1#8G	2"	100/3	7	8				
"			"	9	10				
"			"	11	12				

PS2 PANEL SCHEDULE

200	AMPS	MAIN BREAKER	200	AMPS	INSTALLATION	SURFACE	
480	VOLTS	LUGS		AMPS	LOCATION	PUMP STATION 2	
3	PHASE	GND. BAR	CU		PANEL FEEDER	SWGR-1	
3	WIRE	SC RATING	22	KAIC	NOTES:		
12	POLE SPACES	ENCLOSURE	NEMA 4X				

DESCRIPTION	WIRE	CON	CB. AMPS	CIR #	CIR #	CB. AMPS	CON	WIRE	DESCRIPTION
PUMP 2A	3#2 AWG, 1#8G	2"	100/3	1	2	65/2	1"	3#6 AWG, 1#8G	T-PS2 DP
"			"	3	4	"			"
"			"	5	6				
PUMP 2B	3#2 AWG, 1#8G	2"	100/3	7	8				
"			"	9	10				
"			"	11	12				

NOTE:

1. SEPARATE PAYMENT SHALL BE MADE FOR THE FOLLOWING CIRCUITS:
   - BLOCK HEATER LOAD CENTER, "BHR"
   - APRON LIGHTING "PAD LP"
   - EXISTING APRON LIGHTING "PAD LP (EX)"

   ALL OTHER CIRCUITS SHOWN ON THIS SHEET SHALL BE INCLUDED IN THE REPRESENTATIVE AND APPLICABLE LUMP SUM ITEM.

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · FRANCESCA K. NEILEY · 099684 · PROFESSIONAL ENGINEER · 04/29/2026

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO: O68.069.001
DATE: APRIL 29, 2026
DRAWN BY: D. MASTROPAOLO
DESIGNED BY: F. NEILEY/ C. BRUBACH
CHECKED BY: S. SHOVA

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

PANEL SCHEDULE

ES602

SHEET NO. 105 OF 113

Apr 29, 2026 - 3:40pm
F:\Project\O68 - Syracuse Regional Airport Authority\O68069001 - Como Deicing Pad\Design\CADD\Sheet Files\O68069001_ES Details.dwg

FLUID STORAGE PANEL SCHEDULE

250	AMPS	MAIN BREAKER	____ AMPS	INSTALLATION	SURFACE
480/277	VOLTS	LUGS	250 AMPS	LOCATION	FLUID STORAGE FACILITY
3	PHASE	GND. BAR	42	PANEL FEEDER	SWGR-1
4	WIRE	SC RATING	42 KAIC	NOTES:	
42	POLE SPACES	ENCLOSURE	NEMA 4X SS		

DESCRIPTION	WIRE	CON	CB. AMPS	CIR #	CIR #	CB. AMPS	CON	WIRE	DESCRIPTION
SITE LIGHTING	3#12 AWG	2"	20/1	1	2	15/3	1"	4#12 AWG	AAF TRANSFER SKID 1
PA OFFLOAD PUMP SKID	4#10 AWG	1"	25/3	3	4	"			"
"			"	5	6	"			"
"			"	7	8	15/3	1"	4#12 AWG	AAF TRANSFER SKID 2
ADF OFFLOAD PUMP SKID	4#10 AWG	1"	25/3	9	10	"			"
"			"	11	12	"			"
"			"	13	14	15/3	1"	4#12 AWG	AAF TRANSFER SKID 3
HEAT TRACE	4#8 AWG	1"	40/2	15	16	"			"
"			"	17	18	"			"
HEAT TRACE	4#8 AWG	1"	40/2	19	20	15/3	1"	4#12 AWG	AAF TRANSFER SKID 4
"			"	21	22	"			"
HEAT TRACE	4#8 AWG	1"	40/2	23	24	"			"
"			"	25	26	175/3	2"	3-2/0 AWG, 1#6G	T-FSDP
				27	28	"			"
				29	30	"			"
				31	32				
				33	34				
				35	36				
				37	38				
				39	40				
				41	42				

FLUID STORAGE DP PANEL SCHEDULE

225	AMPS	MAIN BREAKER	225 AMPS	INSTALLATION	SURFACE
120/208	VOLTS	LUGS	____ AMPS	LOCATION	FLUID STORAGE FACILITY
3	PHASE	GND. BAR	CU	PANEL FEEDER	FLUID STORAGE PANEL
4	WIRE	SC RATING	22 KAIC	NOTES:	WIRE SIZE IS PERMITTED TO BE REDUCED TO FACILITATE TERMINATION IN BREAKER ADJACENT TO PANEL
42	POLE SPACES	ENCLOSURE	NEMA 4X SS		

DESCRIPTION	WIRE	CON	CB. AMPS	CIR #	CIR #	CB. AMPS	CON	WIRE	DESCRIPTION	
RECEPTACLE	3#12 AWG	3/4"	20/1	1	2	15/1	1"	3#12 AWG	HOSE REEL	
FMS KIOSK (OFFLOAD)	3#12 AWG	3/4"	20/1	3	4	15/1	1"	3#12 AWG	HOSE REEL	
OBSTRUCTION LIGHT	3#12 AWG	3/4"	20/1	5	6	15/1	1"	3#12 AWG	HOSE REEL	
ADF BLENDING UNIT 1	4#10 AWG, 1#10G	1"	30/3	7	8	15/1	1"	3#12 AWG	LOAD STAND 1	
"			"	9	10	15/1	1"	3#12 AWG	LOAD STAND 2	
"			"	11	12	15/1	1"	3#12 AWG	LOAD STAND 3	
ADF BLENDING UNIT 2	4#10 AWG, 1#10G	1"	30/3	13	14	15/1	1"	3#12 AWG	HEATED WATER CABINET 1	
"			"	15	16	25/1	1"	3#12 AWG	HEATED WATER CABINET 1	
"			"	17	18	15/1	1"	3#12 AWG	HEATED WATER CABINET 2	
ADF BLENDING UNIT 3	4#10 AWG, 1#10G	1"	30/3	19	20	25/1	1"	3#12 AWG	HEATED WATER CABINET 2	
"			"	21	22	15/1	1"	3#12 AWG	HEATED WATER CABINET 3	
"			"	23	24	25/1	1"	3#12 AWG	HEATED WATER CABINET 3	
FMS KIOSK	3#12 AWG	3/4"	20/1	25	26	25/1*	2"	3#4 AWG	HOT BOX HEATER 1 "HBOX"	← PROVIDE GFCI BREAKER
COMMUNICATIONS ENCLOSURE	3#12 AWG	3/4"	20/1	27	28	25/1*	2"	3#4 AWG	HOT BOX HEATER 2 "HBOX"	← PROVIDE GFCI BREAKER
FMS KIOSK (SKID 1)	3#12 AWG	3/4"	20/1	29	30	20/1	3/4"	3#12 AWG	VALVE 1 & FLOW METER 1	
FMS KIOSK (SKID 2)	3#12 AWG	3/4"	20/1	31	32	20/1	3/4"	3#12 AWG	VALVE 2 & FLOW METER 2	
FMS KIOSK (SKID 3)	3#12 AWG	3/4"	20/1	33	34	20/1	3/4"	3#12 AWG	VALVE 3 & FLOW METER 3	
				35	36					
				37	38					
				39	40					
				41	42					

NOTE:

1. SEPARATE PAYMENT SHALL BE MADE FOR THE FOLLOWING CIRCUITS:
   - HOT BOX HEATER, "HBOX"
   - OBSTRUCTION LIGHTS - APRON LIGHTS, "PAD LP OBS"
   - RWIS RPU #2, "RPU 2"
   - RWIS RPU #3, "RPU 3"

   ALL OTHER CIRCUITS SHOWN ON THIS SHEET SHALL BE INCLUDED IN THE REPRESENTATIVE AND APPLICABLE LUMP SUM ITEM.

2. RWIS RPU CABLE SHALL BE 5KV, 1/C AIRFIELD LIGHTING CABLES, #6 OR #8 AWG AS NOTED.

SHELTER DP PANEL SCHEDULE

100	AMPS	MAIN BREAKER	100 AMPS	INSTALLATION	SURFACE
120/240	VOLTS	LUGS	____ AMPS	LOCATION	SHELTER
1	PHASE	GND. BAR	CU	PANEL FEEDER	SHELTER MDP
3	WIRE	SC RATING	22 KAIC	NOTES:	
24	POLE SPACES	ENCLOSURE	NEMA 1		

DESCRIPTION	WIRE	CON	CB. AMPS	CIR #	CIR #	CB. AMPS	CON	WIRE	DESCRIPTION
OBSTRUCTION LIGHTS - APRON LIGHTS, "PAD LP OBS"	3#12 AWG	2"	20/1	1	2	30/2	3/4"	3#10 AWG	HVAC
COMMUNICATION POWER	3#12 AWG	3/4"	20/1	3	4	"			"
SHED LIGHTING	3#12 AWG	3/4"	20/1	5	6	20/1	3/4"	3#12 AWG	RECEPTACLES
APRON LIGHTING CONTACTOR	3#12 AWG	3/4"	20/1	7	8	20/1	3/4"	3#12 AWG	TANK MONITOR POWER
				9	10	20/1	3/4"	3#12 AWG	LINC CONTROLLER
				11	12	20/1	3/4"	3#12 AWG	ALCMS
				13	14	20/2	3/4"	3#12 AWG	SHELTER HEATER
				15	16	"			"
				17	18				
				19	20				
				21	22				
				23	24				

PS1 DP PANEL SCHEDULE

100	AMPS	MAIN BREAKER	100 AMPS	INSTALLATION	SURFACE
120/240	VOLTS	LUGS	____ AMPS	LOCATION	PUMP STATION 1
1	PHASE	GND. BAR	CU	PANEL FEEDER	PS-1 PANEL
3	WIRE	SC RATING	10 KAIC	NOTES:	
18	POLE SPACES	ENCLOSURE	NEMA 4X		

DESCRIPTION	WIRE	CON	CB. AMPS	CIR #	CIR #	CB. AMPS	CON	WIRE	DESCRIPTION
RECEPTACLE	3#12 AWG	3/4"	20/1	1	2	20/1	3/4"	3#12 AWG	COMMUNICATIONS ENCLOSURE
RWIS RPU2, SEE NOTE 2	3#8 AWG	2"	20/1	3	4	20/1	3/4"	3#12 AWG	OBSTRUCTION LIGHT
				5	6				
				7	8				
				9	10				
				11	12				
				13	14				
				15	16				
				17	18				

PS2 DP PANEL SCHEDULE

100	AMPS	MAIN BREAKER	100 AMPS	INSTALLATION	SURFACE
120/240	VOLTS	LUGS	____ AMPS	LOCATION	PUMP STATION 2
1	PHASE	GND. BAR	CU	PANEL FEEDER	PS-2 PANEL
3	WIRE	SC RATING	10 KAIC	NOTES:	
18	POLE SPACES	ENCLOSURE	NEMA 4X		

DESCRIPTION	WIRE	CON	CB. AMPS	CIR #	CIR #	CB. AMPS	CON	WIRE	DESCRIPTION
RECEPTACLE	3#12 AWG	3/4"	20/1	1	2	20/1	3/4"	3#12 AWG	COMMUNICATIONS ENCLOSURE
RWIS RPU3, SEE NOTE 2	3#6 AWG	2"	20/1	3	4				
				5	6				
				7	8				
				9	10				
				11	12				
				13	14				
				15	16				
				17	18				

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · FRANCESCA K. NEILEY · 099684 · PROFESSIONAL ENGINEER · 04/29/2026

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	F. NEILEY/ C. BRUBACH
CHECKED BY:	S. SHOVA

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

PANEL SCHEDULE

ES603

SHEET NO. 106 OF 113

Apr 29, 2026 - 3:40pm
F:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_ES Details.dwg

	FAA SPEC	FIXTURE	OPTIONS	MOUNTING TYPE/STYLE OPTIONS	LAMP TYPE	ESTIMATED CCR LOAD	TRANSFORMER (SIZED FOR FIXTURE PROVIDED)	NOTES
ELEVATED	L-861T(L)	MEDIUM INTENSITY TAXIWAY EDGE	NO ARCTIC KIT	30" MOUNTING HEIGHT	LED	15W	6.6A (P) / 6.6A (S)	
SEMI-FLUSH	L-852B(L)	TAXIWAY CENTERLINE, WIDE BEAM	UNIDIRECTIONAL ARCTIC KIT	12", STYLE 3	LED	54W	6.6A (P) / 6.6A (S)	12" DIA. CAST SNOW PLOW RING 11.25" BOLT CIRCLE GREEN; YELLOW ILCMS READY

C1 LIGHT FIXTURE DATA TABLE
SCALE: NOT TO SCALE

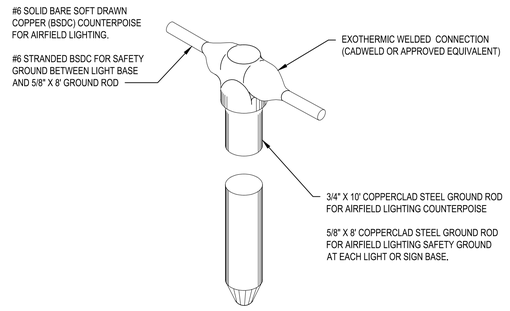
NOTES:

1. BASIS OF DESIGN FOR ESTIMATED CCR LOAD IS ADB SAFEGATE. CCR SIZING MUST BE CHECKED AND ADJUSTED ACCORDINGLY IF THE LOADS VARY BASED ON ALTERNATIVE SUPPLIERS.
2. THE CONTRACTOR SHALL PROVIDE AND TURN OVER THE FOLLOWING SPARE LIGHT FIXTURES IN NEW UNPACKAGED CONDITION TO OWNER.

   (6) L-861T(L); TAXIWAY EDGE
   (6) L-852B(L); TAXIWAY CENTERLINE, WIDE BEAM

   A. PROVIDE OPPOSITE TOE-INS WHERE APPLICABLE TO OBTAIN THE BEST SPARE LIGHT COVERAGE.
   B. 10% OF THE TOTAL QUANTITY USED SPARE BOLTS AND 2 PART LOCK WASHERS FOR ALL GRADE 5 BOLTS USED ON L-868 LIGHT BASES.
   C. A TRANSFER AGREEMENT SHALL BE COMPLETED AND SIGNED BY THE CONTRACTOR AND THE OWNER UPON RECEIPTS OF SPARE PARTS. THE SPARE PARTS PACKAGE MAY NOT EXCEED 10% OF THE ITEM COST NOR A MAXIMUM VALUE OF $10,000. IF THE COST OF THE REQUESTED SPARE PARTS EXCEEDS THESE PARAMETERS, COORDINATE THE PART LIST ADJUSTMENT WITH THE OWNER.
3. CERTAIN MANUFACTURER'S LED LIGHT FIXTURES MAY PRODUCE ENOUGH HEAT TO MEET FAA'S HEAT GENERATION REQUIREMENTS. AN ADDITIONAL ARCTIC KIT IS NOT REQUIRED IN THESE CASES AS NOTED ON THE MANUFACTURER'S EQUIPMENT CATALOG DATA SHEETS.
4. COORDINATE SNOW PLOW RING STYLE WITH LIGHT UNITS PROVIDED FOR COMPATIBILITY.

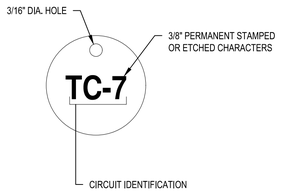
C3 LIGHT FIXTURE NOTES
SCALE: NOT TO SCALE



NOTES:

1. GROUND RODS FOR AIRFIELD LIGHTING #6 COUNTERPOISE SHALL BE INSTALLED AS SHOWN ON LAYOUT PLAN SHEETS AND NOT MORE THAN 500' APART.
2. TOP OF GROUND ROD SHALL BE DRIVEN NOT LESS THAN 12" BELOW GRADE.

C4 AIRFIELD LIGHTING GROUND ROD CONNECTION DETAIL
SCALE: NOT TO SCALE



IDENTIFICATION TAG NOTES:

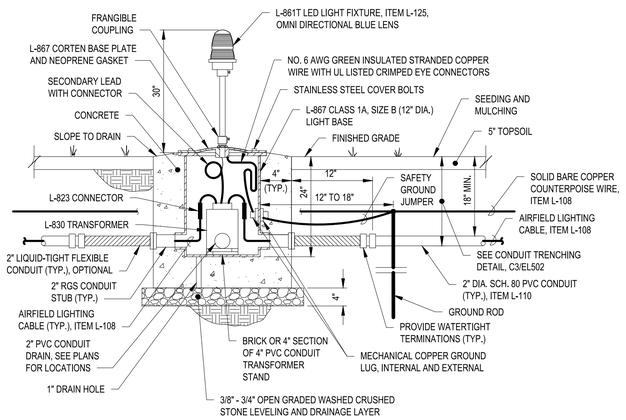
1. AT LEAST TWO CABLE CIRCUIT IDENTIFICATION TAG SHALL BE INSTALLED ON EACH CABLE WITHIN EACH ACCESS POINT ONE AT THE CABLE ENTRANCE AND EXIT.
2. CABLE CIRCUIT IDENTIFICATION TAGS SHALL BE A 1" MIN. 2" MAX. DIA. DISK OF NON-CORROSIVE METAL MATERIAL (BRASS, STAINLESS, ALUMINUM) WITH THE CIRCUIT IDENTIFICATION PERMANENTLY STAMPED OR ENGRAVED.
3. CABLE CIRCUIT IDENTIFICATION TAGS SHALL BE ATTACHED TO CABLES WITH A UV RESISTANCE PLASTIC STRAP,. METAL TIES SHALL NOT BE USED ON CABLES
4. PLASTIC TAGS SHALL NOT BE USED.

B2 CABLE CIRCUIT IDENTIFICATION TAG DETAIL
SCALE: NOT TO SCALE

NOTES:

1. CONNECTION OF CONDUCTORS SHALL BE MADE USING CRIMP CONNECTIONS AND A CRIMPING TOOL APPROVED BY THE MANUFACTURER
2. PROPERLY MATCH THE INSIDE DIAMETER OF CONNECTOR TO THE OUTSIDE DIAMETER OF CABLE FOR A TIGHT FIT.
3. CABLE JACKET SHALL BE REMOVED BY A "PENCILING" TOOL APPROVED BY THE MANUFACTURER. CONDUCTORS SHALL NOT BE NICKED OR DAMAGED.
4. FACTORY MOLDED TRANSFORMER LEADS ONLY REQUIRE TAPE WRAP AFTER INSERTION OF THE PLUG CONNECTOR.

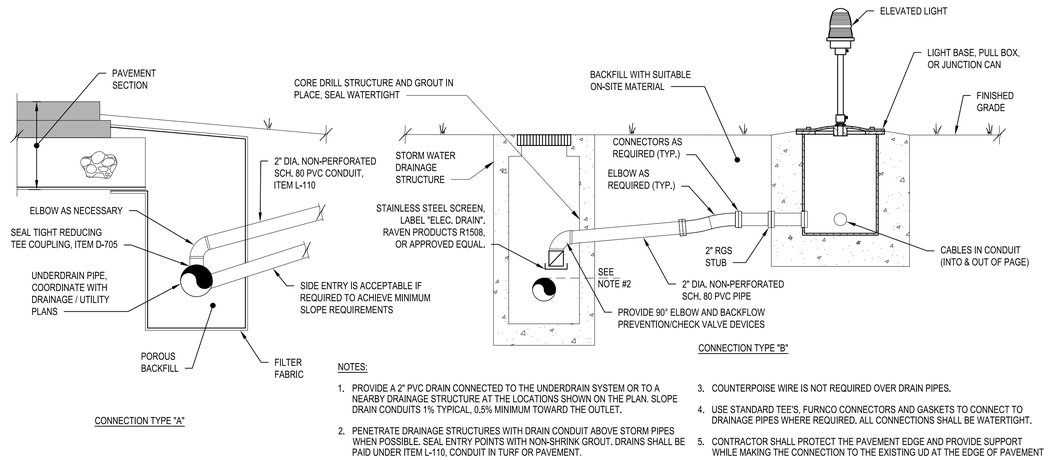
B3 CABLE CONNECTOR DETAIL
SCALE: NOT TO SCALE



LIGHT NOTES:

1. ALL LIGHT BASES SHALL HAVE A MINIMUM OF TWO CONDUIT STUBS SPACED 180 DEGREES APART, CAP CONDUIT IF STUB IS NOT OCCUPIED. ADDITIONAL CONDUIT STUBS MAY BE REQUIRED, SEE PLANS FOR NUMBER AND LOCATION OF STUBS.
2. CONNECT A SAFETY GROUND JUMPER TO THE EXTERNAL GROUND LUG AND ATTACH IT TO A 5/8" DIA. x 8 FT LONG (MIN.) GROUND ROD.
3. CONDUIT OUTBOARD OF THE FLEXIBLE CONDUIT AND AIRFIELD LIGHTING CABLES ARE PAID FOR SEPARATELY. ALL OTHER ITEMS ARE INCLUDED IN PAYMENT FOR THE EDGE LIGHT.
4. TRANSFORMERS FOR L-861T FIXTURES SHALL BE 6.6 AMP PRIMARY/6.6 AMP SECONDARY, SIZE AS REQUIRED FOR LIGHT FIXTURE.
5. PROVIDE A MINIMUM OF 3' OF CABLE SLACK ON PRIMARY CONDUCTORS, AND GREEN GROUND ABOVE THE GROUND SURFACE.
6. WHERE REQUIRED ON THE PLANS, PROVIDE A 2" PVC DRAIN CONNECTOR TO A HUB 90° TO THE LIGHT BASE THAT CONNECTS TO THE UNDERDRAIN SYSTEM, GROUND SUMP OR STORMWATER STRUCTURE. DRAINS ARE POSITIONED AT LOW POINTS IN THE SYSTEM. SEE DETAIL C3/EL501.

A1 ELEVATED LIGHT IN TURF DETAIL (BASE MOUNTED)
SCALE: NOT TO SCALE



NOTES:

1. PROVIDE A 2" PVC DRAIN CONNECTED TO THE UNDERDRAIN SYSTEM OR TO A NEARBY DRAINAGE STRUCTURE AT THE LOCATIONS SHOWN ON THE PLAN. SLOPE DRAIN CONDUITS 1% TYPICAL, 0.5% MINIMUM TOWARD THE OUTLET.
2. PENETRATE DRAINAGE STRUCTURES WITH DRAIN CONDUIT ABOVE STORM PIPES WHEN POSSIBLE. SEAL ENTRY POINTS WITH NON-SHRINK GROUT. DRAINS SHALL BE PAID UNDER ITEM L-110, CONDUIT IN TURF OR PAVEMENT.
3. COUNTERPOISE WIRE IS NOT REQUIRED OVER DRAIN PIPES.
4. USE STANDARD TEE'S, FURNCO CONNECTORS AND GASKETS TO CONNECT TO DRAINAGE PIPES WHERE REQUIRED. ALL CONNECTIONS SHALL BE WATERTIGHT.
5. CONTRACTOR SHALL PROTECT THE PAVEMENT EDGE AND PROVIDE SUPPORT WHILE MAKING THE CONNECTION TO THE EXISTING UD AT THE EDGE OF PAVEMENT

A3 ELECTRICAL SYSTEM DRAINAGE DETAIL
SCALE: NOT TO SCALE

C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · FRANCESCA K. NEILEY · 099684 · PROFESSIONAL ENGINEER
04/29/2026

SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	F. NEILEY/ C. BRUBACH
CHECKED BY:	S. SHOVA

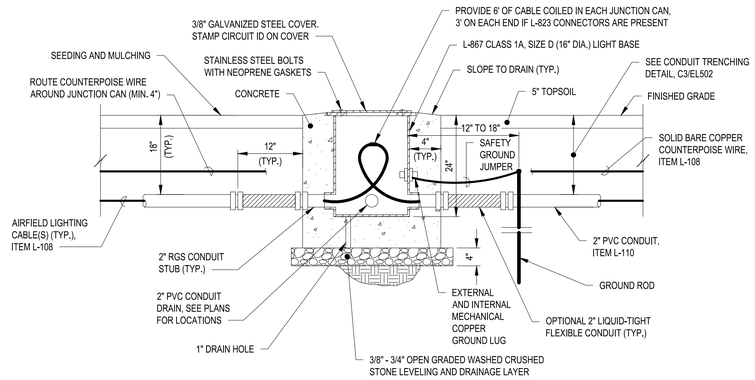
NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

AIRFIELD LIGHTING ELECTRICAL DETAILS

EL501

SHEET NO. 107 OF 113

Apr 29, 2026 - 3:41pm
F:\Projects\C068 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Part\Design\CADD\Sheet Files\O68069001_EL_Details.dwg

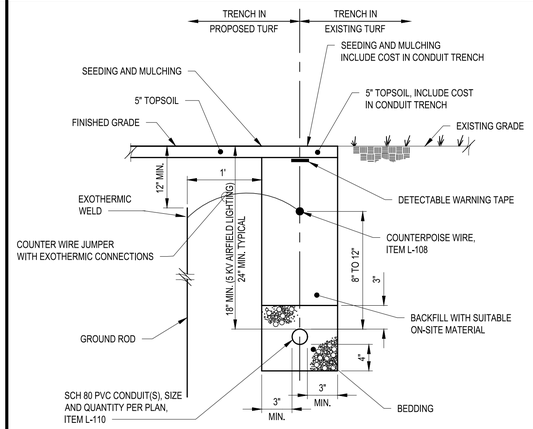


JUNCTION CAN NOTES:

1. ALL JUNCTION CANS SHALL HAVE A MINIMUM OF FOUR (4) CONDUIT STUBS SPACED 90 DEGREES APART. CAP CONDUIT IF STUB IS NOT OCCUPIED. ADDITIONAL CONDUIT STUBS MAY BE REQUIRED, SEE PLANS FOR NUMBER AND LOCATION OF STUBS.
2. CONNECT A SAFETY GROUND JUMPER TO THE EXTERNAL GROUND LUG AND ATTACH IT TO A 5/8" DIA. x 8 FT LONG (MIN.) GROUND ROD.
3. AT INTERVALS NOT EXCEEDING 500 FT, CONNECT THE COUNTERPOISE WIRE TO A 5/8" DIA. x 8 FT LONG (MIN.) GROUND ROD.
4. THE DESIGN INTENT IS TO MINIMIZE THE NUMBER OF SPLICES. SPLICE CABLES ONLY WHERE REQUIRED AND AS APPROVED BY THE RPR.
5. CONDUIT OUTBOARD OF THE FLEXIBLE CONDUIT AND AIRFIELD LIGHTING CABLES ARE PAID FOR SEPARATELY. ALL OTHER ITEMS ARE INCLUDED IN PAYMENT FOR THE JUNCTION CAN.

C1 ELECTRICAL JUNCTION CAN DETAIL (IN TURF)

SCALE: NOT TO SCALE



C3 CONDUIT TRENCHING DETAIL (IN TURF)

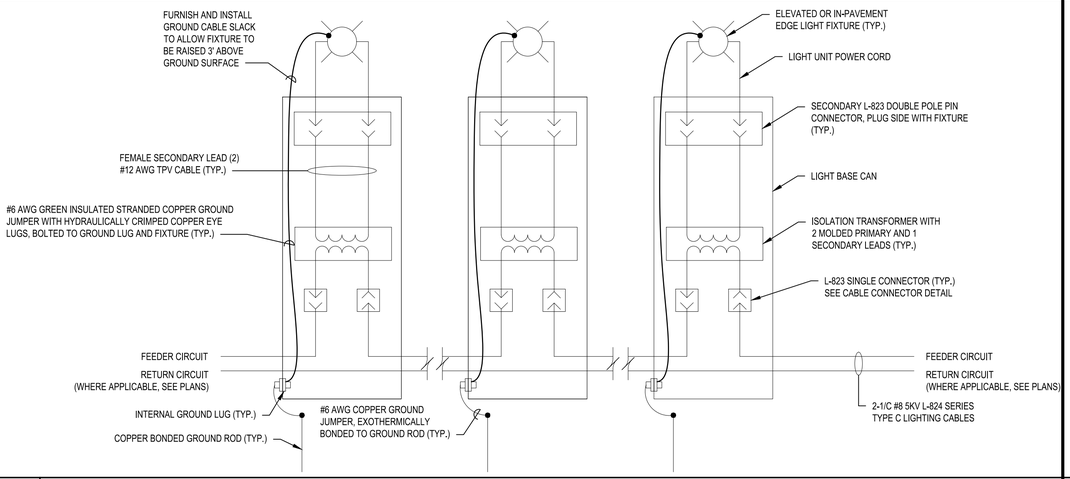
SCALE: NOT TO SCALE

CONDUIT TRENCHING NOTES:

1. EQUIPOTENTIAL LIGHTNING PROTECTION SYSTEM DESIGN IS USED.
2. WHERE REQUIRED, ONE COUNTERPOISE WIRE SHALL BE PROVIDED FOR EVERY 2 CONDUITS OR INCREMENT THERE OF, PLACED IN A COMMON TRENCH. COUNTERPOISE WIRE SHALL BE PLACED PROPORTIONATELY ACROSS THE WIDTH OF CONDUITS.
3. DETECTABLE WARNING TAPE SHALL BE INSTALLED OVER EACH COUNTERPOISE WIRE PRIOR TO PLACING TOPSOIL IN ALL TURF AREAS.
4. PROVIDE 3" BETWEEN MULTIPLE CONDUITS IN A CONDUIT TRENCH HORIZONTALLY OR VERTICALLY STACKED. SEE LIGHTING PLANS FOR NUMBER OF CONDUITS PER TRENCH.
5. THE CONTRACTOR SHALL RESTORE TRENCHED AREAS TO A CONDITION EQUAL TO OR BETTER THAN THE ORIGINAL SURFACE OR AS DIRECTED BY THE RPR.
6. THE TRENCH WIDTH SHALL BE WIDE ENOUGH TO ACCOMMODATE THE CONTRACTOR'S PROPOSED COMPACTION EQUIPMENT AND ACHIEVE THE SPECIFIED COMPACTION REQUIREMENTS.
7. EXCAVATIONS, TRENCHING AND SHORING SHALL BE IN ACCORDANCE WITH OSHA REQUIREMENTS.
8. EXCAVATIONS SHALL NOT UNDERMINE EXISTING PAVEMENTS, STRUCTURES OR UTILITIES.
9. IN EXISTING PAVEMENT AREAS, THE CONTRACTOR SHALL RESTORE TRENCHED AREAS TO A CONDITION EQUAL TO OR BETTER THAN THE ORIGINAL SURFACE. THE COST FOR PAVEMENT RESTORATION SHALL BE INCLUDED IN THE BID PRICE FOR ITEM L-110.
10. CONNECT PROPOSED COUNTERPOISE WIRE TO EXISTING WIRE IF PRESENT. IF NOT PRESENT, TERMINATE COUNTERPOISE WITH NEW GROUND RODS.
11. ALL CONDUIT MINIMUM DEPTH REQUIREMENTS SHALL BE BASED ON PROPOSED FINISHED GRADE. IF SITE EXCAVATION OCCURS OVER CONDUITS AFTER INSTALLATION, THE CONDUITS SHALL BE INITIALLY SET LOWER TO ACCOMMODATE GRADE CHANGES.

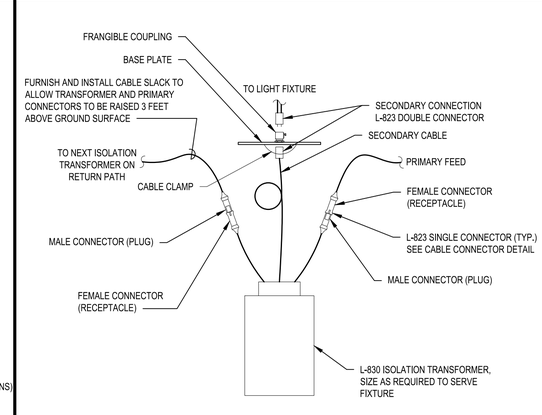
C4 CONDUIT TRENCHING NOTES

SCALE: NOT TO SCALE



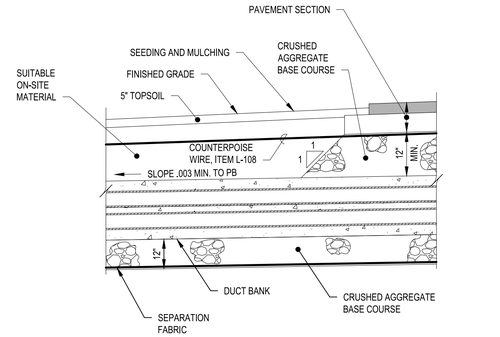
B1 AIRFIELD LIGHTING WIRING DIAGRAM

SCALE: NOT TO SCALE



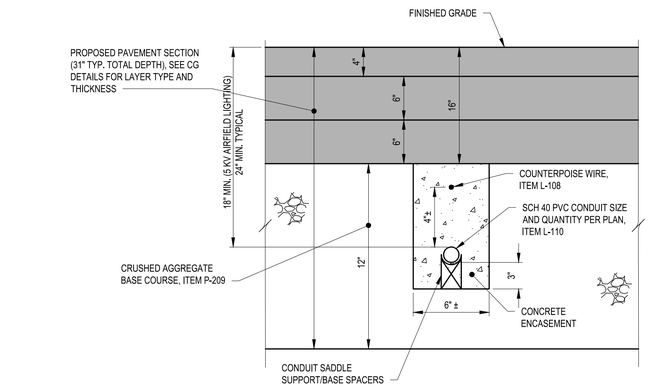
B3 TYPICAL ISOLATION TRANSFORMER CONNECTION DETAIL

SCALE: NOT TO SCALE



B4 DUCT BANK SECTION (TO STRUCTURE)

SCALE: NOT TO SCALE

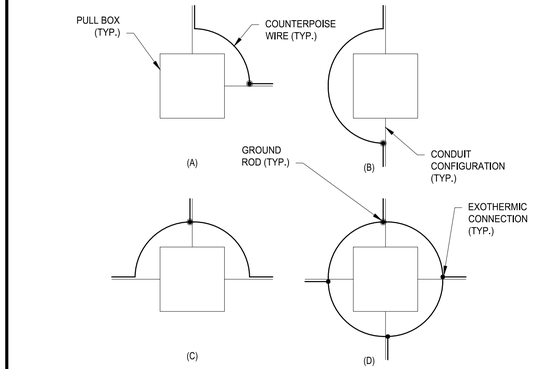


CONDUIT TRENCHING NOTES:

1. TRENCH SHALL HAVE NEAR VERTICAL WALLS AND SHALL NOT RESULT IN UNDERMINING OF THE STONE SUBBASE COURSE
2. CONDUITS SHALL BE PLACED ON GRADE TO CONVEY WATER, DRAIN LIGHT BASES AND CONNECT TO LIGHT BASE HUBS.

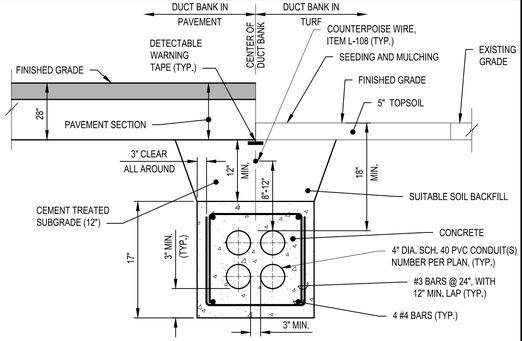
A1 CONDUIT TRENCHING DETAIL (IN NEW FULL DEPTH ASPHALT PAVEMENT)

SCALE: NOT TO SCALE



A3 COUNTERPOISE WIRE GROUNDING LAYOUT DETAIL

SCALE: NOT TO SCALE



DUCT BANK NOTES:

1. EXCAVATIONS, TRENCHING AND SHORING SHALL BE IN ACCORDANCE WITH OSHA REQUIREMENTS.
2. EXCAVATIONS SHALL NOT UNDERMINE EXISTING PAVEMENTS, STRUCTURES OR UTILITIES.
3. CRUSHED AGGREGATE BASE COURSE AND SEPARATION FABRIC SHALL BE INCLUDED IN THE COST OF THE DUCT BANK.
4. WHEN CONNECTING A DUCT BANK TO A STRUCTURE, NO. 4 REINFORCING BARS SHALL BE PLACED IN THE STRUCTURE AND TIED INTO THE DUCT BANK REINFORCING.
5. CONDUITS MAY BE RUN IN ONE PARALLEL HORIZONTAL PLANE IF REQUIRED TO ACHIEVE UTILITY CLEARANCES.

A4 CONCRETE DUCT BANK DETAIL

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · FRANCESCA K. NEILEY · 090.099684 · PROFESSIONAL ENGINEER · 04/29/2026

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	068.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	F. NEILEY/ C. BRUBACH
CHECKED BY:	S. SHOVA

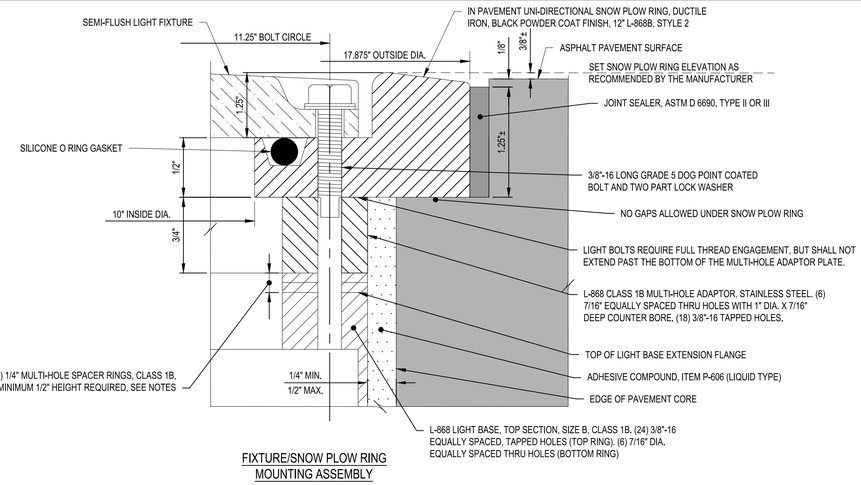
NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

AIRFIELD LIGHTING ELECTRICAL DETAILS

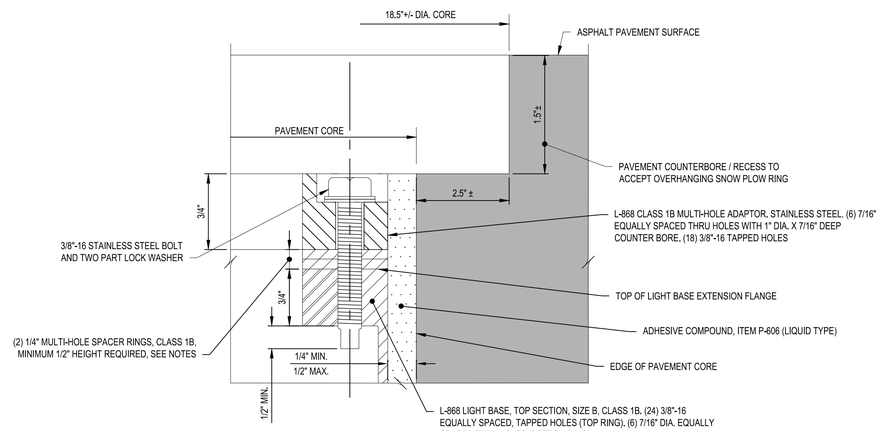
EL502

SHEET NO. 108 OF 113

Apr 29, 2026 - 3:41pm
F:\Projects\068 - Syracuse Regional Airport Authority\068069001 - Comp Deicing Pad\Design\CADD\Sheet Files\068069001_EL_Details.dwg



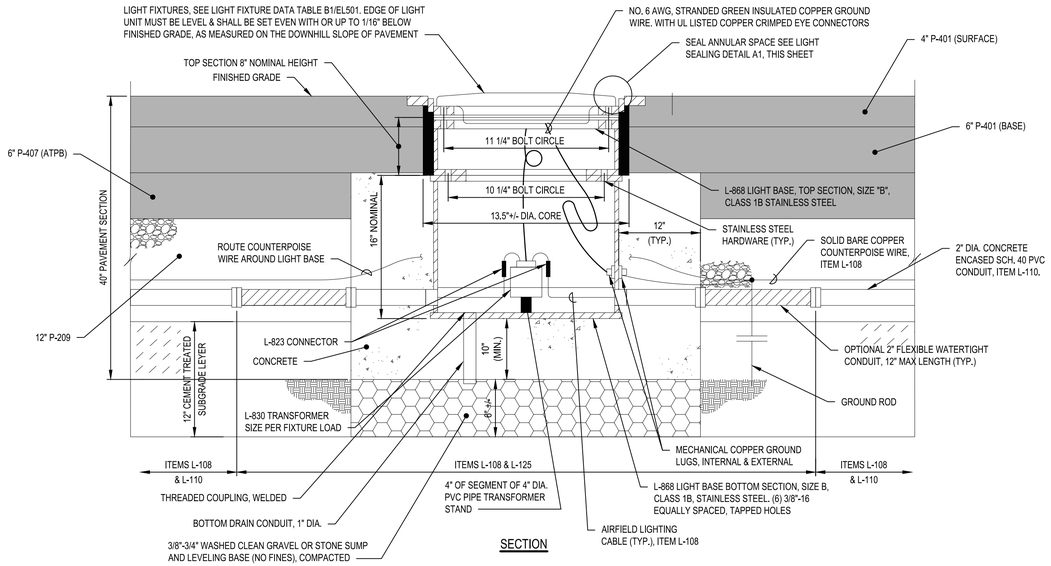
FIXTURE/SNOW PLOW RING MOUNTING ASSEMBLY



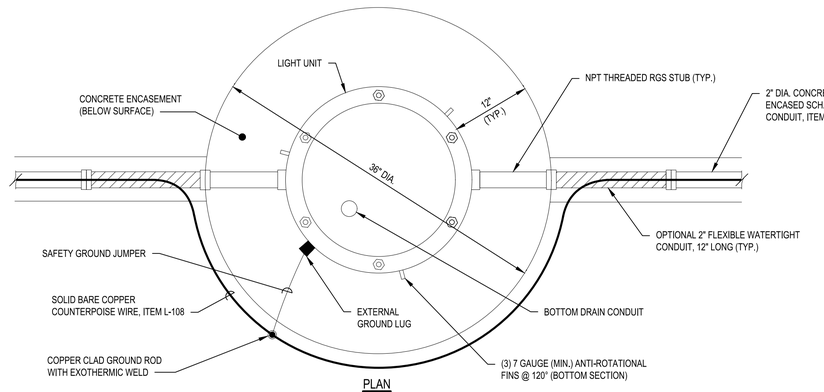
MULTIHOLE ADAPTER AND SPACER RING MOUNTING ASSEMBLY

A1 SEMI-FLUSH LIGHT ASSEMBLY AND SEALING DETAIL

SCALE: NOT TO SCALE



SECTION



PLAN

B3 SEMI-FLUSH LIGHT DETAIL (FULL DEPTH PAVEMENT SECTION APPLICATION)

SCALE: NOT TO SCALE

1. INSTALL AND COMPACT CEMENT TREATED SUBGRADE, CRUSHED AGGREGATE BASE COURSE AND ASPHALT TREATED PERMEABLE BASE COURSES.AUGER LIGHT BASE HOLES AND TRENCH CONDUIT THRU BASE LAYERS. INSTALL BOTTOM SECTION IN CONCRETE USING A JIG TO PRECISELY HOLD THE REQUIRED LOCATION, AZIMUTH AND ELEVATION. SET TOP OF BOTTOM SECTION LEVEL AND TO AN EXACT DEPTH TO ACCOMMODATE THE NOMINAL DEPTH TOP SECTION, SPACERS, GASKET AND CORTEN BASE PLATE BASED ON PROPOSED FINISHED GRADE. CONTRACTOR SHALL FACTOR FACTOR IN ADDED DEPTH OF THE TEMPORARY PLYWOOD COVER PLATE AND STEEL TARGET/MUD PLATE.
2. PROVIDE AND INSTALL 5/8" PLYWOOD (OR 3/4" STEEL) COVER AND MUD/TARGET PLATE. SURVEY AND RECORD THE EXACT CENTER LOCATION.
3. PAVE ASPHALT BASE AND SURFACE COURSES TO FINISHED GRADE COVERING THE BOTTOM SECTION LIGHT BASE.
4. CORE DRILL ASPHALT PAVEMENT SECTION TO REMOVE MUD PLATE AND PLYWOOD COVER. TWO CORES ARE REQUIRED. THE FIRST 4"± CORE WILL EXPOSE THE CENTER LOCATION OF THE TARGET PLATE. THE SECOND LARGER CORE CAN THEN BE PRECISELY CENTERED ON THE LIGHT BASE CONTRACTOR SHALL CONFIRM REQUIRED CORE DIAMETER BASED ON PARTS SUPPLIED. MINIMUM GAP BETWEEN THE CORED ASPHALT AND THE LARGEST DIMENSION OF THE LIGHT BASE COMPONENTS SHALL BE 1/4", MAXIMUM GAP SHALL BE 1/2".
5. INSTALL NOMINAL DEPTH LIGHT BASE TOP SECTION. THE CONTRACTOR SHALL HAVE AN AVAILABLE STOCK OF A VARIETY OF SPACER RINGS OR TOP SECTIONS TO MAKE ELEVATION ADJUSTMENTS. REQUIRED HEIGHT WILL BE SUBJECT TO FINAL ASPHALT PAVEMENT ELEVATION AND WILL VARY BASED ON LOCATION AND PLACEMENT TOLERANCES. ACCEPTABLE PAVEMENT TOLERANCES ARE GENERALLY ±0.5" - CONFIRM WITH PAVEMENT CONTRACTOR.
6. INSTALL TWO STANDARD 1/4" SPACER RINGS. SPACER RINGS SHALL NOT BE PLACED BETWEEN THE LIGHT BASE BOTTOM AND TOP SECTIONS.
7. INSTALL MULTI-HOLE SPACER RING AND MULTI-HOLE ADAPTER.
8. INSTALL CABLE, CONNECTORS, AND L-830 ISOLATION TRANSFORMER, PLACE CONNECTORS NEAR THE TOP OF THE LIGHT BASE.
9. INSTALL LIGHT UNIT.
10. IF THE LIGHT UNIT IS TOO HIGH, REPLACE THE TOP SECTION WITH A SHORTER ONE.
11. IF THE BASE PLATE IS TOO LOW, REPLACE THE TOP SECTION WITH A LONGER ONE, OR IF THE ADJUSTMENT IS MINOR, CORRECT WITH SPACER RINGS. USE NO MORE THAN A TOTAL OF 3 SPACER RINGS AND THE DAM RING COUNTS AS A SPACER RING. THE TOTAL THICKNESS OF THE 3 SPACER RINGS SHALL NOT EXCEED 2".
12. THE INTENT OF THE 2 STANDARD SPACER RINGS IS TO GIVE THE OWNER THE ABILITY OF MAKING ELEVATION ADJUSTMENTS WITHOUT THE NEED TO REPLACE THE TOP SECTION.
13. APPLY GE RTV-118 SILICONE SEALANT OR EQUAL TO ALL MATED METAL SURFACES EXCEPT BETWEEN THE GROOVED FLANGE RING AND THE LIGHT UNIT.
14. SEAL ANNULAR SPACE WITH ITEMS P-606 AND ITEM P-605. ENSURE THAT THE SEALANTS DO NOT ENTER THE LIGHT BASE VIA JOINTS, SEAMS, ETC. LIGHT BASE TO BE OPEN TO SEE INSIDE WHILE PLACING P-606.
15. ALL STAINLESS STEEL BOLTS SHALL BE COATED WITH NON-METALLIC ANTI-SEIZE COMPOUND. STAINLESS STEEL BOLTS SHALL BE USED FOR ELEVATED LIGHT CONNECTIONS. ALL BOLTS SHALL EXTEND FULLY INTO AND EXTEND AT LEAST 1/2" THROUGH THE TOP PLATE.
16. ADDITIONAL CONDUIT HUBS MAY BE REQUIRED, SEE LIGHTING PLANS FOR NUMBER AND LOCATION OF STUBS.
17. TRANSFORMERS FOR FIXTURES SHALL BE 6.6 AMP PRIMARY/6.6 AMP SECONDARY.
18. AIRFIELD LIGHTING CABLES, COUNTERPOISE WIRE AND PVC CONDUIT ARE PAID FOR SEPARATELY. ALL OTHER ITEMS ARE INCLUDED IN PAYMENT FOR THE LIGHT UNIT.
19. PROVIDE A MINIMUM OF 3' OF SLACK ABOVE THE GROUND SURFACE ON PRIMARY CONDUCTORS AND GREEN GROUND.
20. THE CONTRACTOR SHALL BE ADVISED OF THE STRICT ELEVATION AND AZIMUTH TOLERANCES ASSOCIATED WITH SEMI-FLUSH LIGHTS AND SHALL TAKE EXTREME CARE IN ACHIEVING THE TOLERANCES SPECIFIED.
21. THE CONTRACTOR SHALL BE ADVISED THAT THE LIGHT BASE ORIENTATION IS CRITICAL TO ACHIEVE THE LIGHT BEAM AZIMUTH REQUIRED. ALL LIGHTS SHALL BE INSTALLED TO THE ANGLES REQUIRED WITHIN A TOLERANCE OF ± 1°.
22. ENSURE THAT THE PAVEMENT, SEALANTS, SNOW PLOW RING AND LIGHT BASE COMPONENTS DO NOT BLOCK THE LIGHT OPTICS. LIGHT OPTICS WILL BE VISUALLY CHECKED AFTER INSTALLATION.

A3 SEMI-FLUSH LIGHT INSTALL NOTES (IN PAVEMENT)

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · FRANCESCA K. NEILEY · 099684 · PROFESSIONAL ENGINEER · 04/29/2026

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	F. NEILEY/ C. BRUBACH
CHECKED BY:	S. SHOVA

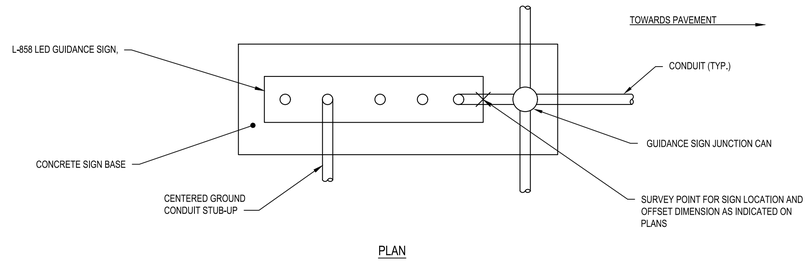
NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

AIRFIELD LIGHTING INPAVEMENT LIGHTING DETAILS

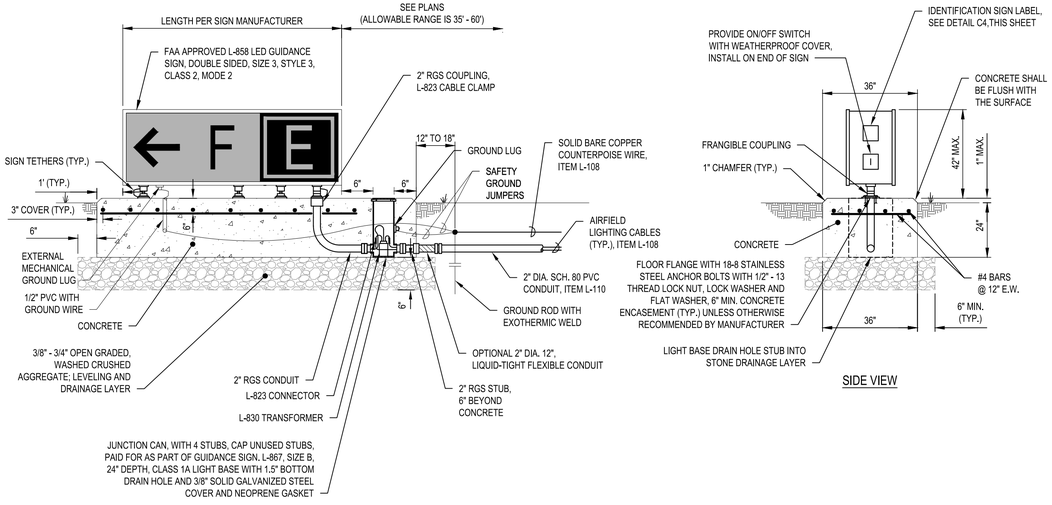
EL503

SHEET NO. 109 OF 113

Apr 29, 2026 - 3:41pm
P:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Devcing Pad\Design\CADD\Sheet Files\O68069001_EL_Details.dwg



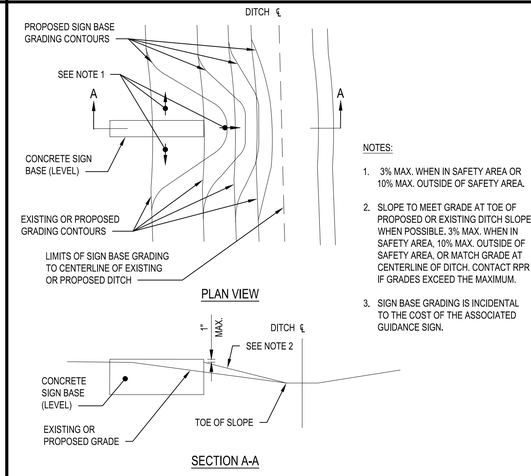
PLAN



SIDE VIEW

B1 GUIDANCE SIGN DETAIL

SCALE: NOT TO SCALE



PLAN VIEW

SECTION A-A

NOTES:

1. 3% MAX. WHEN IN SAFETY AREA OR 10% MAX. OUTSIDE OF SAFETY AREA.
2. SLOPE TO MEET GRADE AT TOE OF PROPOSED OR EXISTING DITCH SLOPE WHEN POSSIBLE. 3% MAX. WHEN IN SAFETY AREA, 10% MAX. OUTSIDE OF SAFETY AREA, OR MATCH GRADE AT CENTERLINE OF DITCH. CONTACT RPR IF GRADES EXCEED THE MAXIMUM.
3. SIGN BASE GRADING IS INCIDENTAL TO THE COST OF THE ASSOCIATED GUIDANCE SIGN.

C3 AIRFIELD GUIDANCE SIGN GRADING DETAIL (IN TURF)

SCALE: NOT TO SCALE

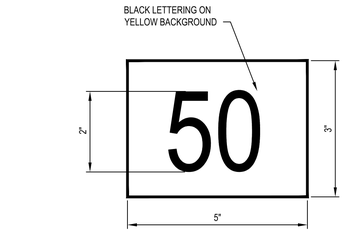
SIGN NO.	CIRCUIT NO.	NO. OF MODULES	SIDE 1	SIDE 2
37	TC-6	2	←F E	E
38	TC-1	2	← A→	
43	TC-6	2	←E A	A
44	TC-6	2	E F→	E
50	TC-6	3	←A E A→	E
53	TC-6	4	DEICE →	← DEICE
154	TC-1	2		←A →

THIS END OF SIGN TOWARDS PAVEMENT EDGE

- INDICATES BLANK PANEL OR BLANK AREA OF PANEL

B3 GUIDANCE SIGN INDEX

SCALE: NOT TO SCALE

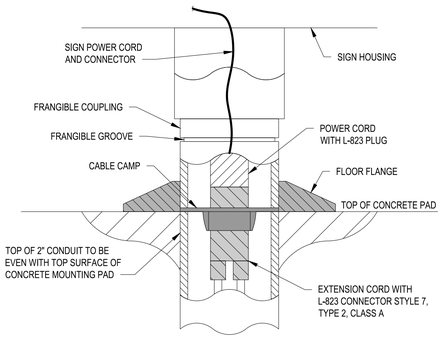


NOTES:

1. THIS ITEM IS INCIDENTAL TO THE COST OF THE ASSOCIATED GUIDANCE SIGN.
2. EACH AIRFIELD SIGN EITHER NEW, RELOCATED, AND/OR MODIFIED SHALL BE FITTED WITH AN ADHESIVE LABEL WITH REFLECTIVE NUMBERS DEPICTING THE SIGN NUMBER ASSIGNED BY THE AIRPORT. ADHESIVE LABEL SHALL BE 10 YEAR VINYL, OR GREATER SERVICE LIFE. PLACARD PRODUCED BY THE SIGN MANUFACTURER WILL BE ACCEPTABLE.
3. THE LABEL IS TO BE PLACED ON THE SIGN'S EDGE WHERE IT IS VISIBLE FROM THE ADJACENT RUNWAY OR TAXIWAY.
4. THE CONTRACTOR IS RESPONSIBLE TO COORDINATE WITH THE AIRPORT OWNER FOR ACTUAL NUMBERS PRIOR TO ORDERING SIGN IDENTIFICATION LABELS.

C4 AIRFIELD GUIDANCE SIGN IDENTIFICATION DETAIL

SCALE: NOT TO SCALE



NOTE:

1. AS REQUIRED BY THE FAA, THIS DETAIL ENSURES THAT THE POWER CORD WILL BE DISCONNECTED IN THE EVENT THAT THE SIGN IS KNOCKED OVER.

B4 GUIDANCE SIGN ELECTRICAL CONNECTION DETAIL

SCALE: NOT TO SCALE

1. SIGNS SHALL BE CENTERED ON CONCRETE PAD.
2. SIGNS THAT CONSIST OF MULTIPLE SEPARATE MODULES NOT CONNECTED TOGETHER MUST HAVE A MINIMUM OF ONE TETHER PER MODULE.
3. SIGNS THAT USE MULTIPLE MODULES CONNECTED TOGETHER IN A CONTINUOUS FRAME MUST USE A TETHER AT BOTH ENDS.
4. JUNCTION CANS FOR GUIDANCE SIGNS SHALL HAVE 4 CONDUIT HUBS SPACED AT 90°.
5. SIGN, FOUNDATION, JUNCTION CAN, CONDUIT AND WIRE BETWEEN SIGN AND JUNCTION CAN, FLEXIBLE CONDUIT, TRANSFORMER AND ANCHOR BOLTS SHALL BE INCLUDED IN COST OF THE SIGN.
6. THE SIGN MODULES ARE BASED ON TWO CHARACTERS PER MODULE. WHEN DETERMINING THE NUMBER OF CHARACTERS IN A GUIDANCE SIGN, THE FIGURES 1 AND - SHALL BE CONSIDERED ONE-HALF OF A CHARACTER. THE NUMBER OF MODULES MAY VARY BASED ON MANUFACTURER. IF A PARTICULAR VENDOR REQUIRES MORE OR LESS MODULES, NO ADDITIONAL PAYMENT SHALL BE MADE FROM WHAT IS SHOWN.
7. THE OWNER RESERVES THE RIGHT TO CHANGE SIGN MESSAGE INFORMATION PRIOR TO FINAL APPROVAL.
8. FLEXIBLE CONDUIT MAY BE USED WHERE NECESSARY, OTHERWISE USE STANDARD PVC TO RGS CONNECTORS.
9. CONTRACTOR IS ADVISED THAT L-830 TRANSFORMERS WILL VARY WITH EACH INDIVIDUAL SIGN AS A RESULT OF WATTAGE AND CURRENT RATINGS FOR THE VARIOUS SIGN SIZE (MODULES) AND CIRCUIT TO BE INSTALLED ON. IT IS THE CONTRACTORS RESPONSIBILITY TO WORK WITH THE SIGN MANUFACTURER TO SUPPLY THE APPROPRIATE L-830 ISOLATION TRANSFORMER FOR EACH NEW SIGN. CONTRACTOR SHALL SUBMIT ISOLATION TRANSFORMER SIZE WITH SIGN SUBMITTAL PACKAGE FOR APPROVAL FROM THE ENGINEER PRIOR TO ACCEPTANCE ON THE PROJECT.
10. THE CONTRACTOR IS ADVISED THAT FOUNDATION SIZES FOR NEW SIGNS WILL VARY AS A RESULT OF THE NUMBER OF SIGN MODULES, SIGN MANUFACTURE REQUIREMENTS, SIZE OF JUNCTION CAN, AND SPECIFIED FOUNDATION OVERHANGS.
11. IT IS THE CONTRACTORS RESPONSIBILITY TO IDENTIFY THE VARIABLE FOUNDATION LENGTHS REQUIRED FOR EACH SIGN AND ACCOUNT FOR THE COSTS UNDER THE RESPECTIVE AIRFIELD GUIDANCE SIGN AND RUNWAY DISTANCE REMAINING SIGN BID ITEMS.
12. SIGN FOUNDATIONS SHALL BE INSTALLED WITH THE JUNCTION CAN NEAREST THE EDGE OF PAVEMENT.
13. SIGNS OVER 170" SIZE 3 IN LENGTH SHALL BE CONSTRUCTED IN TWO SECTIONS, WITH A 3" MIN. TO 12" MAX. CLEAR DISTANCE BETWEEN SIGNS.
14. THE SIGN TOP SHALL BE REMOVABLE FOR MAINTENANCE AND ALLOW FOR VERTICAL/UPWARDS SIGN PANEL REMOVAL/REINSTALLATION.
15. SIGN PANELS SHALL BE MODULAR AND NOT FORMED IN ONE CONTINUOUS PIECE.
16. PROVIDE THE STRONGEST PANELS PRODUCED BY THE PARTICULAR MANUFACTURER.
17. SIGN MANUFACTURER SHALL MOUNT ALL POWER, CONTROL, AND CIRCUIT BOARDS IN A PROTECTED LOCATION WITHIN THE SIGN HOUSING.
18. PROVIDE ONE SET TOTAL OF STANDARD SPARE PARTS, ITEM L-125 SPARE SIGN PARTS, LUMP SUM, INCLUDING:
    - CONTROLLER / CONTROL BOARDS 2 EA
    - LAMPS / LIGHT STRIP
      - LIGHT STRIPS 2 EA OR
      - LIGHT BULBS / LAMPS 12 EA
    - ISOLATION TRANSFORMERS 2 EA
    - FRANGIBLE COUPLINGS 4 EA
    - FLOOR FLANGES / SIGN LEGS 2 EA
    - SURGE PROTECTOR (IF USED BY MANUFACTURER) 2 EA
19. THE NUMBER OF SIGN MODULES REQUIRED TO DISPLAY THE MESSAGE SHOWN MAY VARY BASED ON MANUFACTURER'S STANDARD LAYOUTS. IF A PARTICULAR VENDOR REQUIRES MORE OR LESS MODULES, PAYMENT SHALL BE MADE AS NOTED IN THE GUIDANCE SIGN INDEX. NO ADDITIONAL PAYMENT SHALL BE MADE.

A1 AIRFIELD GUIDANCE SIGN NOTES

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

FRANCESCA K. NEILEY — STATE OF NEW YORK — 090684 — PROFESSIONAL ENGINEER — 04/29/2026

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	068.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	F. NEILEY/ C. BRUBACH
CHECKED BY:	S. SHOVA

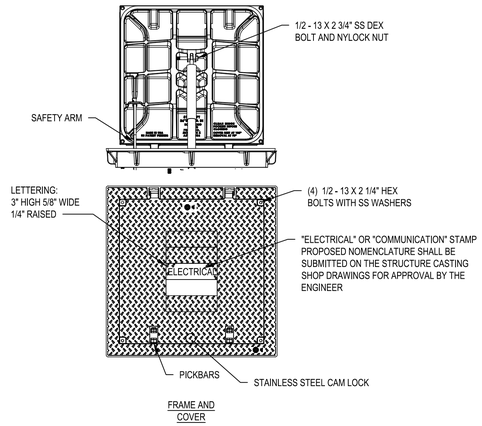
NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

AIRFIELD SIGNAGE DETAILS

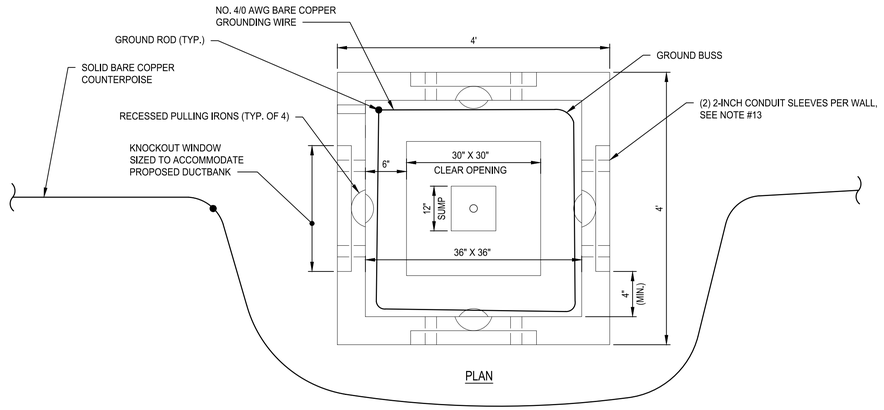
EL504

SHEET NO. 110 OF 113

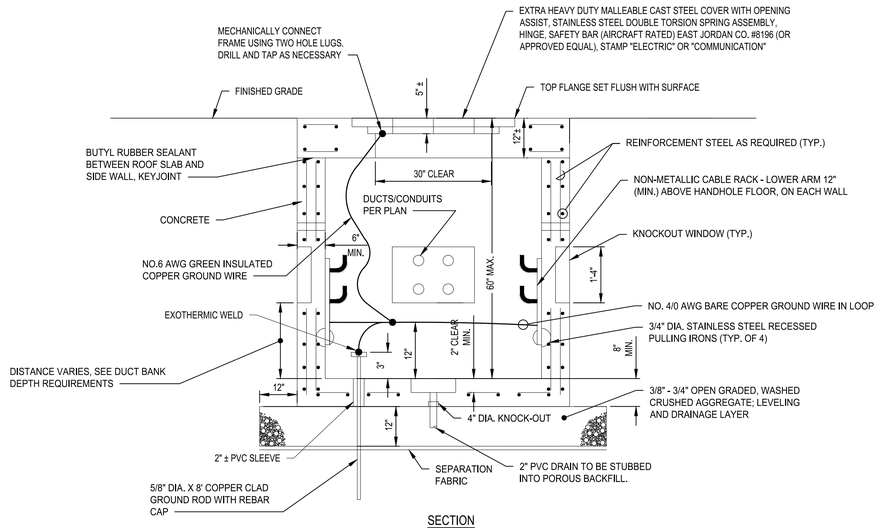
Apr 29, 2026 - 3:41pm
F:\Projects\068 - Syracuse Regional Airport Authority\068069001 - Comp Deicing Pad\Design\CADD\Sheet Files\068069001_EL Details.dwg



FRAME AND COVER



PLAN

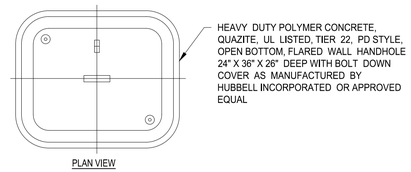


SECTION

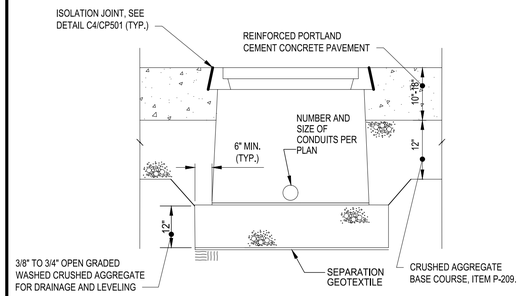
A1 ELECTRICAL PULL BOX DETAIL (AIRCRAFT RATED)
SCALE: NOT TO SCALE

1. ALL STRUCTURES, FRAMES AND GRATES/COVERS INSTALLED WITHIN RUNWAY AND TAXIWAY SAFETY AREAS AND/OR WHERE DESIGNATED AS "AIRCRAFT RATED" SHALL BE DESIGNED TO SUPPORT A300-600 AIRCRAFT (MAXIMUM TAKEOFF WEIGHT 380,518 LBS.) WITH WHEEL SET AIRCRAFT LOADING REQUIREMENTS OF 180,746 LBS. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND MANUFACTURER CERTIFICATIONS TO THE ENGINEER FOR REVIEW PRIOR TO INSTALLATION. SHOP DRAWINGS FOR LOADING SHALL BE STAMPED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF NEW YORK.
2. FRAMES AND COVERS SHALL BE BOLTED TO THE FRAMES.
3. ALL CONCRETE SHALL CONFORM TO ACI 318-89, F'c=4000 PSI, ITEM P-610.
4. REINFORCING STEEL IS NOT SPECIFICALLY SHOWN & SHALL BE DESIGNED BY THE PRECAST MANUFACTURER AND INCLUDED IN THE SHOP DRAWING SUBMITTAL'S.
5. ALL REINFORCING STEEL SHALL CONFORM TO ASTM-615, GRADE 60.
6. THE MINIMUM REBAR COVER SHALL BE 2" FROM ANY SURFACE.
7. ALL CONNECTIONS TO STRUCTURES SHALL BE SEALED WATERTIGHT.
8. CONDUIT LOCATIONS VARY. SEE ELECTRICAL PLAN SHEET FOR DIRECTIONS.
9. EXCAVATION, BACKFILL & SEPARATION FABRIC SHALL BE INCLUDED IN THE COST OF THE PULL BOX.
10. INSTALL 10' OF COILED CABLE IN EACH PULL BOX AT END OF CABLE RUNS.
11. GROUND ALL METALLIC PARTS OF THE PULL BOX, INCLUDING CASTING, WITH A NO.6 AWG GREEN INSULATED STRANDED COPPER WIRE AND CONNECT TO THE GROUND BUS USING UL APPROVED CONNECTORS.
12. DUCT BANKS SHALL DRAIN TOWARD THE PULL BOXES WITH THE CROWN OF THE DUCT BANK MIDWAY BETWEEN STRUCTURES. THE DUCT SLOPE SHALL BE THREE (3) INCHES MINIMUM PER ONE HUNDRED (100) FEET, UNLESS OTHERWISE SPECIFIED.
13. TWO 2" PVC SLEEVES SHALL BE INSTALLED IN EACH WALL OF EVERY PULL BOX WHERE DUCT BANKS AND CONDUITS ARE NOT SHOWN ON THE PLANS. THE SLEEVES SHALL BE POSITIONED 24" MINIMUM BELOW THE GROUND LEVEL TO THE TOP OF THE SLEEVE. THESE SLEEVES ARE FOR FUTURE USE.
14. INSTALL PVC PLUGS IN ALL EMPTY SLEEVES AND DUCTS.
15. CONTRACTOR SHALL CORE DRILL WITH A DIAMOND BIT DRILL, IF REQUIRED FOR OPENINGS FOR NEW CONDUIT. CORED OPENINGS AND CONDUIT PENETRATIONS SHALL BE SEALED WATERTIGHT PRIOR TO BACKFILL.
16. PULL BOXES SHALL BE LOCATED AS SHOWN ON THE PLANS. THE PLACEMENT DEPTH OF THE PULL BOX MAY VARY TO ACCOMMODATE THE DUCT BANKS.
17. ALL PULL BOXES SHALL BE PROVIDED WITH A HEAVY DUTY NON-METALLIC CABLE RACK. LOWER ARM OF CABLE RACK SHALL BE LOCATED 12" ABOVE THE FLOOR OF THE PULL BOX. PROVIDE TWO (2) 3" SADDLES PER CABLE RACK AS MANUFACTURED BY UNDERGROUND DEVICES INCORPORATED OR APPROVED EQUAL. MOUNT USING STAINLESS STEEL HARDWARE AS SPECIFIED BY THE MANUFACTURER.
18. A PULLING IRON SHALL BE PROVIDED IN EACH PULL BOX OPPOSITE EACH CONDUIT ENTRANCE AND KNOCKOUT. THE PULLING IRON WILL BE POSITIONED 4" BELOW THE LEVEL OF CONDUIT OR KNOCKOUT.
19. IN THE EVENT ANY PULL BOX COVER IS NOT INSTALLED WHEN BOX IS PLACED, THE CONTRACTOR SHALL TAKE NECESSARY MEASURES TO ASSURE SAFETY. THE SAFETY MEASURES SHALL INCLUDE, BUT NOT LIMITED TO BARRICADING THE PULL BOX SITE AND COVERING THE HOLE.
20. ALL PULL BOX RIMS SHALL BE SET 2" ABOVE THE FINISHED GRADE FOR THE SURROUNDING AREA IN TURF AREAS, FLUSH TO THE SURFACE IN PAVEMENT AREAS, AS CALLED FOR ON THE PLANS. CONCRETE SHALL BE PLACED FLUSH WITH THE TOP OF CASTING AND GENTLY SLOPED AWAY FROM THE STRUCTURE TO PREVENT THE PONDING OR INFILTRATION OF WATER.
21. EACH PULL BOX SHALL INCLUDE A 5/8" DIAMETER BY 8' MIN. LONG GROUND ROD, EACH GROUND ROD SHALL INDIVIDUALLY TESTED BY THE CONTRACTOR PRIOR TO CONNECTION TO THE COUNTERPOISE TO ENSURE A NOT-TO-EXCEED EARTH RESISTANCE OF 10 OHMS, ADDITIONAL SECTIONS OF GROUND ROD SHALL BE ADDED TO OR A GROUND GRID INSTALLED TO ACHIEVE THE 10 OHM REQUIREMENT.
22. ALL CABLES AND CONNECTORS SHALL BE RACKED AND TIED ABOVE HANDHOLE FLOOR. THE CONNECTORS AND CABLES SHALL BE EASILY ACCESSIBLE TO THE AIRFIELD MAINTENANCE ELECTRICIANS FROM THE EXTERIOR OF THE HANDHOLE.
23. CONNECTION OF EXISTING OR PROPOSED CONDUITS OR DUCT BANK TO PULL BOX, INCLUDING CONCRETE, CONDUIT, CONNECTIONS AND BACKFILL SHALL BE INCIDENTAL TO ITEM L-115.
24. ALL MATERIALS AND COMPONENTS SHOWN ARE INCIDENTAL TO THE ELECTRICAL PULL BOX, ITEM L-115

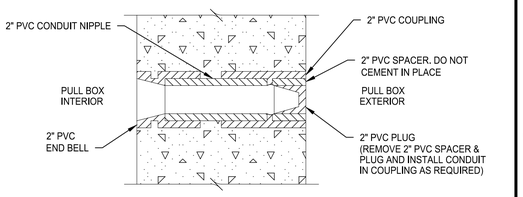
B3 ELECTRICAL PULL BOX NOTES
SCALE: NOT TO SCALE



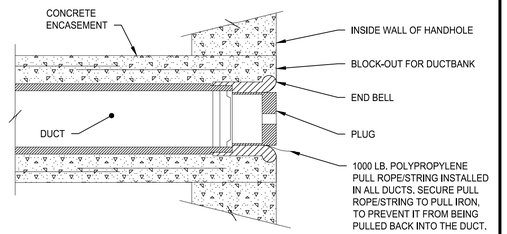
PLAN VIEW



A3 ELECTRIC/COMMUNICATION HANDHOLE DETAIL
SCALE: NOT TO SCALE



C4 2" SLEEVE THROUGH PULL BOX DETAIL
SCALE: NOT TO SCALE



B4 END OF DUCT DETAIL
SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

FRANCESCA K. NEILEY — 099684 — PROFESSIONAL ENGINEER — STATE OF NEW YORK — 04/29/2026

SYR. SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	F. NEILEY/ C. BRUBACH
CHECKED BY:	S. SHOVA

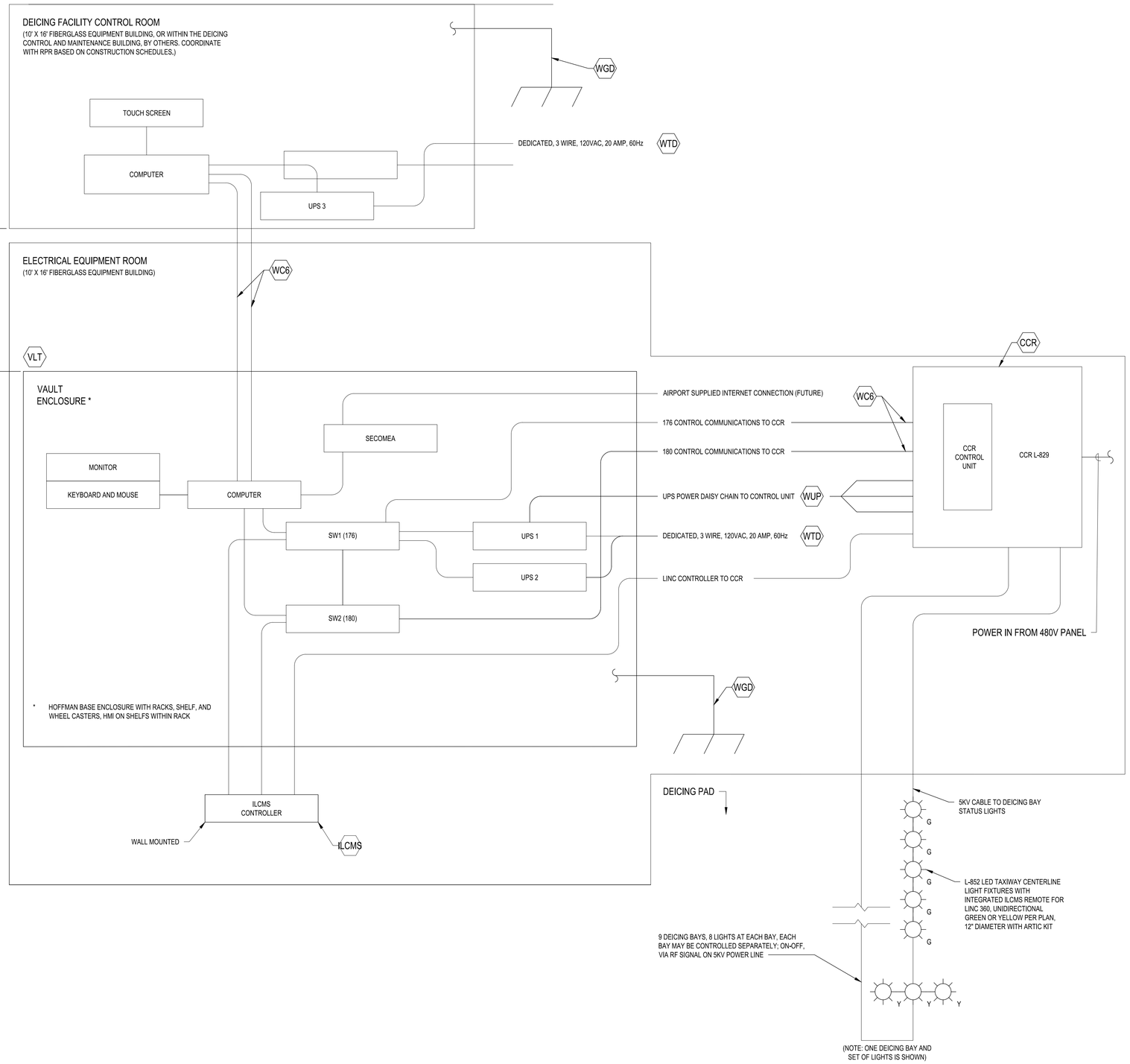
NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

AIRFIELD LIGHTING ELECTRICAL PULLBOX DETAILS

EL505

SHEET NO. 111 OF 113

Apr 29, 2026 - 3:41pm
P:\Projects\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_EL Details.dwg



A1 DEICING FACILITY STATUS LIGHTS POWER AND CONTROL DIAGRAM

SCALE: NOT TO SCALE

GENERAL ASSEMBLIES BILLS OF MATERIAL

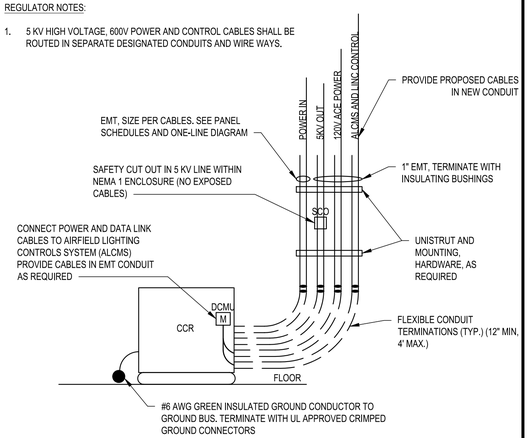
CALLOUT	PART NUMBER/DESCRIPTION	QTY
VLT	L-890 AIRPORT LIGHTING CONTROL AND MONITORING SYSTEM (ALCMS) PC BASED VAULT ASSEMBLY, WITH REMOTE STATION ADVANCED MONITORING	1
SPR	SPARE PARTS ASSEMBLY, STANDARD	1
WGD	WIRE, GROUND, 8AWG STRANDED, MUST BE CONNECTED DIRECTLY TO BUILDING GROUND	A/R
WUP	WIRE, DAISY-CHAINED 120 VAC UPS POWER FROM EQUIPMENT CABINET TO EACH ACE UNIT, 3 CONDUCTOR, 12AWG, STRANDED	A/R
WTD	WIRE TO DEDICATED 20A, 120VAC CIRCUIT	A/R
WC6	WIRE, 23AWG, SOLID BARE COPPER, CAT 6A, NON-PLENUM, SHIELDED, OUTDOOR DIRECT BURIED RATED, WATER BLOCKING GEL FILLED (SUPPORTING 10G UP TO 165')	A/R
ILCMS	INDIVIDUAL LAMP CONTROL AND MONITORING SYSTEM (ILCMS), WALL MOUNT, ENCLOSURE DOOR OPEN LEFT	1
CCR	L-829 CONSTANT CURRENT REGULATOR (CCR), FERRORESONANT, AIR COOLED: 5KW, 6.6 AMP, NO SERIES CUT OUT INCORPORATED, 3-STEP, 480, 60Hz INPUT VOLTAGE, IRMS, INPUT POWER MONITOR, 120 VAC REMOTE CONTROL VOLTAGE, CIRCUIT DESIGNED LOAD = 4.22 KW (CONFIRM BASED ON FIXTURES PROVIDED)	1

B4 GENERAL ASSEMBLIES BILLS OF MATERIAL

SCALE: NOT TO SCALE

REGULATOR NOTES:

1. 5 KV HIGH VOLTAGE, 600V POWER AND CONTROL CABLES SHALL BE ROUTED IN SEPARATE DESIGNATED CONDUITS AND WIRE WAYS.



A4 TYPICAL CONSTANT CURRENT REGULATOR DETAIL

SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · FRANCESCA K. NEILEY · 099684 · PROFESSIONAL ENGINEER · 04/29/2026

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF) SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION
		REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	F. NEILEY/ C. BRUBACH
CHECKED BY:	S. SHOVA

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

DEICING FACILITY STATUS LIGHTS POWER AND CONTROL DIAGRAM

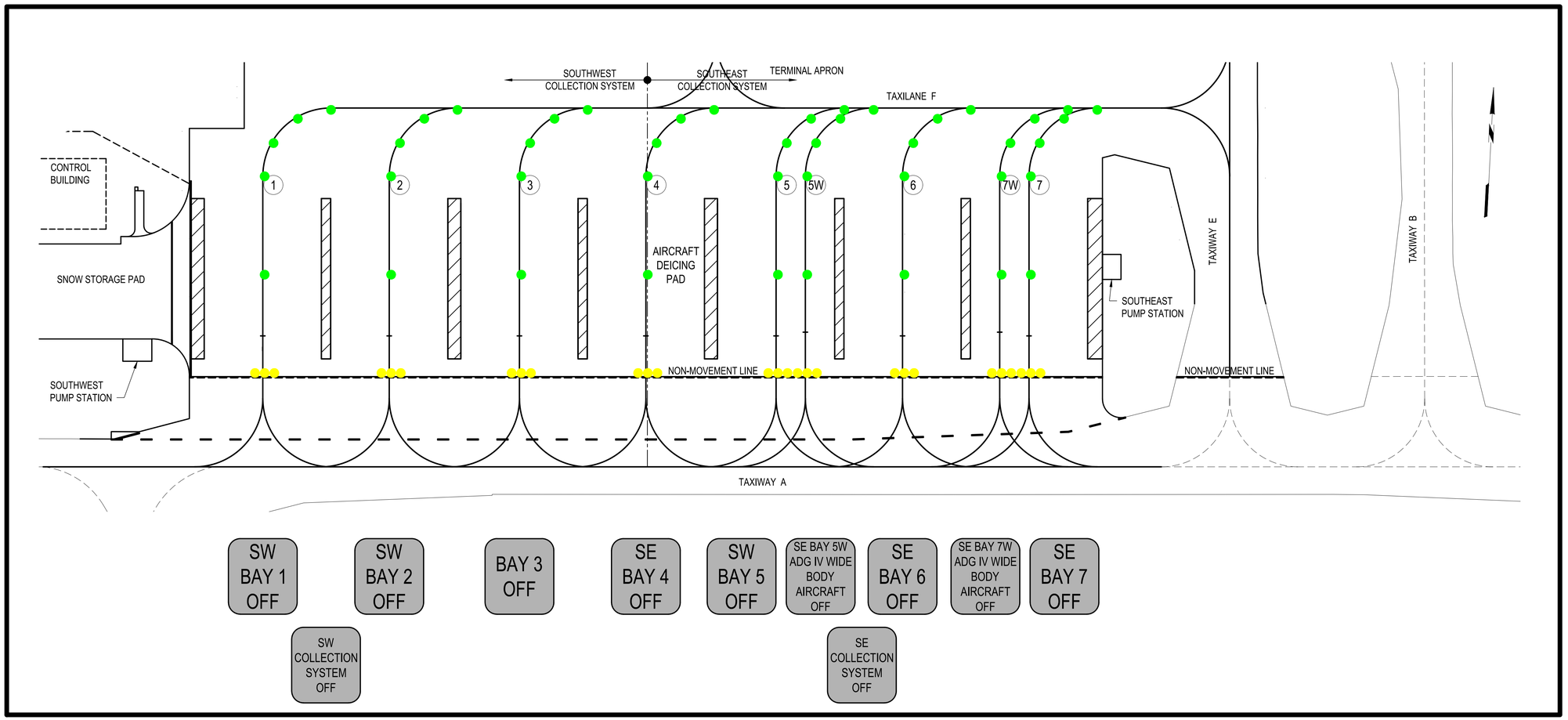
EL506

SHEET NO. 112 OF 113

Apr 29, 2026 - 3:41pm
F:\Project\O68 - Syracuse Regional Airport Authority\O68069001 - Comp Deicing Pad\Design\CADD\Sheet Files\O68069001_EL Details.dwg

1. SYSTEM PRESETS SHALL NOT ALLOW THE FOLLOWING PAIRS: 7 AND 7W; 5W AND 5; 6 AND 7W; 6 AND 5W TO BE OPERATIONAL AT THE SAME TIME.
2. BAY 4 REQUIRES THAT THE SOUTHWEST AND SOUTHEAST COLLECTION SYSTEMS BE ACTIVATED.
3. THE SOUTHWEST COLLECTION SYSTEM MUST BE ACTIVE FOR DEICING IN BAY'S #'S: 1, 2, 3 AND 4.
4. THE SOUTHEAST COLLECTION SYSTEM MUST BE ACTIVE FOR DEICING IN BAY'S #'S: 4, 5, 5W, 6, 7, 7W.
5. AIRCRAFT ENTRY FROM THE NORTH.

C4 NOTES
SCALE: NOT TO SCALE



A1 ALCMS TOUCHSCREEN CONTROL GRAPHIC DIAGRAM
SCALE: NOT TO SCALE

C&S COMPANIES®
C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

STATE OF NEW YORK · FRANCESCA K. NEILEY · 099684 · PROFESSIONAL ENGINEER
04/29/2026

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING FACILITY (CDF)
SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	O68.069.001
DATE:	APRIL 29, 2026
DRAWN BY:	D. MASTROPAOLO
DESIGNED BY:	F. NEILEY/ C. BRUBACH
CHECKED BY:	S. SHOVA

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

ALCMS TOUCHSCREEN CONTROL GRAPHIC DIAGRAM

EL507

SHEET NO. 113 OF 113

Apr 29, 2026 - 3:41pm
F:\Project\O68 - Syracuse Regional Airport Authority\O68069001 - Como Deicing Pad\Design\CADD\Sheet Files\O68069001_EL Details.dwg

TECHNICAL SPECIFICATIONS
FOR THE CONSTRUCTION OF THE

CENTRALIZED DEICING FACILITY (CDF) PROJECT

SYRACUSE HANCOCK INTERNATIONAL AIRPORT (SYR)
SYRACUSE, NEW YORK

C&S PROJECT NO. O68.069.001

OWNER:
SYRACUSE REGIONAL AIRPORT AUTHORITY (SRAA)
1000 COL. EILEEN COLLINS BLVD.
SYRACUSE, NEW YORK 13212

ENGINEER:
C&S ENGINEERS, INC. (C&S)
499 COL. EILEEN COLLINS BOULEVARD
SYRACUSE, NEW YORK 13212
(315) 455-2000

BID DOCUMENTS
NOT FOR CONSTRUCTION

April 29, 2026



Christopher D. Brubach, P.E. - N.Y.S.P.E. Lic. No. 083424

NO ALTERATION PERMITTED HEREIN EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK STATE EDUCATION LAW.

TECHNICAL SPECIFICATIONS TABLE OF CONTENTS

SPECIFICATIONS

PART 1 - GENERAL CONTRACT PROVISIONS

Section 10 Definition of Terms

Section 20 Proposal Requirements and Conditions

20-01 - Advertisement (Notice to Bidders)
20-02 - Qualifications of bidders
20-03 - Contents of proposal forms
20-04 - Issuance of proposal forms
20-05 - Interpretation of estimated proposal quantities
20-06 - Examination of plans, specifications and site
20-07 - Preparation of proposal
20-08 - Responsive and responsible bidder
20-09 - Irregular proposals
20-10 - Bid guarantee
20-11 - Delivery of proposal
20-12 - Withdrawal or revision of proposals
20-13 - Public opening of proposals
20-14 - Disqualification of bidders
20-15 - Discrepancies and omissions

Section 30 Award and Execution of Contract

30-01 - Consideration of proposals
30-02 - Award of contract
30-03 - Cancellation of award
30-04 - Return of proposal guarantee
30-05 - Requirements of contract bonds
30-06 - Execution of contract
30-07 - Approval of contract
30-08 - Failure to execute contract

Section 40 Scope of Work

40-01 - Intent of contract
40-02 - Alteration of work and quantities
40-03 - Omitted items
40-04 - Extra work
40-05 - Maintenance of traffic
40-06 - Removal of existing structures
40-07 - Rights in and use of materials found in the work
40-08 - Final cleanup

Section 50 Control of Work

50-01 - Authority of the Resident Project Representative (RPR)
50-02 - Conformity with plans and specifications
50-03 - Coordination of contract, plans and specifications
50-04 - List of Special Provisions

50-05 - Cooperation of Contractor
50-06 - Cooperation between contractors
50-07 - Construction layout and stakes
50-08 - Authority and duties of Quality Assurance (QA) inspectors
50-09 - Inspection of the work
50-10 - Removal of unacceptable and unauthorized work
50-11 - Load restrictions
50-12 - Maintenance during construction
50-13 - Failure to maintain the work
50-14 - Partial acceptance
50-15 - Final acceptance
50-16 - Claims for adjustment and disputes

Section 60 Control of Materials
60-01 - Source of supply and quality requirements
60-02 - Samples, tests and cited specifications
60-03 - Certification of compliance/analysis (COC/COA)
60-04 - Plant inspection
60-05 - Engineer/ Resident Project Representative (RPR) field office
60-06 - Storage of materials
60-07 - Unacceptable materials
60-08 - Owner furnished materials

Section 70 Legal Regulations and Responsibility to Public
70-01 - Laws to be observed
70-02 - Permits, licenses and taxes
70-03 - Patented devices, materials and processes
70-04 - Restoration of surfaces disturbed by others
70-05 - Federal participation
70-06 - Sanitary, health and safety provisions
70-07 - Public convenience and safety
70-08 - Construction Safety and Phasing Plan (CSPP)
70-09 - Use of explosives
70-10 - Protection and restoration of property and landscape
70-11 - Responsibility for damage claims
70-12 - Third party beneficiary clause
70-13 - Opening sections of the work to traffic
70-14 - Contractor's responsibility for work
70-15 - Contractor's responsibility for utility service and facilities of others
70-15.1 - FAA facilities and cable runs
70-16 - Furnishing rights-of-way
70-17 - Personal liability of public officials
70-18 - No waiver of legal rights
70-19 - Environmental protection
70-20 - Archaeological and historical findings

Attachment A to Section 70-08 – Construction Safety and Phasing Plan (CSPP)

Section 80 Execution and Progress
80-01 - Subletting of contract
80-02 - Notice to proceed
80-03 - Execution and progress

80-04 - Limitation of operations
80-04.1 - Operational safety on airport during construction
80-05 - Character of workers, methods and equipment
80-06 - Temporary suspension of the work
80-07 - Determination and extension of contract time
80-08 - Failure to complete on time
80-09 - Default and termination of contract
80-10 - Termination for national emergencies
80-11 - Work area, storage area and sequence of operations

Section 90 Measurement and Payment
90-01 - Measurement of quantities
90-02 - Scope of payment
90-03 - Compensation for altered quantities
90-04 - Payment for omitted items
90-05 - Payment for extra work
90-06 - Partial payments
90-07 - Payment for materials on hand
90-08 - Payment of withheld funds
90-09 - Acceptance and final payment
90-10 - Construction warranty
90-11 - Contractor Final Project Documentation

SPECIAL PROVISIONS TO THE GENERAL CONTRACT PROVISIONS
SP 20-17 Sales tax exemption
SP 30-09 Conformed Contract Documents
SP 30-10 Issued for Construction Contract Documents
SP 50-18 Removal of water
SP 50-19 Sheeting and bracing
SP 60-09 Shop and setting drawings and catalogue data
SP 60-10 Electrical shop drawings
SP 60-11 Substitute items
SP 60-12 Submittal procedure
SP 70-22 Additional sanitary, health, and safety provisions
SP 90-12 Security for construction warranty
SP 90-13 Lien law

PART 2 – GENERAL CONSTRUCTION ITEMS

Item Number	**Description**
C-100	Contractor Quality Control Program (CQCP)
C-102	Temporary Air and Water Pollution, Soil Erosion, and Siltation Control
C-102.1	Attachment A to C-102 for NY (SWPPP)
C-105	Mobilization
C-106	Safety, Security and Maintenance of Traffic
C-107	Survey and Stakeout
C-110	Method of Estimating Percentage of Material Within Specification Limits (PWL)

TECHNICAL SPECIFICATIONS

FAA Format:

Item Number	Description
P-101	Preparation/Removal of Existing Pavements
P-152	Excavation, Subgrade, and Embankment
P-153	Controlled Low-Strength Material (CLSM)
P-156	Cement Treated Subgrade
P-160	Crushed Stone for Undercut Replacement
P-209	Crushed Aggregate Base Course
P-401	Asphalt Mix Pavement
P-407	Asphalt Treated Permeable Base Course (ATPB)
P-603	Emulsified Asphalt Tack Coat
P-605	Joint Sealants for Pavements
P-608	Emulsified Asphalt Seal Coat
P-610	Concrete for Miscellaneous Structures
P-620	Runway and Taxiway Marking
P-621	Saw-Cut Grooves
P-640	Building Removal
P-670	Automated Machine Guidance
F-170	Guide Railing and Bollards
D-701	Pipe for Storm Drains and Culverts
D-705	Pipe Underdrains for Airports
D-707	Water Main (Ductile Iron Pipe)
D-711	Lining
D-751	Manholes, Catch Basins, Inlets and Inspection Holes
T-901	Seeding
T-905	Topsoil
T-908	Mulching
L-100	Apron Area Lighting
L-108	Underground Power Cable for Airports
L-109	Airport Electric Building Equipment
L-110	Airport Underground Electrical Duct Banks and Conduits
L-115	Electrical Manholes and Junction Structures
L-125	Installation of Airport Lighting Systems
PQ-101	Deicing Fluid Storage Facility
PQ-102	Spoil Area Liner System

CSI Format:

Item Number	Description
02060	Demolition
02090	Universal Waste
02710	Geotextile
02720	Geocomposite Drainage Layer
02730	Geomembrane Liner (Base Liner)
02740	Geomembrane Cover (Cap Liner)
028200	Asbestos Abatement
221119	Domestic Water Piping Specialties
260533.13	Conduits for Electrical Systems
260533.16	Boxes and Covers for Electrical Systems
261216	Dry-Type, Medium-Voltage Transformers
262413	Switchboards
271100	Network Panel Fittings

271300	Backbone Cabling
271500	Communications Copper Horizontal Cabling
271700	Testing and Identification
331000	Water Utilities
331419	Valves and Hydrants
333123	Force Main Piping
333211	Submersible Sewage Pump Station and Equipment
405000	Instrumentation
405001	Control Systems Integrator
405300	Programmable Logic Controllers
409070	Control Panels
430000	Deicing Tanks and Equipment
440000	Equipment Installation
440001	Startup Requirements
440002	Instruction of Operations and Maintenance Personnel
440003	Operations and Maintenance Data

GEOTECHNICAL INFORMATION (Not part of Contract Documents, Reference Only)

Subsurface Investigation and Geotechnical Laboratory Testing Services Report
Prepared by: Renaissance Geotechnical Engineering, dated July 9, 2025

ASBESTOS, LEAD PAINT AND PCB CAULK SURVEY REPORT (Not part of Contract Documents, Reference Only)

Asbestos, Lead Paint, and PCB Caulk Survey Report
Prepared by: Lu Engineers, dated December, 2024

CONTRACT DRAWINGS

Sheet No.	Ref. No.	Title
1.	GI001	Title Sheet
2.	GI002	General Notes and Index to Drawings
3.	GI003	Abbreviations, and Legend
4.	GI004	Quantities
5.	GI101	General Plan
6.	GI102	Overall Site and Key Plan
7.	GI601	Glycol Collection System Process Flow Diagram
8.	GC001	General Work Phasing Notes
9.	GC101	Overall Construction Safety and Phasing Plan
10.	GC102	Construction Safety and Phasing Plan – Work Area A
11.	GC103	Construction Safety and Phasing Plan – Work Area A1
12.	GC104	Construction Safety and Phasing Plan – Work Area A2
13.	GC105	Construction Safety and Phasing Plan – Work Area A3
14.	GC106	Construction Safety and Phasing Plan – Work Area B
15.	GC107	Construction Safety and Phasing Plan – Work Area B1
16.	GC108	Construction Safety and Phasing Plan – Work Area C
17.	GC109	Construction Safety and Phasing Plan – Work Area D
18.	GC501	Construction Safety and Phasing Details
19.	GC502	Construction Safety and Phasing Details
20.	VF100	Existing Conditions Plan
21.	VF101	Existing Conditions Plan
22.	VF102	Existing Conditions Plan

23.	VF103	Existing Conditions Plan
24.	CE100	Soil Erosion and Sediment Control Plan
25.	CE101	Soil Erosion and Sediment Control Plan
26.	CE102	Soil Erosion and Sediment Control Plan
27.	CE103	Soil Erosion and Sediment Control Plan
28.	CE104	Soil Erosion and Sediment Control Plan
29.	CE105	Soil Erosion and Sediment Control Plan
30.	CE501	Soil Erosion and Sediment Control Details
31.	CD100	Demolition Plan
32.	CD101	Demolition Plan
33.	CD102	Demolition Plan
34.	CD103	Demolition Plan
35.	CS100	Geometry Plan (Add On #1)
36.	CS101	Geometry Plan
37.	CS102	Geometry Plan
38.	CS103	Geometry Plan
39.	CG100	Grading Plan (Add On #1)
40.	CG101	Grading Plan
41.	CG102	Grading Plan
42.	CG103	Grading Plan
43.	CG104	Spoil Area Plan
44.	CG201	Taxilane “F” Centerline Profile
45.	CG501	Typical Sections and Details
46.	CG502	Pavement and Grading Details
47.	CG503	On-Site Spoil Area Details
48.	CP101	Joint Sealing and Paving Plan
49.	CP102	Concrete Pavement Joint Plan (Add On #1)
50.	CP501	Concrete Pad Pavement Details (Add On #1)
51.	CP502	Concrete Pad Pavement Details (Add On #1)
52.	CU100	Drainage and Utility Plan
53.	CU101	Drainage and Utility Plan
54.	CU102	Drainage and Utility Plan
55.	CU103	Drainage and Utility Plan
56.	CU104	Drainage and Utility Plan
57.	CU301	Drainage and Utility Profiles
58.	CU302	Drainage and Utility Profiles
59.	CU303	Drainage and Utility Profiles
60.	CU304	Drainage and Utility Profiles
61.	CU401	Enlarged Pump Station Plans
62.	CU501	Drainage Details
63.	CU502	Drainage Details
64.	CU503	Drainage BMP Details
65.	CU504	Drainage BMP Details
66.	CU505	Drainage BMP General Notes
67.	CU506	Channel Drain Details
68.	CU507	Channel Drain Details
69.	CU508	Pump Station Details – Southwest
70.	CU509	Pump Station Details - Southeast
71.	CU510	Drainage Details
72.	CU511	Water Utility Details
73.	CU512	Utility Details
74.	PQ101	Deicing Tanks Plan (Add On #1)
75.	PQ201	Deicing Tank Layout Details (Add On #1)
76.	PQ202	Deicing Tank Layout Details (Add On #1)
77.	PQ501	ADF and AAF System P&ID (Add On #1)

78.	PQ502	Potassium Acetate System P&ID (Add On #1)
79.	PQ503	Deicing Details (Add On #1)
80.	XM101	Marking Plan
81.	XM102	Marking Plan
82.	XM103	Marking Plan
83.	XM501	Pavement Marking Details
84.	XM502	Aircraft Deicing Pad Identification Pavement Marking Details
85.	EI001	General Electrical Notes
86.	ED100	Electrical Demolition Plan
87.	ED101	Electrical Demolition Plan
88.	ED102	Electrical Demolition Plan
89.	ED103	Electrical Demolition Plan
90.	ES100	Electrical Site Plan (Add On #1)
91.	ES101	Electrical Site Plan
92.	ES102	Electrical Site Plan
93.	ES103	Electrical Site Plan
94.	ES104	Electrical Homerun Plan
95.	ES401	Deicing Facility Equipment Shelter Plan
96.	ES402	Deicing Fluid Tank Storage Facility Plan (Add On #1)
97.	ES501	Equipment Shelter Layout Details
98.	ES502	Equipment Shelter and Grounding Details
99.	ES503	Equipment Shelter Foundation Details
100.	ES504	Area Flood Lighting Details
101.	ES505	Equipment Rack Details
102.	ES506	Electrical Equipment Details
103.	ES507	Telecom Cabling and Conduit Details
104.	ES601	Schedules and One-Line Diagrams
105.	ES602	Panel Schedule
106.	ES603	Panel Schedule
107.	EL501	Airfield Lighting Electrical Details
108.	EL502	Airfield Lighting Electrical Details
109.	EL503	Airfield Lighting Inpavement Lighting Details
110.	EL504	Airfield Signage Details
111.	EL505	Airfield Lighting Electrical Pullbox Details
112.	EL506	Deicing Facility Status Lights Power and Control Diagram
113.	EL507	ALCMS Touchscreen Control Graphic Diagram

END OF TABLE OF CONTENTS

Part 1 – General Contract Provisions

Section 10 Definition of Terms

When the following terms are used in these specifications, in the contract, or in any documents or other instruments pertaining to construction where these specifications govern, the intent and meaning shall be defined as follows:

Paragraph Number	Term	Definition
10-01	**AASHTO**	The American Association of State Highway and Transportation Officials.
10-02	**Access Road**	The right-of-way, the roadway and all improvements constructed thereon connecting the airport to a public roadway.
10-03	**Advertisement**	A public announcement, as required by local law, inviting bids for work to be performed and materials to be furnished.
10-04	**Airport**	Airport means an area of land or water which is used or intended to be used for the landing and takeoff of aircraft; an appurtenant area used or intended to be used for airport buildings or other airport facilities or rights of way; airport buildings and facilities located in any of these areas, and a heliport.
10-05	**Airport Improvement Program (AIP)**	A grant-in-aid program, administered by the Federal Aviation Administration (FAA).
10-06	**Air Operations Area (AOA)**	The term air operations area (AOA) shall mean any area of the airport used or intended to be used for the landing, takeoff, or surface maneuvering of aircraft. An air operation area shall include such paved or unpaved areas that are used or intended to be used for the unobstructed movement of aircraft in addition to its associated runway, taxiway, or apron.
10-07	**Apron**	Area where aircraft are parked, unloaded or loaded, fueled and/or serviced.
10-08	**ASTM International (ASTM)**	Formerly known as the American Society for Testing and Materials (ASTM).
10-09	**Award**	The Owner’s notice to the successful bidder of the acceptance of the submitted bid.
10-10	**Bidder**	Any individual, partnership, firm, or corporation, acting directly or through a duly authorized representative, who submits a proposal for the work contemplated.

Paragraph Number	Term	Definition
10-11	**Building Area**	An area on the airport to be used, considered, or intended to be used for airport buildings or other airport facilities or rights-of-way together with all airport buildings and facilities located thereon.
10-12	**Calendar Day**	Every day shown on the calendar.
10-13	**Certificate of Analysis (COA)**	The COA is the manufacturer's Certificate of Compliance (COC) including all applicable test results required by the specifications.
10-14	**Certificate of Compliance (COC)**	The manufacturer's certification stating that materials or assemblies furnished fully comply with the requirements of the contract. The certificate shall be signed by the manufacturer's authorized representative.
10-15	**Change Order**	A written order to the Contractor covering changes in the plans, specifications, or proposal quantities and establishing the basis of payment and contract time adjustment, if any, for work within the scope of the contract and necessary to complete the project.
10-16	**Contract**	A written agreement between the Owner and the Contractor that establishes the obligations of the parties including but not limited to performance of work, furnishing of labor, equipment and materials and the basis of payment. The awarded contract includes but may not be limited to: Advertisement, Contract form, Proposal, Performance bond, payment bond, General provisions, certifications and representations, Technical Specifications, Plans, Supplemental Provisions, standards incorporated by reference and issued addenda.
10-17	**Contract Item (Pay Item)**	A specific unit of work for which a price is provided in the contract.
10-18	**Contract Time**	The number of calendar days or working days, stated in the proposal, allowed for completion of the contract, including authorized time extensions. If a calendar date of completion is stated in the proposal, in lieu of a number of calendar or working days, the contract shall be completed by that date.
10-19	**Contractor**	The individual, partnership, firm, or corporation primarily liable for the acceptable performance of the work contracted and for the payment of all legal debts pertaining to the work who acts directly or through lawful agents or employees to complete the contract work.
10-20	**Contractors Quality Control (QC) Facilities**	The Contractor's QC facilities in accordance with the Contractor Quality Control Program (CQCP).

Paragraph Number	Term	Definition
10-21	**Contractor Quality Control Program (CQCP)**	Details the methods and procedures that will be taken to assure that all materials and completed construction required by the contract conform to contract plans, technical specifications and other requirements, whether manufactured by the Contractor, or procured from subcontractors or vendors.
10-22	**Control Strip**	A demonstration by the Contractor that the materials, equipment, and construction processes results in a product meeting the requirements of the specification.
10-23	**Construction Safety and Phasing Plan (CSPP)**	The overall plan for safety and phasing of a construction project developed by the airport operator, or developed by the airport operator's consultant and approved by the airport operator. It is included in the invitation for bids and becomes part of the project specifications.
10-24	**Drainage System**	The system of pipes, ditches, and structures by which surface or subsurface waters are collected and conducted from the airport area.
10-25	**Engineer**	The individual, partnership, firm, or corporation duly authorized by the Owner to be responsible for engineering, of the contract work and acting directly or through an authorized representative.
10-26	**Equipment**	All machinery, together with the necessary supplies for upkeep and maintenance; and all tools and apparatus necessary for the proper construction and acceptable completion of the work.
10-27	**Extra Work**	An item of work not provided for in the awarded contract as previously modified by change order or supplemental agreement, but which is found by the Owner's Engineer or Resident Project Representative (RPR) to be necessary to complete the work within the intended scope of the contract as previously modified.
10-28	**FAA**	The Federal Aviation Administration. When used to designate a person, FAA shall mean the Administrator or their duly authorized representative.
10-29	**Federal Specifications**	The federal specifications and standards, commercial item descriptions, and supplements, amendments, and indices prepared and issued by the General Services Administration.

Paragraph Number	Term	Definition
10-30	**Force Account**	**a.** Contract Force Account - A method of payment that addresses extra work performed by the Contractor on a time and material basis. **b.** Owner Force Account - Work performed for the project by the Owner's employees.
10-31	**Intention of Terms**	Whenever, in these specifications or on the plans, the words "directed," "required," "permitted," "ordered," "designated," "prescribed," or words of like import are used, it shall be understood that the direction, requirement, permission, order, designation, or prescription of the Engineer and/or Resident Project Representative (RPR) is intended; and similarly, the words "approved," "acceptable," "satisfactory," or words of like import, shall mean approved by, or acceptable to, or satisfactory to the Engineer and/or RPR, subject in each case to the final determination of the Owner. Any reference to a specific requirement of a numbered paragraph of the contract specifications or a cited standard shall be interpreted to include all general requirements of the entire section, specification item, or cited standard that may be pertinent to such specific reference.
10-32	**Lighting**	A system of fixtures providing or controlling the light sources used on or near the airport or within the airport buildings. The field lighting includes all luminous signals, markers, floodlights, and illuminating devices used on or near the airport or to aid in the operation of aircraft landing at, taking off from, or taxiing on the airport surface.
10-33	**Major and Minor Contract Items**	A major contract item shall be any item that is listed in the proposal, the total cost of which is equal to or greater than 20% of the total amount of the award contract. All other items shall be considered minor contract items.
10-34	**Materials**	Any substance specified for use in the construction of the contract work.
10-35	**Modification of Standards (MOS)**	Any deviation from standard specifications applicable to material and construction methods in accordance with FAA Order 5300.1.
10-36	**Notice to Proceed (NTP)**	A written notice to the Contractor to begin the actual contract work on a previously agreed to date. If applicable, the Notice to Proceed shall state the date on which the contract time begins.
10-37	**Owner**	The term "Owner" shall mean the party of the first part or the contracting agency signatory to the contract. Where the term "Owner" is capitalized in this document, it shall mean airport Sponsor only. The Owner for this project is **Syracuse Regional Airport Authority (SRAA)**.

Paragraph Number	Term	Definition
10-38	**Passenger Facility Charge (PFC)**	Per 14 Code of Federal Regulations (CFR) Part 158 and 49 United States Code (USC) § 40117, a PFC is a charge imposed by a public agency on passengers enplaned at a commercial service airport it controls.
10-39	**Pavement Structure**	The combined surface course, base course(s), and subbase course(s), if any, considere4d as a single unit.
10-40	**Payment bond**	The approved form of security furnished by the Contractor and their own surety as a guaranty that the Contractor will pay in full all bills and accounts for materials and labor used in the construction of the work.
10-41	**Performance bond**	The approved form of security furnished by the Contractor and their own surety as a guaranty that the Contractor will complete the work in accordance with the terms of the contract.
10-42	**Plans**	The official drawings or exact reproductions which show the location, character, dimensions and details of the airport and the work to be done and which are to be considered as a part of the contract, supplementary to the specifications. Plans may also be referred to as 'contract drawings.'
10-43	**Project**	The agreed scope of work for accomplishing specific airport development with respect to a particular airport.
10-44	**Proposal**	The written offer of the bidder (when submitted on the approved proposal form) to perform the contemplated work and furnish the necessary materials in accordance with the provisions of the plans and specifications.
10-45	**Proposal guaranty**	The security furnished with a proposal to guarantee that the bidder will enter into a contract if their own proposal is accepted by the Owner.
10-46	**Quality Assurance (QA)**	Owner's responsibility to assure that construction work completed complies with specifications for payment.
10-47	**Quality Control (QC)**	Contractor's responsibility to control material(s) and construction processes to complete construction in accordance with project specifications.
10-48	**Quality Assurance (QA) Inspector**	An authorized representative of the Engineer and/or Resident Project Representative (RPR) assigned to make all necessary inspections, observations, tests, and/or observation of tests of the work performed or being performed, or of the materials furnished or being furnished by the Contractor.

Paragraph Number	Term	Definition
10-49	**Quality Assurance (QA) Laboratory**	The official quality assurance testing laboratories of the Owner or such other laboratories as may be designated by the Engineer or RPR. May also be referred to as Engineer's, Owner's, or QA Laboratory.
10-50	**Resident Project Representative (RPR)**	The individual, partnership, firm, or corporation duly authorized by the Owner to be responsible for all necessary inspections, observations, tests, and/or observations of tests of the contract work performed or being performed, or of the materials furnished or being furnished by the Contractor, and acting directly or through an authorized representative.
10-51	**Runway**	The area on the airport prepared for the landing and takeoff of aircraft.
10-52	**Runway Safety Area (RSA)**	A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to aircraft. See the construction safety and phasing plan (CSPP) for limits of the RSA.
10-53	**Safety Plan Compliance Document (SPCD)**	Details how the Contractor will comply with the CSPP.
10-54	**Specifications**	A part of the contract containing the written directions and requirements for completing the contract work. Standards for specifying materials or testing which are cited in the contract specifications by reference shall have the same force and effect as if included in the contract physically.
10-55	**Sponsor**	A Sponsor is defined in 49 USC § 47102(24) as a public agency that submits to the FAA for an AIP grant; or a private Owner of a public-use airport that submits to the FAA an application for an AIP grant for the airport.
10-56	**Structures**	Airport facilities such as bridges; culverts; catch basins, inlets, retaining walls, cribbing; storm and sanitary sewer lines; water lines; underdrains; electrical ducts, manholes, handholes, lighting fixtures and bases; transformers; navigational aids; buildings; vaults; and, other manmade features of the airport that may be encountered in the work and not otherwise classified herein.
10-57	**Subgrade**	The soil that forms the pavement foundation.
10-58	**Superintendent**	The Contractor's executive representative who is present on the work during progress, authorized to receive and fulfill instructions from the RPR, and who shall supervise and direct the construction.

Paragraph Number	Term	Definition
10-59	**Supplemental Agreement**	A written agreement between the Contractor and the Owner that establishes the basis of payment and contract time adjustment, if any, for the work affected by the supplemental agreement. A supplemental agreement is required if: (1) in scope work would increase or decrease the total amount of the awarded contract by more than 25%: (2) in scope work would increase or decrease the total of any major contract item by more than 25%; (3) work that is not within the scope of the originally awarded contract; or (4) adding or deleting of a major contract item.
10-60	**Surety**	The corporation, partnership, or individual, other than the Contractor, executing payment or performance bonds that are furnished to the Owner by the Contractor.
10-61	**Taxilane**	A taxiway designed for low speed movement of aircraft between aircraft parking areas and terminal areas.
10-62	**Taxiway**	The portion of the air operations area of an airport that has been designated by competent airport authority for movement of aircraft to and from the airport's runways, aircraft parking areas, and terminal areas.
10-63	**Taxiway/Taxilane Safety Area (TSA)**	A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an aircraft. See the construction safety and phasing plan (CSPP) for limits of the TSA.
10-64	**Work**	The furnishing of all labor, materials, tools, equipment, and incidentals necessary or convenient to the Contractor's performance of all duties and obligations imposed by the contract, plans, and specifications.
10-65	**Working day**	A working day shall be any day other than a legal holiday, Saturday, or Sunday on which the normal working forces of the Contractor may proceed with regular work for at least six (6) hours toward completion of the contract. When work is suspended for causes beyond the Contractor's control, it will not be counted as a working day. Saturdays, Sundays and holidays on which the Contractor's forces engage in regular work will be considered as working days.
10-66	**Owner Defined terms**	The following terms are included in this contract:
	Contract Drawings	Plans.
	Subcontractor	The subcontractor refers any individual, firm, or corporation to whom the contractor, with approval of the Owner, sublets any part of work.

Paragraph Number	Term	Definition
	Time and Materials Work	An item or items of work not provided for in the awarded contract as previously modified by change order or supplemental agreement, but which is found by the Engineer to be necessary to complete the work within the intended scope of the contract as previously modified and an agreed price cannot be agreed upon. The Contractor shall perform this work and the Owner agrees to pay the Contractor based upon the work performed by the Contractor's employees and subcontractors, and for materials and equipment used in the construction (along with the Contractor's allowed overhead and profit).

END OF SECTION 10

Section 20 Proposal Requirements and Conditions

20-01 Advertisement (Notice to Bidders). See the Advertisement located in the front of these Contract Documents.

20-02 Qualification of bidders. Within one week of receiving a written request, the bidder shall submit the requirements of this section to the Owner.

Evidence of competency, unless otherwise specified, shall consist of statements covering the bidder's past experience on similar work, and a list of equipment and a list of key personnel that would be available for the work.

Each bidder shall furnish the Owner satisfactory evidence of their financial responsibility. Evidence of financial responsibility, unless otherwise specified, shall consist of a confidential statement or report of the bidder's financial resources and liabilities as of the last calendar year or the bidder's last fiscal year. Such statements or reports shall be certified by a public accountant. At the time of submitting such financial statements or reports, the bidder shall further certify whether their financial responsibility is approximately the same as stated or reported by the public accountant. If the bidder's financial responsibility has changed, the bidder shall qualify the public accountant's statement or report to reflect the bidder's true financial condition at the time such qualified statement or report is submitted to the Owner.

In addition, each bidder who receives a written request shall furnish the following to the Owner:

a. A list of the categories of work to be performed by the bidder's work force and a list of work to be subcontracted out (See Section 80-01).

b. A list of construction projects completed in the past five years. The list shall include the project name, completion date, total contract value, value of bidder's portion of the work, engineer and owner contact information (names and phone numbers).

c. A list of construction projects in progress and under contract including the project name, percent complete, estimated completion date, total contract value, value of bidder's portion of the work, engineer and owner contact information (names and phone numbers).

Unless otherwise specified, a bidder may submit evidence that they are prequalified with the State Highway Division and are on the current "bidder's list" of the state in which the proposed work is located. Evidence of State Highway Division prequalification may be submitted as evidence of financial responsibility in lieu of the certified statements or reports specified above.

20-03 Contents of proposal forms. The Owner's proposal forms state the location and description of the proposed construction; the place, date, and time of opening of the proposals; and the estimated quantities of the various items of work to be performed and materials to be furnished for which unit bid prices are asked. The proposal form states the time in which the work must be completed, and the amount of the proposal guaranty that must accompany the proposal. The Owner will accept only those Proposals properly executed on physical forms or electronic forms provided by the Owner. Bidder actions that may cause the Owner to deem a proposal irregular are given in paragraph 20-09 *Irregular proposals*.

Mobilization, if included in this proposal, is specified in Item C-105.

A nonmandatory prebid conference, if scheduled on this project, will discuss as a minimum, the following items: material requirements; submittals; Quality Control/Quality Assurance requirements; the construction safety and phasing plan including airport access and staging areas; and unique airfield paving construction requirements. The location, date and time are stated in the Advertisement.

20-04 Issuance of proposal forms. The Owner reserves the right to refuse to issue a proposal form to a prospective bidder if the bidder is in default for any of the following reasons:

a. Failure to comply with any prequalification regulations of the Owner, if such regulations are cited, or otherwise included, in the proposal as a requirement for bidding.

b. Failure to pay, or satisfactorily settle, all bills due for labor and materials on former contracts in force with the Owner at the time the Owner issues the proposal to a prospective bidder.

c. Documented record of Contractor default under previous contracts with the Owner.

d. Documented record of unsatisfactory work on previous contracts with the Owner.

20-05 Interpretation of estimated proposal quantities. An estimate of quantities of work to be done and materials to be furnished under these specifications is given in the proposal. It is the result of careful calculations and is believed to be correct. It is given only as a basis for comparison of proposals and the award of the contract. The Owner does not expressly, or by implication, agree that the actual quantities involved will correspond exactly therewith; nor shall the bidder plead misunderstanding or deception because of such estimates of quantities, or of the character, location, or other conditions pertaining to the work. Payment to the Contractor will be made only for the actual quantities of work performed or materials furnished in accordance with the plans and specifications. It is understood that the quantities may be increased or decreased as provided in the Section 40, paragraph 40-02, Alteration of Work and Quantities, without in any way invalidating the unit bid prices.

20-06 Examination of plans, specifications, and site. The bidder is expected to carefully examine the site of the proposed work, the proposal, plans, specifications, and contract forms. Bidders shall satisfy themselves to the character, quality, and quantities of work to be performed, materials to be furnished, and to the requirements of the proposed contract. The submission of a proposal shall be prima facie evidence that the bidder has made such examination and is satisfied to the conditions to be encountered in performing the work and the requirements of the proposed contract, plans, and specifications.

Boring logs and other records of subsurface investigations and tests are available for inspection of bidders. It is understood and agreed that such subsurface information, whether included in the plans, specifications, or otherwise made available to the bidder, was obtained and is intended for the Owner's design and estimating purposes only. Such information has been made available for the convenience of all bidders. It is further understood and agreed that each bidder is solely responsible for all assumptions, deductions, or conclusions which the bidder may make or obtain from their own examination of the boring logs and other records of subsurface investigations and tests that are furnished by the Owner.

20-07 Preparation of proposal. The bidder shall submit their proposal on the forms furnished by the Owner. All blank spaces in the proposal forms, unless explicitly stated otherwise, must be correctly filled in where indicated for each and every item for which a quantity is given. The bidder shall state the price (written in ink or typed) both in words and numerals which they propose for each pay item furnished in the proposal. In case of conflict between words and numerals, the words, unless obviously incorrect, shall govern.

Prices should be written in whole dollars and cents. The extended total amount of each item should not be rounded.

The bidder shall correctly sign the proposal in ink. If the proposal is made by an individual, their name and post office address must be shown. If made by a partnership, the name and post office address of each member of the partnership must be shown. If made by a corporation, the person signing the proposal shall give the name of the state where the corporation was chartered and the name, titles, and business address of the president, secretary, and the treasurer. Anyone signing a proposal as an agent shall file evidence of their authority to do so and that the signature is binding upon the firm or corporation.

20-08 Responsive and responsible bidder. A responsive bid conforms to all significant terms and conditions contained in the Owner's invitation for bid. It is the Owner's responsibility to decide if the exceptions taken by a bidder to the solicitation are material or not and the extent of deviation it is willing to accept.

A responsible bidder has the ability to perform successfully under the terms and conditions of a proposed procurement, as defined in 2 CFR § 200.318(h). This includes such matters as Contractor integrity, compliance with public policy, record of past performance, and financial and technical resources.

20-09 Irregular proposals. Proposals shall be considered irregular for the following reasons:

a. If the proposal is on a form other than that furnished by the Owner, or if the Owner's form is altered, or if any part of the proposal form is detached.

b. If there are unauthorized additions, conditional or alternate pay items, or irregularities of any kind that make the proposal incomplete, indefinite, or otherwise ambiguous.

c. If the proposal does not contain a unit price for each pay item listed in the proposal, except in the case of authorized alternate pay items, for which the bidder is not required to furnish a unit price.

d. If the proposal contains unit prices that are obviously unbalanced.

e. If the proposal is not accompanied by the proposal guaranty specified by the Owner.

f. If the applicable Disadvantaged Business Enterprise information is incomplete.

The Owner reserves the right to reject any irregular proposal and the right to waive technicalities if such waiver is in the best interest of the Owner and conforms to local laws and ordinances pertaining to the letting of construction contracts.

20-10 Bid guarantee. Each separate proposal shall be accompanied by a bid bond, certified check, or other specified acceptable collateral, in the amount specified in the proposal form. Such bond, check, or collateral, shall be made payable to the Owner.

20-11 Delivery of proposal. Refer to SRAA general specifications.

20-12 Withdrawal or revision of proposals. A bidder may withdraw or revise (by withdrawal of one proposal and submission of another) a proposal provided that the bidder's request for withdrawal is received by the Owner in writing or by fax or by email before the time specified for opening bids. Revised proposals must be received at the place specified in the advertisement before the time specified for opening all bids.

20-13 Public opening of proposals. Proposals shall be opened, and read, publicly at the time and place specified in the advertisement. Bidders, their authorized agents, and other interested persons are invited to attend. Proposals that have been withdrawn (by written or telegraphic request) or received after the time specified for opening bids shall be returned to the bidder unopened. Bids will be opened via Microsoft Teams only.

20-14 Disqualification of bidders. Refer to SRAA general specifications.

20-15 Discrepancies and Omissions. A Bidder who discovers discrepancies or omissions with the project bid documents shall immediately notify the Owner's Engineer of the matter. A bidder that has doubt as to the true meaning of a project requirement may submit to the Owner's Engineer a written request for interpretation no later than 7 calendar days prior to bid opening.

Any interpretation of the project bid documents by the Owner's Engineer will be by written addendum issued by the Owner. The Owner will not consider any instructions, clarifications or interpretations of the bidding documents in any manner other than written addendum.

END OF SECTION 20

Section 30 Award and Execution of Contract

30-01 Consideration of proposals. After the proposals are publicly opened and read, they will be compared on the basis of the summation of the products obtained by multiplying the estimated quantities shown in the proposal by the unit bid prices. If a bidder's proposal contains a discrepancy between unit bid prices written in words and unit bid prices written in numbers, the unit bid price written in words shall govern. Where discrepancies in the summation of the products occur, the Owner will make the necessary corrections and the corrected values will be used in the Owner's consideration of proposals.

Until the award of a contract is made, the Owner reserves the right to reject a bidder's proposal for any of the following reasons:

a. If the proposal is irregular as specified in Section 20, paragraph 20-09, *Irregular Proposals*.

b. If the bidder is disqualified for any of the reasons specified Section 20, paragraph 20-14, *Disqualification of Bidders*.

In addition, until the award of a contract is made, the Owner reserves the right to reject any or all proposals, waive technicalities, if such waiver is in the best interest of the Owner and is in conformance with applicable state and local laws or regulations pertaining to the letting of construction contracts; advertise for new proposals; or proceed with the work otherwise. All such actions shall promote the Owner's best interests.

30-02 Award of contract. The award of a contract, if it is to be awarded, shall be made within 45 calendar days of the date specified for publicly opening proposals, unless otherwise specified herein.

If the Owner elects to proceed with an award of contract, the Owner will make award to the responsible bidder whose bid, conforming with all the material terms and conditions of the bid documents, is the lowest in price.

The Owner reserves the right to award only the Base Bid, to award any Alternate Bid (if Alternates are an option), or to award either the Base Bid or the Alternate Bid plus Add-On Bids (if Add-On bids are an option).Where discrepancies occur that affect the bid total(s) as described in the subsection titled CONSIDERATION OF PROPOSALS, the contract amount awarded will reflect the corrected values.

Where alternate bids and/or add-on bids are included in the proposal, the lowest qualified bidder will be determined by comparison of the combination of Base Bid, or Alternate Bid, plus Add-On bids which are chosen by the Owner.

The Owner, based on their operational needs and available grant funding, will select the combination of add-on(s) if included in the Contract. The is no guarantee of which add-on(s) will be selected.

30-03 Cancellation of award. The Owner reserves the right to cancel the award without liability to the bidder, except return of proposal guaranty, at any time before a contract has been fully executed by all parties and is approved by the Owner in accordance with paragraph 30-07 *Approval of Contract*.

30-04 Return of proposal guaranty. All proposal guaranties, except those of the two lowest bidders, will be returned immediately after the Owner has made a comparison of bids as specified in the paragraph 30-01, *Consideration of Proposals.* Proposal guaranties of the two lowest bidders will be retained by the Owner until such time as an award is made, at which time, the unsuccessful bidder's proposal guaranty will be returned. The successful bidder's proposal guaranty will be returned as soon as the Owner receives the contract bonds as specified in paragraph 30-05, *Requirements of Contract Bonds.*

30-05 Requirements of contract bonds. Refer to SRAA general specifications.

30-06 Execution of contract. Refer to SRAA general specifications.

30-07 Approval of contract. Refer to SRAA general specifications.

30-08 Failure to execute contract. Refer to SRAA general specifications.

END OF SECTION 30

Section 40 Scope of Work

40-01 Intent of contract. The intent of the contract is to provide for construction and completion, in every detail, of the work described. It is further intended that the Contractor shall furnish all labor, materials, equipment, tools, transportation, and supplies required to complete the work in accordance with the plans, specifications, and terms of the contract.

40-02 Alteration of work and quantities. The Owner reserves the right to make such changes in quantities and work as may be necessary or desirable to complete, in a satisfactory manner, the original intended work. Unless otherwise specified in the Contract, the Owner's Engineer or RPR shall be and is hereby authorized to make, in writing, such in-scope alterations in the work and variation of quantities as may be necessary to complete the work, provided such action does not represent a significant change in the character of the work.

For purpose of this section, a significant change in character of work means: any change that is outside the current contract scope of work; any change (increase or decrease) in the total contract cost by more than 25%; or any change in the total cost of a major contract item by more than 25%.

Work alterations and quantity variances that do not meet the definition of significant change in character of work shall not invalidate the contract nor release the surety. Contractor agrees to accept payment for such work alterations and quantity variances in accordance with Section 90, paragraph 90-03, *Compensation for Altered Quantities*.

Should the value of altered work or quantity variance meet the criteria for significant change in character of work, such altered work and quantity variance shall be covered by a supplemental agreement. Supplemental agreements shall also require consent of the Contractor's surety and separate performance and payment bonds. If the Owner and the Contractor are unable to agree on a unit adjustment for any contract item that requires a supplemental agreement, the Owner reserves the right to terminate the contract with respect to the item and make other arrangements for its completion.

However, if the Contractor elects to waive the limitations on work that increase or decrease the originally awarded contract or any major contract item by more than 25 percent, the supplemental agreement shall be subject to the same wage determination as was included in the originally awarded contract.

All supplemental agreements shall require consent of the Contractor's surety and separate performance and payment bonds.

40-03 Omitted items. The Owner, the Owner's Engineer or the RPR may provide written notice to the Contractor to omit from the work any contract item that does not meet the definition of major contract item. Major contract items may be omitted by a supplemental agreement. Such omission of contract items shall not invalidate any other contract provision or requirement.

Should a contract item be omitted or otherwise ordered to be non-performed, the Contractor shall be paid for all work performed toward completion of such item prior to the date of the order to omit such item. Payment for work performed shall be in accordance with Section 90, paragraph 90-04, *Payment for Omitted Items*.

40-04 Extra work. Should acceptable completion of the contract require the Contractor to perform an item of work not provided for in the awarded contract as previously modified by change order or supplemental agreement, Owner may issue a Change Order to cover the necessary extra work. Change orders for extra work shall contain agreed unit prices for performing the change order work in accordance with the requirements specified in the order, and shall contain any adjustment to the contract time that, in the RPR's opinion, is necessary for completion of the extra work.

When determined by the RPR to be in the Owner's best interest, the RPR may order the Contractor to proceed with extra work as provided in Section 90, paragraph 90-05, *Payment for Extra Work*. Extra work that is necessary for acceptable completion of the project, but is not within the general scope of the work covered by the original contract shall be covered by a supplemental agreement as defined in Section 10, paragraph 10-59, *Supplemental Agreement*.

If extra work is essential to maintaining the project critical path, RPR may order the Contractor to commence the extra work under a Time and Material contract method. Once sufficient detail is available to establish the level of effort necessary for the extra work, the Owner shall initiate a change order or supplemental agreement to cover the extra work.

Any claim for payment of extra work that is not covered by written agreement (change order or supplemental agreement) shall be rejected by the Owner.

40-05 Maintenance of traffic. It is the explicit intention of the contract that the safety of aircraft, as well as the Contractor's equipment and personnel, is the most important consideration. The Contractor shall maintain traffic in the manner detailed in the Construction Safety and Phasing Plan (CSPP).

a. It is understood and agreed that the Contractor shall provide for the free and unobstructed movement of aircraft in the air operations areas (AOAs) of the airport with respect to their own operations and the operations of all subcontractors as specified in Section 80, paragraph 80-04, *Limitation of Operations*. It is further understood and agreed that the Contractor shall provide for the uninterrupted operation of visual and electronic signals (including power supplies thereto) used in the guidance of aircraft while operating to, from, and upon the airport as specified in Section 70, paragraph 70-15, *Contractor's Responsibility for Utility Service and Facilities of Others*.

b. With respect to their own operations and the operations of all subcontractors, the Contractor shall provide marking, lighting, and other acceptable means of identifying personnel, equipment, vehicles, storage areas, and any work area or condition that may be hazardous to the operation of aircraft, fire-rescue equipment, or maintenance vehicles at the airport in accordance with the construction safety and phasing plan (CSPP) and the safety plan compliance document (SPCD).

c. When the contract requires the maintenance of an existing road, street, or highway during the Contractor's performance of work that is otherwise provided for in the contract, plans, and specifications, the Contractor shall keep the road, street, or highway open to all traffic and shall provide maintenance as may be required to accommodate traffic. The Contractor, at their expense, shall be responsible for the repair to equal or better than preconstruction conditions of any damage caused by the Contractor's equipment and personnel. The Contractor shall furnish, erect, and maintain barricades, warning signs, flag person, and other traffic control devices in reasonable conformity with the Manual on Uniform Traffic Control Devices (MUTCD) (http://mutcd.fhwa.dot.gov/), unless otherwise specified. The Contractor shall also construct and maintain in a safe condition any temporary connections necessary for ingress to and egress from abutting property or intersecting roads, streets or highways. Unless otherwise specified herein, the Contractor will not be required to furnish snow removal for such existing road, street, or highway.

40-06 Removal of existing structures. All existing structures encountered within the established lines, grades, or grading sections shall be removed by the Contractor, unless such existing structures are otherwise specified to be relocated, adjusted up or down, salvaged, abandoned in place, reused in the work or to remain in place. The cost of removing such existing structures shall not be measured or paid for directly, but shall be included in the various contract items.

Should the Contractor encounter an existing structure (above or below ground) in the work for which the disposition is not indicated on the plans, the Resident Project Representative (RPR) shall be notified prior to disturbing such structure. The disposition of existing structures so encountered shall be immediately determined by the RPR in accordance with the provisions of the contract.

Except as provided in Section 40, paragraph 40-07, *Rights in and Use of Materials Found in the Work*, it is intended that all existing materials or structures that may be encountered (within the lines, grades, or grading sections established for completion of the work) shall be used in the work as otherwise provided for in the contract and shall remain the property of the Owner when so used in the work.

40-07 Rights in and use of materials found in the work. Should the Contractor encounter any material such as (but not restricted to) sand, stone, gravel, slag, or concrete slabs within the established lines, grades, or grading sections, the use of which is intended by the terms of the contract to be embankment, the Contractor may at their own option either:

a. Use such material in another contract item, providing such use is approved by the RPR and is in conformance with the contract specifications applicable to such use; or,

b. Remove such material from the site, upon written approval of the RPR; or

c. Use such material for the Contractor's own temporary construction on site; or,

d. Use such material as intended by the terms of the contract.

Should the Contractor wish to exercise option a., b., or c., the Contractor shall request the RPR's approval in advance of such use.

Should the RPR approve the Contractor's request to exercise option a., b., or c., the Contractor shall be paid for the excavation or removal of such material at the applicable contract price. The Contractor shall replace, at their expense, such removed or excavated material with an agreed equal volume of material that is acceptable for use in constructing embankment, backfills, or otherwise to the extent that such replacement material is needed to complete the contract work. The Contractor shall not be charged for use of such material used in the work or removed from the site.

Should the RPR approve the Contractor's exercise of option a., the Contractor shall be paid, at the applicable contract price, for furnishing and installing such material in accordance with requirements of the contract item in which the material is used.

It is understood and agreed that the Contractor shall make no claim for delays by reason of their own exercise of option a., b., or c.

The Contractor shall not excavate, remove, or otherwise disturb any material, structure, or part of a structure which is located outside the lines, grades, or grading sections established for the work, except where such excavation or removal is provided for in the contract, plans, or specifications.

40-08 Final cleanup. Upon completion of the work and before acceptance and final payment will be made, the Contractor shall remove from the site all machinery, equipment, surplus and discarded materials, rubbish, temporary structures, and stumps or portions of trees. The Contractor shall cut all brush and woods within the limits indicated and shall leave the site in a neat and presentable condition. Material cleared from the site and deposited on adjacent property will not be considered as having been disposed of satisfactorily, unless the Contractor has obtained the written permission of the property Owner.

Contractor shall leave the premises broom-clean and everything in perfect order and repair. Upon neglect or refusal of Contractor to keep the premises clean, the RPR shall have the authority to have such work performed, and the cost of the same shall be charged to the Contractor in default and collected from any monies which have or may become due on this Contract. The RPR shall issue no certificates of payment on the Contract until premises are clean, in good order, and all claims properly resolved.

END OF SECTION 40

Section 50 Control of Work

50-01 Authority of the Resident Project Representative (RPR). The RPR has final authority regarding the interpretation of project specification requirements. The RPR shall determine acceptability of the quality of materials furnished, method of performance of work performed, and the manner and rate of performance of the work. The RPR does not have the authority to accept work that does not conform to specification requirements.

50-02 Conformity with plans and specifications. All work and all materials furnished shall be in reasonably close conformity with the lines, grades, grading sections, cross-sections, dimensions, material requirements, and testing requirements that are specified (including specified tolerances) in the contract, plans, or specifications.

If the RPR finds the materials furnished, work performed, or the finished product not within reasonably close conformity with the plans and specifications, but that the portion of the work affected will, in their opinion, result in a finished product having a level of safety, economy, durability, and workmanship acceptable to the Owner, the RPR will advise the Owner of their determination that the affected work be accepted and remain in place. The RPR will document the determination and recommend to the Owner a basis of acceptance that will provide for an adjustment in the contract price for the affected portion of the work. Changes in the contract price must be covered by contract change order or supplemental agreement as applicable.

If the RPR finds the materials furnished, work performed, or the finished product are not in reasonably close conformity with the plans and specifications and have resulted in an unacceptable finished product, the affected work or materials shall be removed and replaced or otherwise corrected by and at the expense of the Contractor in accordance with the RPR's written orders.

The term "reasonably close conformity" shall not be construed as waiving the Contractor's responsibility to complete the work in accordance with the contract, plans, and specifications. The term shall not be construed as waiving the RPR's responsibility to insist on strict compliance with the requirements of the contract, plans, and specifications during the Contractor's execution of the work, when, in the RPR's opinion, such compliance is essential to provide an acceptable finished portion of the work.

The term "reasonably close conformity" is also intended to provide the RPR with the authority, after consultation with the Sponsor and FAA, to use sound engineering judgment in their determinations to accept work that is not in strict conformity, but will provide a finished product equal to or better than that required by the requirements of the contract, plans and specifications.

The RPR will not be responsible for the Contractor's means, methods, techniques, sequences, or procedures of construction or the safety precautions incident thereto.

50-03 Coordination of contract, plans, and specifications. The contract, plans, specifications, and all referenced standards cited are essential parts of the contract requirements. If electronic files are provided and used on the project and there is a conflict between the electronic files and hard copy plans, the hard copy plans shall govern. A requirement occurring in one is as binding as though occurring in all. They are intended to be complementary and to describe and provide for a complete work. In case of discrepancy, calculated dimensions will govern over scaled dimensions; contract technical specifications shall govern over contract general provisions, plans, cited standards for materials or testing, and cited advisory circulars (ACs); contract general provisions shall govern over plans, cited standards for materials or testing, and cited ACs; plans shall govern over cited standards for materials or testing and cited ACs. If

any paragraphs contained in the Special Provisions conflict with General Provisions or Technical Specifications, the Special Provisions shall govern.

From time to time, discrepancies within cited testing standards occur due to the timing of the change, edits, and/or replacement of the standards. If the Contractor discovers any apparent discrepancy within standard test methods, the Contractor shall immediately ask the RPR for an interpretation and decision, and such decision shall be final.

The Contractor shall not take advantage of any apparent error or omission on the plans or specifications. In the event the Contractor discovers any apparent error or discrepancy, Contractor shall immediately notify the Owner or the designated representative in writing requesting their written interpretation and decision.

50-04 List of Special Provisions. See Special Provisions section to the General Provisions and SRAA front end contract documents.

50-05 Cooperation of Contractor. The Contractor shall be supplied with five hard copies or an electronic PDF of the plans and specifications. The Contractor shall have available on the construction site at all times one hardcopy each of the plans and specifications. Additional hard copies of plans and specifications may be obtained by the Contractor for the cost of reproduction.

The Contractor shall give constant attention to the work to facilitate the progress thereof, and shall cooperate with the RPR and their inspectors and with other Contractors in every way possible. The Contractor shall have a competent superintendent on the work at all times who is fully authorized as their agent on the work. The superintendent shall be capable of reading and thoroughly understanding the plans and specifications and shall receive and fulfill instructions from the RPR or their authorized representative.

50-06 Cooperation between Contractors. The Owner reserves the right to contract for and perform other or additional work on or near the work covered by this contract.

When separate contracts are let within the limits of any one project, each Contractor shall conduct the work not to interfere with or hinder the progress of completion of the work being performed by other Contractors. Contractors working on the same project shall cooperate with each other as directed.

Each Contractor involved shall assume all liability, financial or otherwise, in connection with their own contract and shall protect and hold harmless the Owner from any and all damages or claims that may arise because of inconvenience, delays, or loss experienced because of the presence and operations of other Contractors working within the limits of the same project.

The Contractor shall arrange their work and shall place and dispose of the materials being used to not interfere with the operations of the other Contractors within the limits of the same project. The Contractor shall join their work with that of the others in an acceptable manner and shall perform it in proper sequence to that of the others.

50-07 Construction layout and stakes. The Engineer/RPR shall establish necessary horizontal and vertical control. The establishment of Survey Control and/or reestablishment of survey control shall be by a State Licensed Land Surveyor. Contractor is responsible for preserving integrity of horizontal and vertical controls established by Engineer/RPR. In case of negligence on the part of the Contractor or their employees, resulting in the destruction of any horizontal and vertical control, the resulting costs will be deducted as a liquidated damage against the Contractor.

Prior to the start of construction, the Contractor will check all control points for horizontal and vertical accuracy and certify in writing to the RPR that the Contractor concurs with survey control established for the project. All lines, grades and measurements from control points necessary for the proper execution and control of the work on this project will be provided to the RPR. The Contractor is responsible to establish all layout required for the construction of the project.

Copies of survey notes will be provided to the RPR for each area of construction and for each placement of material as specified to allow the RPR to make periodic checks for conformance with plan grades, alignments and grade tolerances required by the applicable material specifications. Surveys will be provided to the RPR prior to commencing work items that cover or disturb the survey staking. Survey(s) and notes shall be provided in the following format(s): five (5) full size copies of signed and sealed surveys, five (5) copies of the notes as well as pdf copies of both.

Laser, GPS, String line, or other automatic control shall be checked with temporary control as necessary. In the case of error, on the part of the Contractor, their surveyor, employees or subcontractors, resulting in established grades, alignment or grade tolerances that do not concur with those specified or shown on the plans, the Contractor is solely responsible for correction, removal, replacement and all associated costs at no additional cost to the Owner.

Refer to technical specification C-107, Survey and Stakeout, for additional requirements and payment.

50-08 Authority and duties of Quality Assurance (QA) inspectors. QA inspectors shall be authorized to inspect all work done and all material furnished. Such QA inspection may extend to all or any part of the work and to the preparation, fabrication, or manufacture of the materials to be used. QA inspectors are not authorized to revoke, alter, or waive any provision of the contract. QA inspectors are not authorized to issue instructions contrary to the plans and specifications or to act as foreman for the Contractor.

QA Inspectors are authorized to notify the Contractor or their representatives of any failure of the work or materials to conform to the requirements of the contract, plans, or specifications and to reject such nonconforming materials in question until such issues can be referred to the RPR for a decision.

50-09 Inspection of the work. All materials and each part or detail of the work shall be subject to inspection. The RPR shall be allowed access to all parts of the work and shall be furnished with such information and assistance by the Contractor as is required to make a complete and detailed inspection.

If the RPR requests it, the Contractor, at any time before acceptance of the work, shall remove or uncover such portions of the finished work as may be directed. After examination, the Contractor shall restore said portions of the work to the standard required by the specifications. Should the work thus exposed or examined prove acceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts removed will be paid for as extra work; but should the work so exposed or examined prove unacceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts removed will be at the Contractor's expense.

Provide advance written notice to the RPR of work the Contractor plans to perform each week and each day. Any work done or materials used without written notice and allowing opportunity for inspection by the RPR may be ordered removed and replaced at the Contractor's expense.

Should the contract work include relocation, adjustment, or any other modification to existing facilities, not the property of the (contract) Owner, authorized representatives of the Owners of such facilities shall have the right to inspect such work. Such inspection shall in no sense make any facility owner a party to the contract, and shall in no way interfere with the rights of the parties to this contract.

50-10 Removal of unacceptable and unauthorized work. All work that does not conform to the requirements of the contract, plans, and specifications will be considered unacceptable, unless otherwise determined acceptable by the RPR as provided in paragraph 50-02, *Conformity with Plans and Specifications*.

Unacceptable work, whether the result of poor workmanship, use of defective materials, damage through carelessness, or any other cause found to exist prior to the final acceptance of the work, shall be removed immediately and replaced in an acceptable manner in accordance with the provisions of Section 70, paragraph 70-14, *Contractor's Responsibility for Work*.

No removal work made under provision of this paragraph shall be done without lines and grades having been established by the RPR. Work done contrary to the instructions of the RPR, work done beyond the lines shown on the plans or as established by the RPR, except as herein specified, or any extra work done without authority, will be considered as unauthorized and will not be paid for under the provisions of the contract. Work so done may be ordered removed or replaced at the Contractor's expense.

Upon failure on the part of the Contractor to comply with any order of the RPR made under the provisions of this subsection, the RPR will have authority to cause unacceptable work to be remedied or removed and replaced; and unauthorized work to be removed and recover the resulting costs as a liquidated damage against the Contractor.

50-11 Load restrictions. The Contractor shall comply with all legal load restrictions in the hauling of materials on public roads beyond the limits of the work. A special permit will not relieve the Contractor of liability for damage that may result from the moving of material or equipment.

The operation of equipment of such weight or so loaded as to cause damage to structures or to any other type of construction will not be permitted. Hauling of materials over the base course or surface course under construction shall be limited as directed. No loads will be permitted on a concrete pavement, base, or structure before the expiration of the curing period. The Contractor, at their own expense, shall be responsible for the repair to equal or better than preconstruction conditions of any damage caused by the Contractor's equipment and personnel.

50-12 Maintenance during construction. The Contractor shall maintain the work during construction and until the work is accepted. Maintenance shall constitute continuous and effective work prosecuted day by day, with adequate equipment and forces so that the work is maintained in satisfactory condition at all times.

In the case of a contract for the placing of a course upon a course or subgrade previously constructed, the Contractor shall maintain the previous course or subgrade during all construction operations.

All costs of maintenance work during construction and before the project is accepted shall be included in the unit prices bid on the various contract items, and the Contractor will not be paid an additional amount for such work.

50-13 Failure to maintain the work. Should the Contractor at any time fail to maintain the work as provided in paragraph 50-12, *Maintenance during Construction*, the RPR shall immediately notify the Contractor of such noncompliance. Such notification shall specify a reasonable time within which the Contractor shall be required to remedy such unsatisfactory maintenance condition. The time specified will give due consideration to the exigency that exists.

Should the Contractor fail to respond to the RPR's notification, the Owner may suspend any work necessary for the Owner to correct such unsatisfactory maintenance condition, depending on the exigency that exists. Any maintenance cost incurred by the Owner, shall be recovered as a liquidated damage against the Contractor.

50-14 Partial acceptance. If at any time during the execution of the project the Contractor substantially completes a usable unit or portion of the work, the occupancy of which will benefit the Owner, the Contractor may request the RPR to make final inspection of that unit. If the RPR finds upon inspection that the unit has been satisfactorily completed in compliance with the contract, the RPR may accept it as being complete, and the Contractor may be relieved of further responsibility for that unit. Such partial acceptance and beneficial occupancy by the Owner shall not void or alter any provision of the contract.

50-15 Final acceptance. Upon due notice from the Contractor of presumptive completion of the entire project, the RPR and Owner will make an inspection. If all construction provided for and contemplated by the contract is found to be complete in accordance with the contract, plans, and specifications, such

inspection shall constitute the final inspection. The RPR shall notify the Contractor in writing of final acceptance as of the date of the final inspection.

If, however, the inspection discloses any work, in whole or in part, as being unsatisfactory, the RPR will notify the Contractor and the Contractor shall correct the unsatisfactory work. Upon correction of the work, another inspection will be made which shall constitute the final inspection, provided the work has been satisfactorily completed. In such event, the RPR will make the final acceptance and notify the Contractor in writing of this acceptance as of the date of final inspection.

50-16 Claims for adjustment and disputes. If for any reason the Contractor deems that additional compensation is due for work or materials not clearly provided for in the contract, plans, or specifications or previously authorized as extra work, the Contractor shall notify the RPR in writing of their intention to claim such additional compensation before the Contractor begins the work on which the Contractor bases the claim. If such notification is not given or the RPR is not afforded proper opportunity by the Contractor for keeping strict account of actual cost as required, then the Contractor hereby agrees to waive any claim for such additional compensation. Such notice by the Contractor and the fact that the RPR has kept account of the cost of the work shall not in any way be construed as proving or substantiating the validity of the claim. When the work on which the claim for additional compensation is based has been completed, the Contractor shall, within 10 calendar days, submit a written claim to the RPR who will present it to the Owner for consideration in accordance with local laws or ordinances.

Nothing in this subsection shall be construed as a waiver of the Contractor's right to dispute final payment based on differences in measurements or computations.

END OF SECTION 50

Section 60 Control of Materials

60-01 Source of supply and quality requirements. The materials used in the work shall conform to the requirements of the contract, plans, and specifications. Unless otherwise specified, such materials that are manufactured or processed shall be new (as compared to used or reprocessed).

In order to expedite the inspection and testing of materials, the Contractor shall furnish documentation to the RPR as to the origin, composition, and manufacture of all materials to be used in the work. Documentation shall be furnished promptly after execution of the contract but, in all cases, prior to delivery of such materials.

At the RPR's option, materials may be approved at the source of supply before delivery. If it is found after trial that sources of supply for previously approved materials do not produce specified products, the Contractor shall furnish materials from other sources.

The Contractor shall furnish airport lighting equipment that meets the requirements of the specifications; and is listed in AC 150/5345-53, *Airport Lighting Equipment Certification Program* and *Addendum*, that is in effect on the date of advertisement.

All other equipment and materials covered by other referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification.

60-02 Samples, tests, and cited specifications. All materials used in the work shall be inspected, tested, and approved by the RPR before incorporation in the work unless otherwise designated. Any work in which untested materials are used without approval or written permission of the RPR shall be performed at the Contractor's risk. Materials found to be unacceptable and unauthorized will not be paid for and, if directed by the RPR, shall be removed at the Contractor's expense.

Unless otherwise designated, quality assurance tests will be made by and at the expense of the Owner in accordance with the cited standard methods of ASTM, American Association of State Highway and Transportation Officials (AASHTO), federal specifications, Commercial Item Descriptions, and all other cited methods, which are current on the date of advertisement for bids.

The testing organizations performing on-site quality assurance field tests shall have copies of all referenced standards on the construction site for use by all technicians and other personnel. Unless otherwise designated, samples for quality assurance will be taken by a qualified representative of the RPR. All materials being used are subject to inspection, test, or rejection at any time prior to or during incorporation into the work. Copies of all tests will be furnished to the Contractor's representative at their request after review and approval of the RPR.

A copy of all Contractor QC test data shall be provided to the RPR daily, along with printed reports, in an approved format, on a weekly basis. After completion of the project, and prior to final payment, the Contractor shall submit a final report to the RPR showing all test data reports, plus an analysis of all results showing ranges, averages, and corrective action taken on all failing tests.

The Contractor shall employ a Quality Control (QC) testing organization to perform all Contractor required QC tests in accordance with Item C-100 Contractor Quality Control Program (CQCP).

60-03 Certification of compliance/analysis (COC/COA). The RPR may permit the use, prior to sampling and testing, of certain materials or assemblies when accompanied by manufacturer's COC stating that such materials or assemblies fully comply with the requirements of the contract. The certificate shall be signed by the manufacturer. Each lot of such materials or assemblies delivered to the work must be accompanied by a certificate of compliance in which the lot is clearly identified. The COA is the manufacturer's COC and includes all applicable test results.

Manufacturer's certificates of compliance shall not relieve the Contractor of their responsibility to provide materials in accordance with these specifications and acceptable to the RPR. Materials supplied and/or installed that do not materially comply with these specifications shall be removed, when directed by the RPR, and replaced with materials, which do comply with these specifications, at the sole cost of the Contractor.

Materials or assemblies used on the basis of certificates of compliance may be sampled and tested at any time and if found not to be in conformity with contract requirements will be subject to rejection whether in place or not.

The form and distribution of certificates of compliance shall be as approved by the RPR.

When a material or assembly is specified by "brand name or equal" and the Contractor elects to furnish the specified "or equal," the Contractor shall be required to furnish the manufacturer's certificate of compliance for each lot of such material or assembly delivered to the work. Such certificate of compliance shall clearly identify each lot delivered and shall certify as to:

a. Conformance to the specified performance, testing, quality or dimensional requirements; and,

b. Suitability of the material or assembly for the use intended in the contract work.

The RPR shall be the sole judge as to whether the proposed "or equal" is suitable for use in the work.

The RPR reserves the right to refuse permission for use of materials or assemblies on the basis of certificates of compliance.

60-04 Plant inspection. The RPR or their authorized representative may inspect, at its source, any specified material or assembly to be used in the work. Manufacturing plants may be inspected from time to time for the purpose of determining compliance with specified manufacturing methods or materials to be used in the work and to obtain samples required for acceptance of the material or assembly.

Should the RPR conduct plant inspections, the following conditions shall exist:

a. The RPR shall have the cooperation and assistance of the Contractor and the producer with whom the Contractor has contracted for materials.

b. The RPR shall have full entry at all reasonable times to such parts of the plant that concern the manufacture or production of the materials being furnished.

c. If required by the RPR, the Contractor shall arrange for adequate office or working space that may be reasonably needed for conducting plant inspections. Place office or working space in a convenient location with respect to the plant.

It is understood and agreed that the Owner shall have the right to retest any material that has been tested and approved at the source of supply after it has been delivered to the site. The RPR shall have the right to reject only material which, when retested, does not meet the requirements of the contract, plans, or specifications.

60-05 Engineer/ Resident Project Representative (RPR) field office. The Engineer/RPR field office, if required, shall be as indicated in C-105, Mobilization.

60-06 Storage of materials. Materials shall be stored to assure the preservation of their quality and fitness for the work. Stored materials, even though approved before storage, may again be inspected prior to their use in the work. Stored materials shall be located to facilitate their prompt inspection. The Contractor shall coordinate the storage of all materials with the RPR. Materials to be stored on airport property shall not create an obstruction to air navigation nor shall they interfere with the free and unobstructed movement of aircraft. Unless otherwise shown on the plans and/or CSPP, the storage of materials and the location of the Contractor's plant and parked equipment or vehicles shall be as directed by the RPR. Private property shall not be used for storage purposes without written permission of the Owner or lessee of such property. The Contractor shall make all arrangements and bear all expenses for the storage of materials on private property. Upon request, the Contractor shall furnish the RPR a copy of the property Owner's permission.

All storage sites on private or airport property shall be restored to their original condition by the Contractor at their expense, except as otherwise agreed to (in writing) by the Owner or lessee of the property.

60-07 Unacceptable materials. Any material or assembly that does not conform to the requirements of the contract, plans, or specifications shall be considered unacceptable and shall be rejected. The Contractor shall remove any rejected material or assembly from the site of the work, unless otherwise instructed by the RPR.

Rejected material or assembly, the defects of which have been corrected by the Contractor, shall not be returned to the site of the work until such time as the RPR has approved its use in the work.

60-08 Owner furnished materials. The Contractor shall furnish all materials required to complete the work, except those specified, if any, to be furnished by the Owner. Owner-furnished materials shall be made available to the Contractor at the location specified.

All costs of handling, transportation from the specified location to the site of work, storage, and installing Owner-furnished materials shall be included in the unit price bid for the contract item in which such Owner-furnished material is used.

After any Owner-furnished material has been delivered to the location specified, the Contractor shall be responsible for any demurrage, damage, loss, or other deficiencies that may occur during the Contractor's handling, storage, or use of such Owner-furnished material. The Owner will deduct from any monies due or to become due the Contractor any cost incurred by the Owner in making good such loss due to the Contractor's handling, storage, or use of Owner-furnished materials.

END OF SECTION 60

Section 70 Legal Regulations and Responsibility to Public

70-01 Laws to be observed. The Contractor shall keep fully informed of all federal and state laws, all local laws, ordinances, and regulations and all orders and decrees of bodies or tribunals having any jurisdiction or authority, which in any manner affect those engaged or employed on the work, or which in any way affect the conduct of the work. The Contractor shall at all times observe and comply with all such laws, ordinances, regulations, orders, and decrees; and shall protect and indemnify the Owner, the Engineer, the RPR and all their officers, agents, or servants against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order, or decree, whether by the Contractor or the Contractor's employees.

70-02 Permits, licenses, and taxes. The Contractor shall procure all permits and licenses, pay all charges, fees, and taxes, and give all notices necessary and incidental to the due and lawful execution of the work.

The SRAA pays for all permits, if required, from the City of Syracuse.

70-03 Patented devices, materials, and processes. If the Contractor is required or desires to use any design, device, material, or process covered by letters of patent or copyright, the Contractor shall provide for such use by suitable legal agreement with the Patentee or Owner. The Contractor and the surety shall indemnify and hold harmless the Owner, the Engineer, the RPR, any third party, or political subdivision from any and all claims for infringement by reason of the use of any such patented design, device, material or process, or any trademark or copyright, and shall indemnify the Owner for any costs, expenses, and damages which it may be obliged to pay by reason of an infringement, at any time during the execution or after the completion of the work.

70-04 Restoration of surfaces disturbed by others. The Owner reserves the right to authorize the construction, reconstruction, or maintenance of any public or private utility service, FAA or National Oceanic and Atmospheric Administration (NOAA) facility, or a utility service of another government agency at any time during the progress of the work. To the extent that such construction, reconstruction, or maintenance has been coordinated with the Owner, such authorized work (by others) must be shown on the plans and is indicated as follows:

Utility	Location (Sheet No.)	Person to Contact	Phone No.
Gas – Nat. Grid	CU101 – CU103	Nicholas Coon	(315) 283-2755
Water – OCWA	CU100	OCWA Engineering	(315) 455-7061

Except as listed above, the Contractor shall not permit any individual, firm, or corporation to excavate or otherwise disturb such utility services or facilities located within the limits of the work without the written permission of the RPR.

Should the Owner of public or private utility service, FAA, or NOAA facility, or a utility service of another government agency be authorized to construct, reconstruct, or maintain such utility service or facility during the progress of the work, the Contractor shall cooperate with such Owners by arranging and performing the work in this contract to facilitate such construction, reconstruction or maintenance by others whether or not such work by others is listed above. When ordered as extra work by the RPR, the

Contractor shall make all necessary repairs to the work which are due to such authorized work by others, unless otherwise provided for in the contract, plans, or specifications. It is understood and agreed that the Contractor shall not be entitled to make any claim for damages due to such authorized work by others or for any delay to the work resulting from such authorized work.

70-05 Federal Participation. The United States Government has agreed to reimburse the Owner for some portion of the contract costs. The contract work is subject to the inspection and approval of duly authorized representatives of the FAA Administrator. No requirement of this contract shall be construed as making the United States a party to the contract nor will any such requirement interfere, in any way, with the rights of either party to the contract.

70-06 Sanitary, health, and safety provisions. The Contractor's worksite and facilities shall comply with applicable federal, state, and local requirements for health, safety and sanitary provisions.

70-07 Public convenience and safety. The Contractor shall control their operations and those of their subcontractors and all suppliers, to assure the least inconvenience to the traveling public. Under all circumstances, safety shall be the most important consideration.

The Contractor shall maintain the free and unobstructed movement of aircraft and vehicular traffic with respect to their own operations and those of their own subcontractors and all suppliers in accordance with Section 40, paragraph 40-05, *Maintenance of Traffic,* and shall limit such operations for the convenience and safety of the traveling public as specified in Section 80, paragraph 80-04, *Limitation of Operations*.

The Contractor shall remove or control debris and rubbish resulting from its work operations at frequent intervals, and upon the order of the RPR. If the RPR determines the existence of Contractor debris in the work site represents a hazard to airport operations and the Contractor is unable to respond in a prompt and reasonable manner, the RPR reserves the right to assign the task of debris removal to a third party and recover the resulting costs as a liquidated damage against the Contractor.

70-08 Construction Safety and Phasing Plan (CSPP). The Contractor shall complete the work in accordance with the approved Construction Safety and Phasing Plan (CSPP) developed in accordance with AC 150/5370-2, Operational Safety on Airports During Construction. The CSPP is described in the Construction Safety and Phasing Plan, Appendix A to Section 70.

During the work of this Contract, the Owner will make such arrangements to coordinate aircraft movements and Airport operations as necessary to conform to the construction procedures outlined in the Construction Safety and Phasing Plan, and as shown on the Contract Drawings. The Contractor shall give adequate notice to the RPR, so as to afford time to coordinate construction with the Owner.

70-09 Use of explosives. The use of explosives is not permitted on this project.

70-10 Protection and restoration of property and landscape. The Contractor shall be responsible for the preservation of all public and private property, and shall protect carefully from disturbance or damage all land monuments and property markers until the Engineer/RPR has witnessed or otherwise referenced their location and shall not move them until directed.

The Contractor shall be responsible for all damage or injury to property of any character, during the execution of the work, resulting from any act, omission, neglect, or misconduct in manner or method of executing the work, or at any time due to defective work or materials, and said responsibility shall not be released until the project has been completed and accepted.

When or where any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work, or in consequence of the non-execution thereof by the Contractor, the Contractor shall restore, at their expense, such property to a condition similar or equal to that existing before such damage or injury was done, by repairing, or otherwise restoring as may be directed, or the Contractor shall make good such damage or injury in an acceptable manner.

The Contractor shall indemnify the Owner for any and all costs for the repair or replacement of the Owner's property including, but not limited to, buildings and roads, which arise from or in any manner grow out of any act or neglect on or about the Project site by the Contractor and anyone for whom the Contractor is legally liable.

70-11 Responsibility for damage claims. The Contractor shall indemnify, defend and hold harmless the Engineer/RPR and the Owner and their respective representatives, directors, officers, agents, and employees from all suits, actions, damages, costs, expenses or claims, of any character, (including attorney's fees), and liability (including statutory liability) brought because of any injuries or damage received or sustained by any person, persons, or property on account of the operations of the Contractor; or on account of or in consequence of any neglect in safeguarding the work; or through use of unacceptable materials in constructing the work; or because of any act or omission, neglect, or misconduct or arising out of or related to any negligence of the Contractor or anyone for whom the Contractor is legally liable in performing or safeguarding the work; or through use of unacceptable materials in constructing the work; or because of any and all environmental impairment; or because of any act or omission, neglect, or misconduct of said Contractor or anyone for whom the Contractor is legally liable of said Contractor; or because of any claims or amounts recovered from any infringements of patent, trademark, or copyright; or from any claims or amounts arising or recovered under the "Workmen's Compensation Act," or any other law, ordinance, order, or decree. Money due the Contractor under and by virtue of their own contract considered necessary by the Owner for such purpose may be retained for the use of the Owner or, in case no money is due, their own surety may be held until such suits, actions, or claims for injuries or damages shall have been settled and suitable evidence to that effect furnished to the Owner, except that money due the Contractor will not be withheld when the Contractor produces satisfactory evidence that he or she is adequately protected by public liability and property damage insurance.

As a material part of the consideration to be rendered by the Owner, the Contractor hereby waives all claims against the Owner for damages to the goods, wares, and merchandise in, upon, or about the Project, and the Contractor will hold the Owner exempt and harmless from any damage and injury to any such person or to the goods, wares, or merchandise of any such person, arising from the use of the Project site by the Contractor or from failure of the Contractor to keep the Project site in good condition and repair as provided in this Section.

70-12 Third party beneficiary clause. It is specifically agreed between the parties executing the contract that it is not intended by any of the provisions of any part of the contract to create for the public or any member thereof, a third-party beneficiary or to authorize anyone not a party to the contract to maintain a suit for personal injuries or property damage pursuant to the terms or provisions of the contract.

70-13 Opening sections of the work to traffic. If it is necessary for the Contractor to complete portions of the contract work for the beneficial occupancy of the Owner prior to completion of the entire contract, such "phasing" of the work must be specified below and indicated on the approved Construction Safety

and Phasing Plan (CSPP) and the project plans. When so specified, the Contractor shall complete such portions of the work on or before the date specified or as otherwise specified.

Opening sections of work to traffic shall be as described in the CSPP.

Upon completion of any portion of work listed above, such portion shall be accepted by the Owner in accordance with Section 50, paragraph 50-14, *Partial Acceptance*.

No portion of the work may be opened by the Contractor until directed by the Owner in writing. Should it become necessary to open a portion of the work to traffic on a temporary or intermittent basis, such openings shall be made when, in the opinion of the RPR, such portion of the work is in an acceptable condition to support the intended traffic. Temporary or intermittent openings are considered to be inherent in the work and shall not constitute either acceptance of the portion of the work so opened or a waiver of any provision of the contract. Any damage to the portion of the work so opened that is not attributable to traffic which is permitted by the Owner shall be repaired by the Contractor at their expense.

The Contractor shall make their own estimate of the inherent difficulties involved in completing the work under the conditions herein described and shall not claim any added compensation by reason of delay or increased cost due to opening a portion of the contract work.

The Contractor must conform to safety standards contained AC 150/5370-2 and the approved CSPP.

Contractor shall refer to the plans, specifications, and the approved CSPP to identify barricade requirements, temporary and/or permanent markings, airfield lighting, guidance signs and other safety requirements prior to opening up sections of work to traffic.

70-14 Contractor's responsibility for work. Until the RPR's final written acceptance of the entire completed work, excepting only those portions of the work accepted in accordance with Section 50, paragraph 50-14, *Partial Acceptance*, the Contractor shall have the charge and care thereof and shall take every precaution against injury or damage to any part due to the action of the elements or from any other cause, whether arising from the execution or from the non-execution of the work. The Contractor shall rebuild, repair, restore, and make good all injuries or damages to any portion of the work occasioned by any of the above causes before final acceptance and shall bear the expense thereof except damage to the work due to unforeseeable causes beyond the control of and without the fault or negligence of the Contractor, including but not restricted to acts of God such as earthquake, tidal wave, tornado, hurricane or other cataclysmic phenomenon of nature, or acts of the public enemy or of government authorities.

If the work is suspended for any cause whatsoever, the Contractor shall be responsible for the work and shall take such precautions necessary to prevent damage to the work. The Contractor shall provide for normal drainage and shall erect necessary temporary structures, signs, or other facilities at their own expense. During such period of suspension of work, the Contractor shall properly and continuously maintain in an acceptable growing condition all living material in newly established planting, seeding, and sodding furnished under the contract, and shall take adequate precautions to protect new tree growth and other important vegetative growth against injury.

70-15 Contractor's responsibility for utility service and facilities of others. As provided in paragraph 70-04, *Restoration of Surfaces Disturbed by Others*, the Contractor shall cooperate with the owner of any public or private utility service, FAA or NOAA, or a utility service of another government agency that may be authorized by the Owner to construct, reconstruct or maintain such utility services or facilities during the progress of the work. In addition, the Contractor shall control their operations to prevent the unscheduled interruption of such utility services and facilities.

To the extent that such public or private utility services, FAA, or NOAA facilities, or utility services of another governmental agency are known to exist within the limits of the contract work, the approximate locations have been indicated on the plans and/or in the contract documents.

Utility Service or Facility	Person to Contract	Telephone No.
Gas – Nat. Grid	Nicholas Coon	(315) 283-2755
Water – OCWA	OCWA Engineering	(315) 455-7061

It is understood and agreed that the Owner does not guarantee the accuracy or the completeness of the location information relating to existing utility services, facilities, or structures that may be shown on the plans or encountered in the work. Any inaccuracy or omission in such information shall not relieve the Contractor of the responsibility to protect such existing features from damage or unscheduled interruption of service.

It is further understood and agreed that the Contractor shall, upon execution of the contract, notify the Owners of all utility services or other facilities of their plan of operations. Such notification shall be in writing addressed to "The Person to Contact" as provided in this paragraph and paragraph 70-04, *Restoration of Surfaces Disturbed By Others*. A copy of each notification shall be given to the RPR.

In addition to the general written notification provided, it shall be the responsibility of the Contractor to keep such individual Owners advised of changes in their plan of operations that would affect such Owners.

Prior to beginning the work in the general vicinity of an existing utility service or facility, the Contractor shall again notify each such Owner of their plan of operation. If, in the Contractor's opinion, the Owner's assistance is needed to locate the utility service or facility or the presence of a representative of the Owner is desirable to observe the work, such advice should be included in the notification. Such notification shall be given by the most expeditious means to reach the utility owner's "Person to Contact" no later than two normal business days prior to the Contractor's commencement of operations in such general vicinity. The Contractor shall furnish a written summary of the notification to the RPR.

The Contractor's failure to give the two days' notice shall be cause for the Owner to suspend the Contractor's operations in the general vicinity of a utility service or facility.

Where the outside limits of an underground utility service have been located and staked on the ground, the Contractor shall be required to use hand excavation methods within 3 feet (1 m) of such outside limits at such points as may be required to ensure protection from damage due to the Contractor's operations.

Should the Contractor damage or interrupt the operation of a utility service or facility by accident or otherwise, the Contractor shall immediately notify the proper authority and the RPR and shall take all reasonable measures to prevent further damage or interruption of service. The Contractor, in such events, shall cooperate with the utility service or facility owner and the RPR continuously until such damage has been repaired and service restored to the satisfaction of the utility or facility owner.

The Contractor shall bear all costs of damage and restoration of service to any utility service or facility due to their operations whether due to negligence or accident. The Owner reserves the right to deduct such costs from any monies due or which may become due the Contractor, or their own surety.

70-15.1 FAA facilities and cable runs. The Contractor is hereby advised that the construction limits of the project include existing facilities and buried cable runs that are owned, operated and maintained by the FAA. The Contractor, during the execution of the project work, shall comply with the following:

a. The Contractor shall permit FAA maintenance personnel the right of access to the project work site for purposes of inspecting and maintaining all existing FAA owned facilities.

b. The Contractor shall provide notice to the FAA Air Traffic Organization (ATO)/Technical Operations/System Support Center (SSC) Point-of-Contact through the airport Owner and RPR a minimum of seven (7) calendar days prior to commencement of construction activities in order to permit sufficient time to locate and mark existing buried cables and to schedule any required facility outages.

c. If execution of the project work requires a facility outage, the Contractor shall contact the FAA Point-of-Contact a minimum of 72 hours prior to the time of the required outage.

d. Any damage to FAA cables, access roads, or FAA facilities during construction caused by the Contractor's equipment or personnel whether by negligence or accident will require the Contractor to repair or replace the damaged cables, access road, or FAA facilities to FAA requirements. The Contractor shall not bear the cost to repair damage to underground facilities or utilities improperly located by the FAA.

e. If the project work requires the cutting or splicing of FAA owned cables, the FAA Point-of-Contact shall be contacted a minimum of 72 hours prior to the time the cable work commences. The FAA reserves the right to have a FAA representative on site to observe the splicing of the cables as a condition of acceptance. All cable splices are to be accomplished in accordance with FAA specifications and require approval by the FAA Point-of-Contact as a condition of acceptance by the Owner. The Contractor is hereby advised that FAA restricts the location of where splices may be installed. If a cable splice is required in a location that is not permitted by FAA, the Contractor shall furnish and install a sufficient length of new cable that eliminates the need for any splice.

70-16 Furnishing rights-of-way. The Owner will be responsible for furnishing all rights-of-way upon which the work is to be constructed in advance of the Contractor's operations.

70-17 Personal liability of public officials. In carrying out any of the contract provisions or in exercising any power or authority granted by this contract, there shall be no liability upon the Engineer, RPR, their authorized representatives, or any officials of the Owner either personally or as an official of the Owner. It is understood that in such matters they act solely as agents and representatives of the Owner.

70-18 No waiver of legal rights. Upon completion of the work, the Owner will expeditiously make final inspection and notify the Contractor of final acceptance. Such final acceptance, however, shall not preclude or stop the Owner from correcting any measurement, estimate, or certificate made before or after completion of the work, nor shall the Owner be precluded or stopped from recovering from the Contractor or their surety, or both, such overpayment as may be sustained, or by failure on the part of the Contractor to fulfill their obligations under the contract. A waiver on the part of the Owner of any breach of any part of the contract shall not be held to be a waiver of any other or subsequent breach.

The Contractor, without prejudice to the terms of the contract, shall be liable to the Owner for latent defects, fraud, or such gross mistakes as may amount to fraud, or as regards the Owner's rights under any warranty or guaranty.

70-19 Environmental protection. The Contractor shall comply with all federal, state, and local laws and regulations controlling pollution of the environment. The Contractor shall take necessary precautions to

prevent pollution of streams, lakes, ponds, and reservoirs with fuels, oils, asphalts, chemicals, or other harmful materials and to prevent pollution of the atmosphere from particulate and gaseous matter.

The Contractor shall perform all testing, removal of contaminated material, transportation, treatment, remediation, and disposal of contaminated materials which are the result of a spill or release caused by the Contractor, and he shall provide and properly place materials to restore the property to its original condition, all to the Owner's satisfaction and at the Contractor's expense. Refer to the subsection 70-10 titled PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPE of this section.

A. Air Pollution

1. No burning of combustible waste shall be permitted.
2. Alternatives to Burning Land Cleared Material.
    a. All spoil material from clearing and grubbing operations shall be disposed of in accordance with the Technical Specifications, unless otherwise directed.
    b. Wood may be salvaged for firewood or commercial use or it may be chipped and disposed of for use as mulch.
    c. Logs, brush, etc. may be removed to an authorized disposal area or disposed of to the general public without charge.
3. Dust Control.
    a. Common construction operations which may cause excessive dust include:
        1) Quarry, drilling and rock crushing.
        2) Clearing, grubbing and stripping.
        3) Excavation and placement of embankment.
        4) Cement and aggregate handling.
        5) Cement or lime stabilization.
        6) Blasting.
        7) Use of haul roads.
        8) Sandblasting or grinding.
    b. Other construction operations which may cause air pollution are:
        1) Volatiles escaping from asphalt and cut back materials.
        2) Use of herbicides or fertilizers.
        3) Smoke from asphalt plants or heater/planers.
    c. Control of Dust and Other Air Pollutants shall be the responsibility of the Contractor and may include the following control methods:
        1) Drilling apparatus equipped with water or chemical dust controlling systems.
        2) Exposing the minimum area of land.
        3) Applying temporary mulch with or without seeding.
        4) Use of water sprinkling trucks.
        5) Use of covered haul trucks.

6) Use of stabilizing agents in solution.

7) Use of dust palliative and penetration asphalt on temporary roads.

8) Use of wood chips in traffic or work areas.

9) Use of vacuum equipped sandblasting systems.

10) Use of plastic sheet coverings.

11) Restricting the application rate of herbicides to recommended dosage. Materials should be covered and protected from the elements. Application, equipment and empty containers shall not be rinsed and discharged to a stream, etc. or allowed to enter the groundwater.

12) Use dust control measures at bituminous mixing plants, and quarry operations.

13) Delay operations until climate or wind conditions dissipate or inhibit the potential pollutants in a manner satisfactory to the RPR.

B. Water Pollution

1. The Contractor shall use suitable precautions to minimize water pollution during the progress of the work. Erosion control devices or methods may consist of berms, dikes, dams, drains, sediment basins, fiber mats, woven plastic filter cloths, gravel, mulches, quick growing grasses, sod, bituminous spray or other control devices.

2. The amount of surface area of erodible earth at any one time shall not exceed the area allowed by permit.

3. Pollutants such as fuels, lubricants, bitumens, raw sewage and other harmful materials shall not be discharged into or near rivers, streams, and impoundments or into natural or man-made channels leading thereto. Wash water or waste from concrete mixing and curing operations should not be allowed to enter streams, etc.

In the event of conflict between these requirements and pollution control laws, rules or regulations or other Federal, State or local agencies, the more restrictive laws, rules, or regulations shall apply.

70-20 Archaeological and historical findings. Unless otherwise specified in this subsection, the Contractor is advised that the site of the work is not within any property, district, or site, and does not contain any building, structure, or object listed in the current National Register of Historic Places published by the United States Department of Interior.

Should the Contractor encounter, during their operations, any building, part of a building, structure, or object that is incongruous with its surroundings, the Contractor shall immediately cease operations in that location and notify the RPR. The RPR will immediately investigate the Contractor's finding and the Owner will direct the Contractor to either resume operations or to suspend operations as directed.

Should the Owner order suspension of the Contractor's operations in order to protect an archaeological or historical finding, or order the Contractor to perform extra work, such shall be covered by an appropriate contract change order or supplemental agreement as provided in Section 40, paragraph 40-04, *Extra Work,* and Section 90, paragraph 90-05, *Payment for Extra Work*. If appropriate, the contract change order or supplemental agreement shall include an extension of contract time in accordance with Section 80, paragraph 80-07, *Determination and Extension of Contract Time*.

END OF SECTION 70

ATTACHMENT "A"

TO

SECTION 70-08

CONSTRUCTION SAFETY AND PHASING PLAN (CSPP)

FOR THE CONSTRUCTION OF

CENTRALIZED DEICING FACILITY (CDF) PROJECT

AT

SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

FAA AIP NO.: 3-36-0114-____-202__
NYSDOT NO.: 3A00.___

APRIL 29, 2026
BID DOCUMENTS

SYR
SYRACUSE
HANCOCK
INTERNATIONAL AIRPORT

C&S COMPANIES®

TABLE OF CONTENTS

1.0 PURPOSE

2.0 SCOPE OF PROJECT AND CSPP

3.0 PLAN REQUIREMENTS

- 3.1 Coordination
  - a. Pre-construction Meeting
  - b. Contractor Progress Meetings
  - c. Scope or Schedule Changes
  - d. FAA ATO Coordination
  - e. Pre-paving Meeting
  - f. Payment
- 3.2 Phasing
  - a. Phase Elements (Work Areas)
  - b. Construction Safety Drawings (Construction and Operating Requirements)
- 3.3 Areas and Operations Affected by the Construction Activity
  - a. Identification of Affected Areas
  - b. Mitigation of Effects
- 3.4 Protection of Navigational Aids (NAVAIDS)
- 3.5 Contractor Access
  - a. Location of Stockpiled Construction Materials
  - b. Vehicle and Pedestrian Operations
  - c. Security
- 3.6 Wildlife Management
  - a. Trash
  - b. Standing Water
  - c. Tall Grass and Seeds
  - d. Poorly Maintained Fencing and Gates
  - e. Disruption of Existing Wildlife Habitat
- 3.7 Foreign Object Debris (FOD) Management
- 3.8 Hazardous Materials (HAZMAT) Management
- 3.9 Notification of Construction Activities
  - a. Maintenance of a List of Responsible Representatives/Point of Contact
  - b. Notices to Airman (NOTAM)
  - c. Emergency Notification Procedures
  - d. Accidents
  - e. Coordination with ARFF Personnel
  - f. Notification to the FAA
- 3.10 Inspection Requirements
  - a. Daily (or more frequent) Inspections
  - b. Final Inspections
- 3.11 Underground Utilities
- 3.12 Penalties
- 3.13 Special Conditions

3.14 Runway and Taxiway Visual Aids
a. General
b. Markings
c. Lighting and Visual NAVAIDS
d. Signs
e. Maintenance of Airport Lighting
3.15 Marking and Signs for Access Routes
3.16 Hazard Marking and Lighting
a. Purpose
b. Equipment
3.17 Protection of Airfield Areas
a. Runway Safety Area (RSA)
b. Runway Object Free Area (ROFA)
c. Taxiway Safety Area (TSA)
d. Taxiway Object Free Area (TOFA)
e. Obstacle Free Zone (OFZ)
f. Runway Approach/Departure Surfaces
3.18 Other Limitations on Construction
a. Prohibitions
b. Restrictions

APPENDICES:

APPENDIX 1 – General Plan and Construction Safety Drawings

APPENDIX 2 – Construction Project Daily Safety Inspection Checklist

APPENDIX 3 – Contractor's Safety Plan Compliance Document (SPCD)

CONSTRUCTION SAFETY AND PHASING PLAN (CSPP)

1.0 PURPOSE.

Aviation safety is the primary consideration at airports, especially during construction. The Airport Owner's Construction Safety and Phasing Plan (CSPP) and the Contractor's Safety Plan Compliance Document (SPCD) are the primary tools to ensure safety compliance when coordinating construction activities with airport operations. These documents identify all aspects of the construction project that pose a potential safety hazard to airport operations and outline respective mitigation procedures for each hazard.

The CSPP sets forth benchmarks and requirements for the project to help ensure the highest levels of safety, security and efficiency at the airport at the time of construction. Requirements for this CSPP were developed from FAA Advisory Circular (AC) 150/5370-2 Operational Safety on Airports During Construction, latest edition. The CSPP is a standalone document, written to correspond with the safety and security requirements set forth in the AC, the airport safety and security requirements, and local codes and requirements. The CSPP is to be used by all personnel involved in the project. The CSPP covers the actions of not only the construction personnel and equipment, but also the action of inspection personnel and airport staff. This document has been developed in order to minimize interruptions to airport operations, reduce construction costs, and maximize the performance and safety of construction activity. Strict adherence to the provisions of the CSPP by all personnel assigned to or visiting the construction site is mandatory.

The Contractor shall submit a Safety Plan Compliance Document (SPCD) to the Airport Owner describing how the Contractor will comply with the requirements set forth in this CSPP. The SPCD must be submitted to the Airport Owner prior to issuance of Notice to Proceed. In the event the Contractor's activities are found in non-compliance with the provisions of the CSPP or the SPCD, the Airport Owner's Representative will direct the Contractor, in writing, to immediately cease those operations in violation. In addition, a safety meeting will be conducted for the purpose of reviewing those provisions in the CSPP/SPCD which were violated. The Contractor will not be allowed to resume any construction operations until conclusion of the safety meeting and all corrective actions have been implemented.

2.0 SCOPE OF PROJECT AND CSPP.

This project aims to centralize aircraft deicing efforts into the existing south deicing pad through the expansion and reconstruction of the south deicing pad. The full depth pavement reconstruction area is approx. 349,000 sf with an additional 440,000 sf of new asphalt pavement which is expected to accommodate 7 narrow and 2 large body aircraft. Incidental project components include site demolition, glycol diversion and pumping system, abandoned ARFF building demolition, airfield light and guidance sign fixtures with foundations, airfield cable and conduit, apron area flood lighting, electrical power and control equipment, surface and subsurface drainage improvements, stormwater collection structures and piping, stormwater management, turf grading, municipal utility service modifications, pavement markings and saw cut grooving. The project also includes approximately 37,000 sf of new pavement for a snow storage/staging area, vehicle access, and operations building (by others). A bulk glycol and potassium acetate tank storage facility which includes approximately 39,000 sf of new pavement is included as Add On. No.1

Safety, maintaining aircraft operations, and construction costs are all interrelated. Since safety must not be compromised, the Airport Owner must strike a balance between maintaining aircraft operations and construction costs. This balance will vary widely depending on the operational needs and resources of the airport and will require early coordination with airport users and the FAA. As the project design progresses, the necessary construction locations, activities and associated costs will be identified. As they are identified, their impact to airport operations must be assessed. Adjustments are made to the proposed construction activities, often by phasing the project and/or to airport operations in order to maintain operational safety. This planning effort will ultimately result in a project CSPP. The development of the CSPP takes place through the following five steps:

a. Identify Affected Areas
b. Describe Current Operations
c. Allow for Temporary Changes to Operations
d. Take Required Measures to Revise Operations
e. Manage Safety Risk

3.0 PLAN REQUIREMENTS.

3.1 COORDINATION. The following items shall be coordinated as required:

a. Pre-construction Meeting. A preconstruction meeting will be conducted to discuss operational safety, testing, quality control, quality acceptance, security, safety, labor requirements, environmental factors, and other issues. All parties affected by the construction will be asked to attend including, but not limited to, the Airport Owner, airline representatives, tenants, contractor, subcontractors and RPR.

At the preconstruction meeting, the Contractor shall submit a plan of operation and schedule of work to the RPR for approval. The Contractor's plan of operation shall indicate, in detail, the amount of construction planned and the number of shifts and/or overtime operations proposed for the project. The schedule of work shall clearly indicate the sequence of work to be performed. The Contractor shall conform, at all times, to the requirements of these provisions and with current safety practices, rules, regulations and security requirements of Airport Owner. The preconstruction meeting will be held prior to issuance of a Notice to Proceed.

b. Contractor Progress Meetings. A minimum of one progress meeting to discuss scheduling and coordination shall be held each week unless otherwise directed by the Airport Owner, throughout the duration of the Contract, between the Airport Owner, Contractor, RPR and any other interested parties at a time and place to be designated by the RPR. These meetings shall include a detailed discussion of construction phasing and safety with regard to the Contractor's compliance with the requirements stipulated in the Contract Documents.

In attendance at these meetings shall be a Contractor's representative with the authority to make decisions concerning the scheduling and coordination of work. Progress meetings shall be facilitated by the RPR. Operational safety shall be a standing agenda item during progress meetings throughout the construction project.

c. Scope or Schedule Changes. Changes in the Scope of Work or Project Schedule shall be governed by Section 40 and Section 80 of the Contract Documents. Any proposed change that

results in a deviation from the established CSPP as expressed by the Contract Documents must be submitted to the FAA and Airport Owner for review and approval. FAA review and approval can be expected to take sixty business days.

d. FAA ATO Coordination. Early coordination with Federal Aviation Administration (FAA) Air Traffic Organization (ATO) is required to schedule airway facility shutdowns and restarts. Relocation or adjustments to NAVAIDs, or changes to final grades in critical areas, may require an FAA flight inspection prior to restarting the facility. Flight inspections shall be coordinated and scheduled well in advance of the intended facility restart. Flight inspections shall be as required by technical specifications or special provisions.

No adjustments to NAVAID, encroachment on facility critical areas, or facility shutdowns are anticipated during construction, so ATO coordination will not be necessary.

e. Pre-Paving Meeting. If paving is included in this project, a pre-paving meeting will be held to discuss the status of preliminary submittals, the RPR's inspection of the plant and laboratory, test section requirements, paving plan requirements, and production requirements.

f. Payment. The cost of complying with the requirements of this section, including but not limited to scheduling; providing flag people; construction, maintenance and removal of temporary access roads and staging areas; providing,–placing, relocating, maintaining and removing temporary barricades; protection of aircraft and vehicular traffic; installation, maintenance and removal of temporary airfield markings; maintenance of airport lighting circuits; installation, maintenance, and removal of temporary wiring and airfield lighting facilities; cleaning of paved surfaces; restoration of surfaces disturbed as a result of the Contractor's operations; providing, maintaining, and removing warning signs, hazard markings, barricade lights; providing a guard at access gates; and all security requirements shall be included under Technical Specification Item C-106, Safety, Security and Maintenance of Traffic.

3.2 PHASING.

a. Phase Elements (Work Area(s))

Work Area Descriptions: The work of the project has been divided into four (4) primary areas and multiple sub work areas in order to coordinate construction in a way that will minimize interference with Airport operations, refer to phasing drawings for work areas that can and cannot be worked on concurrently:

Work Area "A": Includes all work within the existing grass area bound by the Terminal Apron, South deicing pad, and Taxiways A & E. This area includes the existing abandoned ARFF building scheduled for demolition.

Work Area "A2 and A3": Includes area within the Taxilane T along the southern edge of the Terminal Apron. Work in these area requires closure of the Taxilane T, thereby restricting access to two gates per work area. Work area A1 also requires the closure of Taxiway E.

Work Area "A1": Includes area within the Taxiway B object free area. Work in this area requires closure of Taxiway B between Taxiways T and A.

Work Area "B": Includes all work on the existing south deicing pad bound by Taxiway A and the Terminal Apron.

Work Area "B1": Includes area within the Taxiway A object free area. Work in this area will require a partial closure of taxiway A, located between Taxiway E and A3.

Work Area "C": Includes all work west of the new consolidated deicing facility and the glycol bulk storage tank facility. Work area C falls outside all airport operating areas and does not require airfield closures.

Work Area "D": Includes all work at the on-site spoil area, located northwest of runway 10 end. Work area D falls outside and below all airport operating areas and does not require airfield closures.

b. Construction Safety Requirements

The Contractor shall obtain approval from the RPR prior to beginning any work in all areas of the airport. No active runway or taxiway shall be crossed, entered, or obstructed at any time. The Contractor shall plan and coordinate his/her work in such a manner as to insure safety and a minimum of hindrance to airport operations. All Contractor equipment and material stockpiles shall be stored at locations determined during construction or as shown on the Construction Safety Drawings (Appendix 1). No equipment will be allowed to park within the approach area of an active runway at any time.

During the work under this Contract, the Airport Owner will make such arrangements to coordinate aircraft movements and Airport operations as necessary to conform to the construction procedures as outlined below and as shown on the Contract Drawings. The Contractor shall give adequate notice to the RPR, so as to afford time to coordinate construction with the Airport Owner. No work shall proceed in any area without prior approval.

The Contractor shall always confine construction operations to the Contractor work area and designated haul routes. Contractor personnel, equipment, stored materials, subcontractors and suppliers will not be allowed on any other area within the Air Operations Area and within the Airport boundaries without prior approval of the Airport Owner or RPR.

The RPR will perform a visual site assessment before the Contractor occupies the Contractor work area. The Contractor shall be held responsible for all repairs and cleanup costs incurred as a result of the Contractor's construction operations. Restoration shall be the complete return of all work areas to the original conditions.

Temporary above ground cable shall be installed in a conduit (PVC in turf and RGS on pavements). Temporary cables in conduit in grass areas shall be marked with stakes and flagging. Temporary cables in conduit in paved areas shall be marked with barricades.

In general, the Contractor shall perform the following prior to the start of construction operations:

- Coordinate with Airport Operations to provide an airfield escort to establish M&PT devices. Work may only commence after the work site is properly established, separated from AOA area and approved by Airport Operations and the RPR. M&PT shall be established as quickly as possible, but in no case shall exceed a 8-hour work shift. All workers shall be advised of the work area limits and shall never exit the designated work area without approval and escort by Airport Operations.
- Coordinate issuing Notices to Airmen (NOTAM) with the Airport Owner and RPR for the construction activities involved at least 48 hours in advance of the work.
- De-energize equipment that is scheduled to be temporarily disconnected.
- De-energize airfield lighting circuits associated with closed pavements.
- Eradicate pavement markings leading to closed pavements.
- Provide temporary airfield pavement markings as required per plan.
- Place barricades, construction warning fence, construction signs, sign and light covers, and temporary jumpers, as indicated on the Construction Safety Drawings.
- Provide a Gate Guard at the Security Checkpoint.
- Construct temporary construction access roads.
- Provide a vacuum sweeper for use during the project duration.

At the conclusion of construction operations, the Contractor shall perform the following:

- Coordinate with Airport Operations to provide an airfield escort to remove M&PT devices. M&PT shall be removed as quickly as possible, but in no case shall exceed a 8-hour work shift.
- Test and activate airfield lighting circuits.
- Restore and reenergize equipment that was temporarily disconnected.
- Remove barricades, construction signs, construction warning fence, sign and light covers and temporary jumpers, as indicated on the Construction Safety Drawings.
- Restore pavement markings and eradicate temporary markings.
- Remove construction access roads.
- Coordinate cancellation of the NOTAMs with the Airport Owner and RPR.
- Clean all paved surfaces in accordance with Item C-106, Safety, Security and Maintenance of Traffic.

In additional to the general common tasks above, the following specific items apply to each work area:

Refer to the Construction work phasing drawings for AOA operational impacts, maintenance and protection of traffic requirements and contractor restrictions associated with each work area.

3.3 AREAS AND OPERATIONS AFFECTED BY THE CONSTRUCTION ACTIVITY.

Contractor, subcontractor, and supplier employees or any other unauthorized persons shall be restricted from entering an active airport operating area without previous permission from the Airport Owner and the Aircraft Control Tower.

In an emergency situation, the Airport Owner or other designated airport representative may order

the Contractor to suspend operations; move personnel, equipment, and materials to a safe location; and stand by until aircraft use is completed.

The Contractor shall cooperate with the airport users through the RPR, in coordination with airport operations, in scheduling the operations to provide adequate clearance for safe aircraft parking, fueling, maintenance, loading or unloading, maneuvering, taxing operations, or other aircraft operations.

a. Identification of Affected Areas

The following is a summary of impacts to the Airport Operations Areas resulting from the proposed construction safety and work phasing requirements:

A. There will be no operational impacts to Runways as part of this project.
B. Select portions of Taxiways will be closed to accommodate construction while diverting aircraft taxing to other Taxiways.
C. Select portions of Terminal Apron taxilane and gates will be closed to accommodate construction while diverting aircraft to other routes on the Terminal Apron.
D. Commercial aircraft access to the Terminal Apron and Gates shall be maintained at all times, except for the 1-2 planned gate closures.

Table 3.3A Construction Effect on Airport Operations		
Project	CENTRALIZED DEICING FACILITY (CDF) PROJECT	
Phase	**Work Area A-D.** (See Section 3.2.a for description)	
Operational Requirements	Normal (Existing)	Anticipated (During Construction)
RW 10 Average Aircraft Operations	Carrier: 17/day	Carrier: 17/day
	GA: 6/Day	GA: 6/Day
	Military: 3/Day	Military: 3/Day
RW 28 Average Aircraft Operations	Carrier: 51/day	Carrier: 51/day
	GA: 19/Day	GA: 19/Day
	Military: 11/Day	Military: 11/Day
RW 15 Average Aircraft Operations	Carrier: 5/day	Carrier: 5/day
	GA: 2/Day	GA: 2/Day
	Military: 1/Day	Military: 1/Day
RW 33 Average Aircraft Operations	Carrier: 17/day	Carrier: 17/day
	GA: 6/Day	GA: 6/Day
	Military: 3/Day	Military: 3/Day
Runway 10-28 ARC	D-IV	D-IV
Runway 15-33ARC	D-IV	D-IV
RW 10 Approach Visibility Minimums	1/2 Mile	1/2 Mile
RW 28 Approach Visibility Minimums	1/2 Mile	1/2 Mile
RW 15 Approach Visibility Minimums	3/4 Mile	3/4 Mile
RW 33 Approach Visibility Minimums	1 Mile	1 Mile
Runway 10 Approach Procedures	ILS OR LOC 10	ILS OR LOC 10
	RNAV (RNP) Y RWY 10	RNAV (RNP) Y RWY 10
	RNAV (GPS) Z RWY 10	RNAV (GPS) Z RWY 10
Runway 28 Approach Procedures	ILS OR LOC 28	ILS OR LOC 28
	ILS RWY 28 (SA CAT I)	ILS RWY 28 (SA CAT I)
	ILS RWY 29 (CAT II)	ILS RWY 29 (CAT II)
	RNAV (RNP) Y RWY 28	RNAV (RNP) Y RWY 28
	RNAV (GPS) Z RWY 28	RNAV (GPS) Z RWY 28
Runway 15 Approach Procedures	RNAV (GPS) RWY 15	RNAV (GPS) RWY 15
	VOR RWY 15	VOR RWY 15

Table 3.3A Construction Effect on Airport Operations		
Project	CENTRALIZED DEICING FACILITY (CDF) PROJECT	
Phase	**Work Area A-D.** (See Section 3.2.a for description)	
Operational Requirements	Normal (Existing)	Anticipated (During Construction)
Runway 33 Approach Procedures	RNAV (GPS) RWY 33	RNAV (GPS) RWY 33
	TACAN RWY 33	TACAN RWY 33
Runway 10 Visual NAVAIDs	VASI	VASI
	MALSR	MALSR
Runway 28 Visual NAVAIDs	PAPI	PAPI
	ALSF2	ALSF2
Runway 15 Visual NAVAIDs	VASI	VASI
	MALS	MALS
Runway 33 Visual NAVAIDs	PAPI	PAPI
Taxiway ADG	IV	**Taxiway and Taxilane closures per plan**
ATCT (hours open)	00:00 – 24:00 (local)	00:00 – 24:00 (local)
ARFF Index	C	C
Special Conditions	None	**Taxiway and Taxilane closures per plan**

b. Mitigation of effects.

This CSPP has established specific requirements and operational procedures necessary to maintain the safety and efficiency of airport operations during the construction of this project.

All coordination pertaining to airport operations during construction will go through the Airport Owner's Representative and the Airport Operations Manager. Any required NOTAM's to be issued will be sent through the Airport Owner's Representative and issued by Airport Operations.

1. **Temporary Changes to runway and/or taxiway operations:** Any affected Airport Operations Areas identified in the previous section for reduced access or identified as being closed entirely to aircraft traffic, will be barricaded by the use of low profile, lighted barricades placed as shown in the exhibits provided in Appendix 1. In addition, required NOTAM's shall be issued on the various temporary changes to aircraft access through the affected areas.

2. **Detours for ARFF and other airport vehicles:** The project work site shall remain open to all ARFF vehicles in emergency situations. The Contractor is required to maintain access in and around the project work area for all ARFF vehicles. Proper routing of this traffic will be effectively communicated to all supervisory personnel involved in the construction project.

3. **Maintenance of essential utilities:** Special attention shall be given to preventing unscheduled interruption of utility services and facilities. Where required due to construction purposes, the Airport Owner and FAA shall locate all of their underground utilities. It is the Contractor's responsibility to have the locations of cabling and other underground utilities marked prior to beginning excavation. Any locations provided by the Airport Owner or FAA are approximate locations and the Contractor shall verify all locations prior to beginning excavations. When an underground cable or utility is damaged due to the Contractor's negligence the Contractor shall immediately repair the affected cable or utility at his/her own expense. Full coordination between airport staff, field inspectors, and construction personnel will be exercised to ensure that all airport power and control cables are fully protected prior to any excavation.

4. **Temporary Changes to air traffic control procedures:** Changes to air traffic control procedures have been coordinated with airport ATO. Any additional requests for changes must be made to the Airport Owner, through the RPR, in writing. These requested changes will be reviewed by the RPR, Airport Owner and ATO. If these changes are acceptable to all the aforementioned parties, the RPR will request a modification to the CSPP previously turned into the FAA. The Contractor shall plan on a minimum 90 days for this process to be completed. No deviation to the original CSPP shall be made without final FAA approval.

3.4 PROTECTION OF NAVIGATIONAL AIDS (NAVAIDS).

Before commencing construction activity, parking vehicles, or storing construction equipment and materials near a NAVAID, coordination with the appropriate FAA ATO to evaluate the effects of construction activity and the required distances and direction from the NAVAID is required.

3.5 CONTRACTOR ACCESS.

This section of the CSPP details the areas to which the Contractor must have access, and how Contractor personnel will access those project work areas.

a. Location of stockpiled construction materials.

The Contractor shall store material and equipment and schedule his operations for work to be done so that no unauthorized interference to normal Airport operations will result there from. Construction operations shall not be conducted in a manner to cause interference with Airport Operations. Stockpiled materials and equipment storage are not permitted within the Runway Safety Area/ Taxiway Safety Area (RSA/TSA), Obstacle Free Zone (OFZ) or Object Free Area (OFA) of an operational runway or taxiway. Stockpiled construction materials must be located inside the Contractor staging area as shown on the Construction Safety Drawings (Appendix 1), and must be less than 25 feet tall unless otherwise approved by the RPR.

Stockpiled material shall be constrained in a manner to prevent movement resulting from either aircraft jet blast or wind conditions in excess of ten miles per hour. In addition, stockpiled material shall have silt fence located around the material to prevent Foreign Object Debris (FOD) from moving onto the airfield pavements or polluting watercourses.

Open trenches exceeding 3 inches in depth and 5 inches in width or stockpiled material are not permitted within the limits of safety areas of operational runways or taxiways. Stockpiled material shall not be permitted within the protected areas of the runways, or allowed to penetrate into any of the protected airspace.

Spoil and Disposal Areas: Electrical equipment to be salvaged and turned over to the Owner in good working condition shall be as noted in the contract and as requested by the Owner. Excess soil material shall be spoiled on site at the locations shown on the plans and as approved by the Owner and RPR. All other spoil shall be disposed of offsite by the Contractor unless otherwise shown or specified. The Contractor shall submit the "Spoils Deposition Release Form" for any spoils which are transported from the project site. No direct payment will be made for spoiling and disposal operations. The cost of spoiling material on site, or of spoiling material off-site, shall be considered incidental to this Contract and the costs shall be included in the various pay items involved.

b. Vehicle and pedestrian operations. <u>Vehicle and pedestrian access routes for airport construction projects must be controlled to prevent inadvertent or unauthorized entry of persons, vehicles, or animals onto the Air Operations Area (AOA).</u>

The Airport Owner will coordinate requirements for vehicle operations with the affected airport tenants. Specific vehicle and pedestrian requirements for this project are as follows:

All construction vehicles and personnel shall be restricted to the immediate work areas specified by the contract for this project. These areas include the haul routes into the work area, the designated Contractor staging area and the area under construction. Use of alternate haul routes or staging areas by the Contractor shall not be permitted without prior notification and approval by the Airport Owner's Representative.

1. Construction Site Parking:

The Contractor's personal vehicle parking area shall be in the designated area of the Employee's Parking Lot. Contractor's personal vehicles will not be allowed inside the Air Operations Area (AOA) or secured area. Contractor shall provide a gate guard at the entrance to the Employee's Parking Lot. The Gate Guard will be responsible for checking workers' badges prior to allowing them access to the parking lot. The Gate Guard must be in

possession of a cell phone at all times. Contractors shall provide suitable transportation for their employees from the parking location through the security gate to the Staging Area or Work Area. Employees shall not enter the secure area on foot.

A staging area, as indicated on the Contract Drawings, will be provided where the Contractor may set up a field office and store equipment and materials. The Contractor shall make his own arrangements for, and bear all costs of required utilities. The Contractor shall use and maintain the site in accordance with requirements of the Airport Owner. Upon completion of work, the Contractor's staging area shall be cleaned and graded to a smooth compacted surface.

2. Construction Equipment Parking:

The Contractor's equipment storage area shall be in the Contractor staging area as shown on the Construction Safety Drawings (Appendix 1). The Contractor's equipment and construction vehicles shall be restricted to the construction site or storage areas during construction and parked in the equipment storage area during non-working periods. Maximum allowable equipment height in the staging area shall be 25 feet. Maximum allowable equipment height in the work areas shall be 25 feet.

Contractor must service all construction vehicles within the limits of the project work area or the Contractor's Staging Area. Parked construction vehicles must be outside the OFA and never in the safety area of an active runway or taxiway. Inactive equipment must not be parked on closed taxiways or runways. If it is necessary to leave specialized equipment on a closed taxiway or runway at night, the equipment must be well lighted. Employees shall also park construction vehicles outside the OFA when not in use by construction personnel (for example, overnight, on weekends, or during other periods when construction is not active). Parking areas must not obstruct the clear line of sight by the ATCT, as applicable, to any taxiways or runways under air traffic control nor obstruct any runway visual aids, signs, or navigation aids.

3. Access and Haul Roads:

The Contractor shall construct and maintain haul routes as required for the prosecution of the work. The haul routes and access points shall only be in the locations approved by the RPR and the Airport Owner or as shown on the Construction Safety Drawings (Appendix 1).

Access or haul routes used by Contractor vehicles must be clearly marked to prevent inadvertent entry to areas open to airport operations. Construction traffic must remain on the designated haul routes, never straying from the approved paths. Haul and access routes shall be clearly delineated with temporary marking and signage by the Contractor. Signage and marking placement shall be reviewed and approved by the RPR and Airport Owner prior to being put into service. The Contractor shall fully describe the appropriate access routes to all his/her employees, subcontractors and material delivery personnel.

The Contractor shall be responsible for maintaining existing haul routes. At the completion of the project, these areas shall be returned to their original lines and grades and shall be restored to a condition equal to or better than original. All non-paved areas that are disturbed by Contractor's haul roads, operations, etc., located outside of the seeding limits shown on the plans shall be re-seeded and restored to their original or better condition by the Contractor at no additional cost to the Airport Owner.

The Contractor shall coordinate haul routes, closures and schedules with other projects which may be underway during the same time period as this contract.

The Contractor shall control and coordinate the material (supplies) that are hauled to and from work area. Delivery of equipment and materials to the area of work shall be by way of the access route shown on the Construction Safety Drawings (Appendix 1) or designated by the Airport Owner or RPR.

The Contractor shall maintain all haul routes and work areas in a dust free condition at all times. The Contractor shall control dust from the construction operations by vacuum type sweeping, watering or other methods as approved by the RPR. Contractor shall have equipment (in operating condition) on site, at all times, to control dust. If the Contractor fails to comply with this requirement, construction will be suspended until a plan for controlling the dust is approved by the RPR. Landside haul routes, boulevards and drives shall be kept clean by use of a vacuum sweeper on a daily basis as required. Application of water on dirt or gravel haul routes must be provided as often as necessary. Haul roads in any airport traffic areas must be especially monitored for dust and debris to prevent any potential Foreign Object Debris (FOD) situations. As access to the AOA is used by other vehicles, the Contractor shall not stage equipment and material delivery vehicles such that access is blocked off.

The existing perimeter road shall remain open and accessible for airport personnel at all times. Special attention must be given to ensure that if construction traffic is to share or cross any Airport Rescue and Fire Fighting (ARFF) routes that ARFF right of way is not impeded at any time, and that construction traffic on haul roads do not interfere with NAVAIDs or approach surfaces of operational runways.

Portions of the project area(s) shall be bounded by the low profile barricades identifying Contractor personnel and vehicle area operation limits. The locations of any barricaded project limits, haul routes, Contractor Staging Areas, and associated safety and security details are also provided graphically in the attached exhibits.

4. Marking and Lighting of Vehicles:

When any vehicle or piece of equipment, other than one that has prior approval from the Airport Owner, must operate on an airport, it shall be escorted and properly identified.

The Contractor shall limit access within the airport security fence to authorized vehicles. All authorized vehicles shall have a vehicle dash board placard permit issued by the Airport Owner, and an identification sign on both sides of the vehicle containing the Contractor's company name. Private vehicles of the Contractor's personnel must be parked outside the airport security fence and will not be allowed within the airport security fence at any time.

All vehicles operating on the airport and in the general vicinity of the safety area or in aircraft movement areas must be marked with flashing yellow/amber beacons or orange and white flags during daylight hours. During hours of darkness or low visibility they shall be marked with at least flashing yellow/amber beacons.

Each vehicle shall be assigned initials or numbers that are prominently displayed on each side of the vehicle. The identification symbols shall be at least 12-inch high, block-type

characters of a contrasting color, and easy to read. They may be applied either by using tape or a water-soluble paint to facilitate removal. Magnetic signs are also acceptable.

Beacons and flags must be maintained to standards and in good working and operational condition. Beacons must be located on the uppermost part of the vehicle structure, visible from any direction, and flash 75 +/- 15 flashes per minute. Flags shall be 3' by 3' with alternating 1' by 1' international orange and white squares, and shall be replaced by the Contractor if they become faded, discolored, or ragged as determined by Airport Operations or the Airport Owner's Representative.

5. Description of Proper Vehicle Operations:

The Contractor shall be required to follow guidance on the additional identification and control of construction equipment per the Airport's Security Plan. No Contractor's vehicle or pedestrian crossing of active runways or taxiways will be allowed at any time during the work of this Contract, unless otherwise specified. No deviation from the pedestrian and vehicle routes to and from the Project Areas will be allowed unless specific permission has been granted by the Airport Owner.

The ground movement of aircraft shall have the right-of-way at all times, and the Contractor's vehicles and equipment shall yield to aircraft at all times.

6. Required Escorts:

Anyone not in possession of a current airport badge shall be escorted by an appropriately badged person. At no time will vehicles or personnel enter portions of the secure AOA outside the contract area unless permitted and accompanied by an airport approved escort.

All construction-related activity taking place within any airport defined movement area requires the presence of an authorized Airport escort having radio communication with the FAA control tower unless prior approval is obtained from Airport Operations. Spotters and/or flaggers having radio or telephone contact with the FAA control tower may be used with the approval of the Airport Operations Manager.

At no time shall active taxiways or taxilanes be crossed by construction equipment without notification and proper approval/clearance from radio-trained crossing guards and/or Airport Operations.

7. Training Requirements for Vehicle Drivers:

Any employees the Contractor would request to be given permission by Airport Operations to drive on the AOA shall complete airport badging and driver training per the Airport's requirements.

8. Situational Awareness:

Aircraft traffic will continue to use existing runways, aprons, and taxiways of the Airport during the time that work is being performed. The Contractor shall, at all times, conduct the work as to create no hindrance, hazard, or obstacle to aircraft using the Airport.

Vehicle drivers must confirm by personnel observation that no aircraft is approaching their position (either in the air or on the ground) when given clearance to cross a runway, taxiway, or any other area open to airport operations. In addition, it is the responsibility of the escort vehicle driver to verify the movement/position of all escorted vehicles at any given time.

9. Two-way Radio Communication Procedures:

Two-way radio communications are not required between Contractors and Airport Traffic Control Tower. The contractor's personnel shall never enter into the non-movement (ATCT controlled) areas without an Airport Operations escort. The contractors' personnel shall never be allowed direct radio communication with ATCT staff.

Vehicular traffic located in or crossing an active movement area shall be directed by an Airport Operation staff member monitoring the Airport Traffic Control Tower channel. Prior to proceeding into the active movement area, all drivers shall confirm through personal observation that no aircraft is approaching the vehicle position. Construction personnel may operate in movement areas without two-way radio communication provided a NOTAM is issued closing the area, and provided that the area is properly marked to prevent incursions.

10. Maintenance of the Secured Area of the Airport.

Airport Owner and contractors must also maintain a high level of security during construction. Procedures conforming to Airport security protocols should be in place to ensure that only authorized persons and vehicles have access to the AOA. Access shall be made available at all times to all airport emergency vehicles traveling to operations areas within the proximity of the construction work zone.

c. Security.

In general, security in the work area is the responsibility of the Contractor.

The Contractor shall be required to maintain security and comply with the Airport Security Plan and the Transportation Security Administration Security Rules and Regulations throughout the duration of the project. The Contractor and the Surety shall indemnify and save harmless the Airport Owner, RPR and third party or political subdivision from any and all breaches of security and shall indemnify the Airport Owner for any fines, expenses and damages which it may be obliged to pay by reason of any breach of security resulting from the Contractor's actions at any time during the prosecution of the work. Such breaches of security are subject to fines by the Transportation Security Administration of up to ten thousand dollars ($10,000) per incident.

The Security Office will perform periodic checks in the Work Areas throughout the duration of this project to ensure that Security procedures are being followed. All persons entering the Secure Area are subject to search. All vehicles entering the Secure Area will be subject to search by the Security Office, or their representative.

Each Contractor's employee, and subcontractors' employees shall have either an ID Badge or be escorted by someone with an ID Badge. The Security Office recommends that as many employees get badged as possible. The following people, as a minimum, obtain an ID Badge to become a Contractor Escort: Superintendents, Foremen, Flagmen and Gate Guards. Contractor may also request ID Badges for any other individuals who will need to have unescorted access to the AOA.

One ID Badged person may escort up to 5 workers, as long as the workers are under the ID Badged person's control. Control in this situation means that the worker shall be within earshot of the Contractor's Escort. Each Contractor Escort must know which workers they are responsible for, and each worker must know who their Contractor Escort is at all times.

Each person who needs to obtain an ID Badge must fill out an AOA/SIDA Fingerprint Application Form and security training videos with exams online. Persons who need an ID Badge must complete application forms found at Airport Security Office's website noted below. The prime contractor shall designate a one signatory who will be the only person allowed to schedule Airport Security Office visits for their employees via the online portal. Please note that the badging office has select office hours with conditions on allowable tasks per timeframes noted.

Once the application visit is scheduled by the signatory, applicants shall return the completed, signed original form to the Security Office in person, where the applicant will be fingerprinted, photographed and two forms of government identification will be checked. After processing the fingerprint application, and upon acceptance of the applicant, the applicant shall login to complete the training videos and associated exams, after which the applicant's signatory will be allowed to schedule a second appointment to finalize training and be issued the ID Badge. The current price to obtain a new security badge as of the date of this writing is $50 each (subject to change), the cost of which shall be included in the contract and paid by the Contractor. Additional up to date details, procedures and forms on the badging process can be found on the SRAA website located here: https://syrsraa.com/badging-and-vehicle-permit-policy/

Any person who submits a fingerprint application and is rejected by the Security Office will not be allowed on the project.

ANY PERSON WHO IS ISSUED AN ID BADGE AND LOSES IT, OR DOESN'T BRING IT TO THE JOB SITE, WILL NOT BE ALLOWED TO ENTER THE SECURE AREA OF THE AIRPORT, NOR ALLOWED TO BE ESCORTED ON THE JOB SITE. NO EXCEPTIONS. Lost ID Badges may be replaced at the Security Office's discretion. Any lost ID or Construction Badges, and Badges not returned at the end of the project are subject to a charge of one thousand dollars ($1,000.00). The money for lost or unreturned Badges shall be deducted from the Contractor's payment.

Contractor shall provide a Gate Guard stationed at the Access Gate. The Gate Guard will be responsible for checking workers' badges prior to allowing them access to the Work Area. Gate Guard will also be responsible for providing flags for all vehicles entering the secure area. The Gate Guard must be in possession of a cell phone at all times.

Contractor shall provide a list of workers expected to be on the job site to the Security Office. The list shall include names, addresses, Social Security Numbers, phone numbers, driver's license numbers with issuing State, and affiliated company. The Security Office will perform a "threat assessment" of all workers on the list. A list of workers passing the threat assessment will be given to the Gate Guard manning the Access Gate. Workers not on the list will not be allowed to enter the Secure Area. A similar list shall be provided for all subcontractors.

Contractor shall provide a list of all company vehicles that will require access to the work area. Copies of Insurance Certificates covering the vehicles must be submitted with the list. Vehicles shall have their company name marked on the side of the vehicle. The driver of the vehicle shall possess a valid driver's license and either possess an ID Badge, or be escorted by an ID Badged person in order to enter the Secure Area.

Contractor shall provide a list of supply and material deliverymen expected to be on the job site to the Security Office. The list shall include names, addresses, Social Security Numbers, phone numbers, driver's license numbers with issuing State, and affiliated company. The list will be given to the Gate Guard manning the Access Gate. Deliverymen not on the list will not be allowed to enter the Secure Area. Delivery vehicles shall have their company name marked on the side of the vehicle and the driver shall possess a valid driver's license in order to enter the Secure Area. Delivery vehicles shall have a flag displayed. Delivery vehicles shall be escorted to the respective work areas by a Contractor's Escort. Deliverymen are not required to obtain a Badge.

3.6 WILDLIFE MANAGEMENT.

Construction contractors must carefully control and continuously remove waste or loose materials that might attract wildlife. Contractor personnel must be aware of and avoid construction activities that can create wildlife hazards on airports.

a. Trash. Food scraps from construction personnel activity must be collected and disposed of at a proper facility.

b. Standing water. Water shall not be allowed to collect and pool for more than any single 24-hour period. Temporary grading may be required to promote drainage during daily operations as well as between work phases.

c. Tall grass and seeds. The use of millet seed in turfing and seeding operations shall not be permitted.

d. Poorly maintained fencing and gates. Not applicable to this project.

e. Disruption of existing wildlife habitat. Not applicable to this project.

Contractor shall take immediate remedial action to remove wildlife attractants should any occurrence be noted. Contractor shall immediately report to the RPR and Airport Owner should any wildlife congregation be noted, and in particular if mammals enter the airport through the construction gate.

3.7 FOREIGN OBJECT DEBRIS (FOD) MANAGEMENT.

Special care and measures shall be taken to prevent Foreign Object Debris (FOD) damage when working in an airport environment. Waste and loose materials, commonly referred to as FOD, are capable of causing damage to aircraft landing gears, propellers, and jet engines. The Contractor shall be responsible for implementing an approved FOD Management Plan prior to the start of construction activities. The FOD Management Plan will have procedures for prevention, regular cleanup, and containment of construction material and debris. The Contractor will ensure all vehicles related to the construction project using paved surfaces in the AOA shall be free of any debris that could create a FOD hazard. Special attention will be given to the cleaning of cracks and pavement joints. All taxiways, aprons, and runways must remain clean. Waste containers with attached lids shall be required on construction sites.

Special attention should be given to securing lightweight construction material (concrete insulating blankets, tarps, insulation, etc.). Specific securing procedures and/or chain link enclosures may be required.

Contractors will provide their own equipment for vehicle and equipment washing and clean up.

Immediate access to a power sweeper is required when construction occurs on any pavement area inside the AOA, unless an appropriate alternative has been approved by the Airport Owner's Representative and Airport Operations Manager.

3.8 HAZARDOUS MATERIALS (HAZMAT) MANAGEMENT.

Contractors operating construction vehicles and equipment on the airport must be prepared to expeditiously contain and clean-up spills resulting from fuel, hydraulic fluid, or other chemical fluid leaks. Transport and handling of other hazardous materials on an airport also requires special procedures. To that end, the Contractor is required to develop a spill prevention plan and response procedures for vehicle operations prior to the start of construction activities. This includes maintenance of appropriate MSDS data and appropriate prevention and response equipment on-site.

Fueling Procedures and Spill Recovery Procedures shall be in accordance with New York State Fire Code, latest edition, and the National Fire Protection Association standard procedures for spill response, latest edition. If fueling is to take place in the staging area, it must be away from catch basins. Contractor must have spill containment kits on site.

In the event of a fuel spill or the spill of other hazardous materials, the Contractor shall immediately notify the Airport Owner and the RPR, the New York State Department of Environmental Conservation, the Environmental Protection Agency, the Airport Owner and the RPR.

Contractor shall abide by the specific requirements contained in the Technical Specifications of this contract.

3.9 NOTIFICATION OF CONSTRUCTION ACTIVITY.

The following is information and procedures for immediate notification of airport users and the FAA of any conditions adversely affecting the operational safety of the airport.

a. **Maintenance of a list of Responsible Representatives/ Point of contact.** A list of responsible representatives and points of contact shall be created by the RPR, the Airport and the Contractor prior to the start of construction. This list shall be compiled as part of the project pre-construction meeting agenda. Procedures will be established to contact all parties, including after regular work hours. Updates will be made to the list throughout the project duration by the RPR. Contractor points of contact shall be incorporated into the contractor's SPCD.

b. **Notices to Airman (NOTAM).** Only the Airport Owner may initiate or cancel NOTAMs on airport conditions, and is the only entity that can close or open a runway or taxiway. The Airport Owner must coordinate the issuance, maintenance, and cancellation of NOTAMs about airport conditions resulting from construction activities with tenants and the local air traffic facility (control tower, approach control, or air traffic control center), and must provide information on closed or hazardous conditions on airport movement areas to the FAA Flight Service Station (FSS) so it can issue a NOTAM. The Airport Owner must file and maintain a list of authorized representatives with the

FSS. Only the FAA may issue or cancel NOTAMs on shutdown or irregular operation of FAA owned facilities. Any person having reason to believe that a NOTAM is missing, incomplete, or inaccurate must notify the Airport Owner.

Any NOTAMs for planned airfield closures for this project must be coordinated through the airport manager and the airports duly appointed construction management representative. Reference Section 3.2 for planned closures for this project, which require issuance of a NOTAM.

c. Emergency Notification Procedures. In the event of an aircraft emergency, severe weather conditions, or any issue as determined by the Airport that may affect aircraft operations, the Contractor's personnel and/or equipment may be required to immediately vacate the area(s) affected. Points of contact for the various parties involved with the project shall be identified and shared at the pre-construction meeting among the various parties. Emergency points of contact shall be incorporated into the contractor's SPCD.

d. Accidents. The Contractor shall provide at the site such equipment and medical facilities as are necessary to supply first aid service to anyone who may be injured in connection with the work. The Contractor must promptly report in writing to the RPR all accidents whatsoever arising out of, or in connection with, the performance for the work, whether on or adjacent to the site which caused death, personal injury or property damages, giving full details and statements of witnesses. In addition, if death or serious injuries or serious damages are caused, the accident shall be reported immediately by telephone or messenger to both the RPR and the Airport Owner.

If any claim is made by anyone against the Contractor or any Subcontractor on account of any accident, the Contractor shall promptly report the facts in writing to the RPR giving full details of the claims.

e. Coordination with ARFF Personnel. The Contractor shall coordinate, through the duly appointed airport representative, with ARFF personnel, mutual aid providers and other emergency services if construction requires the following:

- The deactivation and subsequent reactivation of water lines or fire hydrants, or
- The re-routing, blocking and restoration of emergency access routes, or
- The use of hazardous materials on the airfield.

Procedures and methods for addressing any planned or emergency response actions on the airfield concerning this project shall be established and implemented prior to the start of construction.

f. Notification to the FAA.

1. **Part 77.** Any person proposing construction or alteration of objects that affect navigable airspace, as defined in Part 77, must notify the FAA. This includes construction equipment and proposed parking areas for this equipment (i.e. cranes, graders, other equipment) on airports. FAA Form 7460-1, Notice of Proposed Construction or Alteration, is used for this purpose and submitted to the appropriated FAA Airports Regional or District Office. A 7460-1 form for this project has been completed and submitted by the Engineer for using equipment with a **maximum height of 25 feet.** A new 7460-1 form must be submitted to the FAA for review and comment for any equipment which the Contractor will use which is taller than the equipment used in the above 7460-1 submission. The Engineer will be responsible for submitting the new 7460-1 form to the FAA. To that end, the Contractor shall identify the equipment in his SPCD

,including the maximum height it will extended to during construction, the area(s) in which the equipment will be used, and the duration the equipment will be used.

2. **Part 157.** It is not anticipated that Part 157 notifications will be required for this project.

3. **NAVAIDS.** For emergency (short-notice) notification about impacts to both airport owned and FAA owned NAVAIDs, contact: 866-432-2622.

   i. **Airport owned/FAA maintained**. If construction operations require a shutdown of more than 24 hours, or more than 4 hours daily on consecutive days, of a NAVAID owned by the airport but maintained by the FAA, provide a 45-day minimum notice to FAA ATO/Technical Operations prior to facility shutdown.

   ii. **FAA owned.** The Airport Owner must notify the appropriate FAA ATO Service Area Planning and Requirements (P&R) Group a minimum of 45 days prior to implementing an event that causes impacts to NAVAIDs. (Impacts to FAA equipment covered by a Reimbursable Agreement (RA) do not have to be reported by the Airport Owner). Coordinate work for an FAA owned NAVAID shutdown with the local FAA ATO/Technical Operations office, through the RPR, including any necessary reimbursable agreements and flight checks. Detail procedures that address unanticipated utility outages and cable cuts that could impact FAA NAVAIDs. In addition, provide seven days' notice to schedule the actual shutdown.

3.10 INSPECTION REQUIREMENTS.

a. **Daily (or more frequent) inspections.** Inspections shall be conducted by the Contractor at least daily, but more frequently if necessary, to ensure conformance with the CSPP. A sample checklist is provided in Appendix 2 of this document. In addition to Contractor's required inspections, airport operations will inspect the construction site three (3) times a day to ensure compliance with the CSPP and the SPCD. The Airport Owner's Representative will have full-time inspectors monitoring activity throughout construction. Promptly take all actions necessary to prevent or remedy any unsafe or potentially unsafe conditions as soon as they are discovered.

b. **Final inspections.** A final inspection with the Airport Owner's Representative, Airport and Contractor will take place prior to allowing airport operations.

3.11 UNDERGROUND UTILITIES.

Special attention shall be given to preventing unscheduled interruption of utility services and facilities. Where required due to construction purposes, the FAA shall be present during locating activities of all FAA facility underground cables. The Contractor shall locate and/or arrange for the location of all the underground cables. When an underground cable is damaged due to the Contractor's negligence the Contractor shall immediately repair the cable affected at his/her own expense. Full coordination between airport staff, field inspectors, and construction personnel will be exercised to ensure that all airport power and control cables are fully protected prior to any excavation. Locations of cabling will be marked prior to beginning excavation.

Prior to opening an excavation, effort shall be made to determine whether underground installation: i.e., sewer, water, fuel, electric lines, etc., will be encountered, and if so, where such underground installations are located. When the excavation approaches the approximate locations of such an installation, the exact locations shall be determined by careful hand probing

or hand digging, and/or use of a vacuum truck, and when it is uncovered, adequate protection shall be provided for the existing installation. All known owners of underground facilities in the area concerned shall be advised of proposed work at least 48 hours prior to the start of actual excavation.

The information concerning underground utilities was compiled from information and sketches furnished by or obtained from utility companies and the Airport. The Airport Owner and the RPR do not guarantee their accuracy. The Contractor is advised to determine the exact locations from the available sources of information or provide his own means of detection. The only case in which the RPR will consider redesign or relocation of a proposed facility in the project is when an existing utility is located within the construction limits. In this case, the RPR will work with the Airport Owner to determine the appropriate action to resolve the conflict. If such relocation is impossible, the RPR will consider re-design or relocation of the proposed facilities. In both cases, Contractor shall be responsible for all underground utilities and shall not be separately compensated for delays or extra cost.

Note that Dig Safely New York (DSNY) services do not include locating FAA and Owner facilities nor do they enter the secure airport property (fenced area). The Contractor shall use a private utility locating service at his/her expense.

3.12 PENALTIES.

Failure on the part of the Contractor to adhere to prescribed requirements may have consequences that jeopardize the health, safety or lives of customers and employees at the airport. The Airport may issue warnings on the first offense based upon the circumstances of the incident. Individuals involved in non-compliance violations may be required to surrender their Airport ID badges and/or be prohibited from working at the airport, pending an investigation of the matter.

Penalties for violations related to airport safety and security procedures will be established by the Airport.

Note: project shutdown or misdemeanor citations may be issued on a first offense. When construction operations are suspended, activity shall not resume until all deficiencies are rectified.

3.13 SPECIAL CONDITIONS.

In the event of an aircraft emergency, the Contractor's personnel and/or equipment may be required to immediately vacate the area. The Contractor will receive notification from airport operations when special conditions require the construction site to be vacated. In any event, extreme care should be exercised should construction personnel identify any ARFF (Airport Rescue and Fire-Fighting) or other emergency or rescue vehicle moving toward the Runway with emergency lights displayed. This will generally mean that an emergency situation is imminent.

Special conditions that could require suspension of the construction work include the following: aircraft in distress, aircraft accident, security breach, VIP operation, vehicle/pedestrian deviation, severe weather, or failing to abide by this Construction Safety and Phasing Plan and/or the Safety Plan Compliance Document.

3.14 RUNWAY AND TAXIWAY VISUAL AIDS.

This topic includes marking, lighting, signs, and visual NAVAIDs. Those areas where aircraft will be operating shall be clearly and visibly separated from construction areas, including closed runways. Throughout the duration of the construction project, the Contractor shall inspect and verify that these areas remain clearly marked and visible at all times and that marking, lighting, signs and visual NAVAIDs remain in place and operational.

a. General. Airport markings, lighting, signs, and visual NAVAIDs must be clearly visible to pilots, not misleading, confusing, or deceptive. All must be secured in place to prevent movement by prop wash, jet blast, wing vortices, or other wind currents and constructed of materials that would minimize damage to an aircraft in the event of inadvertent contact.

Marking and lighting for a temporary threshold is not required.

Closed runway markings are not required.

b. Markings. Markings must be in compliance with the standards of AC 150/5340-1, Standards for Airport Markings, current edition, and the drawings and technical specifications of this project.

c. Lighting and visual NAVAIDs. All runway and taxiway lighting in those sections of runways and taxiways closed to aircraft traffic will be either de-energized or blacked out by use of an appropriately cut length of PVC pipe.

d. Signs. Signs affected by the closed portions of pavement will be de-energized and/or covered to avoid confusion.

e. Testing of Airport Lighting Circuits. See technical specification Item L-108, Underground Power Cable for Airports for testing requirements.

3.15 MARKING AND SIGNS FOR ACCESS ROUTES.

Location of haul routes on the airport site shall be as specified in the project drawing set and as provided graphically in the attached exhibits, reference Appendix 1. It shall be the Contractor's responsibility to coordinate off-site haul routes with the appropriate owner who has jurisdiction over the affected route. The haul routes, to the extent possible, shall be marked and signed in accordance with FAA airfield signage requirements, the Federal Highway Administration Manual on Uniform Traffic Control Devices (MUTCD) and/or state highway specifications, as applicable.

3.16 HAZARD MARKING AND LIGHTING.

a. Purpose. Hazard marking and lighting prevents pilots from entering areas closed to aircraft, and prevents construction personnel from entering areas open to aircraft. To that end, comprehensible warning indicators for any area affected by construction that is normally accessible to aircraft, personnel, or vehicles shall be installed and maintained by the Contractor for the duration of construction operations.

b. Equipment. Low Profile Barricades of the type detailed in the project drawings with red omnidirectional flashing lights shall be placed outside the safety area of intersecting taxiways at the edge of the closed airfield surfaces and the project work limits. Layout locations for this equipment are as shown on the Construction Safety Drawings and attached exhibits, reference Appendix 1.

Plastic Drum Type Barricades of the type detailed in the project drawings with omnidirectional flashing lights shall be placed. Layout locations for this equipment are as shown on the Construction Safety Drawings and attached exhibits, reference Appendix 1. Plastic drum barricades cannot be placed near aircraft operating surfaces and shall not be located in any Runway or Taxiway Object Free area nor non movement areas. Drum style barricades shall only be used to control the movements of the contractors vehicles and equipment.

The Contractor shall have a person on call 24 hours a day for emergency maintenance of airport hazard lighting and barricades. The Contractor must file the contact person's information with the Airport Owner. Lighting should be checked for proper operation at least once per day, preferably at dusk.

3.17 PROTECTION OF AIRFIELD AREAS.

Safety area encroachments, improper ground vehicle operations and unmarked or uncovered holes and trenches in the vicinity of aircraft operation surfaces and construction areas are the three most recurring threats to safety during construction. Protection of runway and taxiway safety areas, object free areas, obstacle free zones, and approach/departure surfaces shall be a standing requirement for the duration of construction operations.

a. Runway Safety Area (RSA). A runway safety area is the defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway by aircraft.

Runway	Aircraft Design Group	RSA Distance from Centerline RSA	Holdline	RSA Width	RSA Length from End of Runway
10-28	D-IV	250 ft.	255 ft.	500 ft.	1,000 ft.
15-33	D-IV	250 ft.	255 ft.	500 ft.	1,000 ft.

No construction may occur within the existing RSA while the runway is open. Any construction between RSA and Holdline must be approved with Airport Operations prior to starting work.

The Airport Owner must coordinate any adjustment of RSA dimensions, to meet the above requirement, with the appropriate FAA Airports Regional or District Office and the local FAA air traffic manager and issue a NOTAM.

Open trenches or excavations are not permitted within the RSA while the runway is open. The Contractor must backfill trenches before the runway is opened. Coverings are not allowed in runway safety areas. There shall be no stockpiled materials or equipment stored within the limits of the RSA. After the Runway has been closed, Contractors must prominently mark open trenches and excavations at the construction site with red or orange flags, as approved by the Airport Owner, and light them with red lights during hours of restricted visibility or darkness.

Soil erosion must be controlled to maintain RSA standards, that is, the RSA must be cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations, and capable, under dry conditions, of supporting snow removal equipment, aircraft rescue and firefighting equipment, and the occasional passage of aircraft without causing structural damage to the aircraft.

b. Runway Object Free Area (ROFA). Construction, including excavations, may be permitted in the ROFA. However, equipment must be removed from the ROFA when not in use, and material should not be stockpiled in the ROFA if not necessary. Stockpiling material in the OFA requires submittal of a 7460-1 form and justification provided to the appropriate FAA Airports Regional or District Office for approval.

Runway	Aircraft Design Group	ROFA Distance from Centerline	ROFA Width	ROFA Length from End of Runway
10-28	D-IV	400 ft.	800 ft.	1,000 ft.
15-33	D-IV	400 ft.	800 ft.	1,000 ft.

c. Taxiway Safety Area (TSA). The taxiway safety area is a defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway. No construction may occur within the TSA while the taxiway is open for aircraft operations.

Taxiway	Aircraft Design Group	TSA Distance from Centerline	TSA Width
All	IV	85.5 ft.	171 ft.

Open trenches or excavations are not permitted within the TSA while the taxiway is open. The Contractor must backfill trenches before the taxiway is opened. Coverings are not allowed in taxiway safety areas.

The Airport Owner must coordinate any adjustment of TSA dimensions, to meet the above requirement, with the appropriate FAA Airports Regional or District Office and the local FAA air traffic manager and issue a NOTAM.

After the Taxiway has been closed, Contractors must prominently mark open trenches and excavations at the construction site with red or orange flags, as approved by the Airport Owner, and light them with red lights during hours of restricted visibility or darkness.

Soil erosion must be controlled to maintain TSA standards, that is, the TSA must be cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations, and capable, under dry conditions, of supporting snow removal equipment, aircraft rescue and firefighting equipment, and the occasional passage of aircraft without causing structural damage to the aircraft.

d. Taxiway Object Free Area (TOFA). Unlike the Runway Object Free Area, aircraft wings regularly penetrate the taxiway/taxilane object free area during normal operations. Thus the restrictions are more stringent. No construction equipment may be parked within the TOFA while the taxiway/taxilane is open for aircraft operations.

Construction activity may be accomplished without adjusting the width of the taxiway object free area, subject to the following restrictions:

1. Appropriate NOTAMs are issued.

2. Marking and lighting meeting the provisions above are implemented.

3. Five-foot clearance is maintained between equipment and materials and any part of an aircraft (includes wingtip overhang). In these situations, flaggers must be used to direct construction equipment, and wing walkers will be necessary to guide aircraft. Wing walkers should be airline/aviation personnel rather than construction workers. If such clearance can only be maintained if an aircraft does not have full use of the entire taxiway width (with its main landing gear at the edge of the pavement), then it will be necessary to move personnel and equipment for the passage of that aircraft.

Taxiway	Aircraft Design Group	TOFA Distance from Centerline	TOFA Width
All	ADG-IV	121.5 ft.	243 ft.

Taxilane	Aircraft Design Group	TLOFA Distance from Centerline	TLOFA Width
All	ADG-IV	112 ft.	224 ft.

e. **Obstacle Free Zone (OFZ).** Construction personnel, material, and/or equipment may not penetrate the OFZ while the runway is open for aircraft operations. The OFZ is a defined volume of airspace centered about and above the runway centerline.

f. **Runway approach/departure surfaces.** All personnel, materials, and/or equipment must remain clear of the applicable threshold siting surfaces. Objects that do not penetrate these surfaces may still be obstructions to air navigation and may affect standard instrument approach procedures. Coordinate with the FAA through the appropriate FAA Airports Regional or District Office.

Construction activity in a runway approach/departure area may result in the need to partially close a runway or displace the existing runway threshold. Partial runway closure, displacement of the runway threshold, as well as closure of the complete runway and other portions of the movement area also require coordination through the Airport Owner with the appropriate FAA air traffic manager (FSS if non-towered) and ATO/Technical Operations (for affected NAVAIDS) and airport users.

Runway End	Aircraft Approach Category	Airplane Design Group	Minimum Safety Area Behind Threshold	Minimum Unobstructed Approach Slope
10	D	IV	1,000	34:1 to 200 feet behind threshold
28	D	IV	1,000	34:1 to 200 feet behind threshold
15	D	IV	1,000	34:1 to 200 feet behind threshold
33	D	IV	1,000	34:1 to 200 feet behind threshold

3.18 OTHER LIMITATIONS ON CONSTRUCTION.

a. Prohibitions. The following prohibitions are in effect for the duration of this project:

1. No use of tall equipment (cranes, concrete pumps, and so on) unless a 7460-1 determination letter is issued for such equipment.
2. No use of open flame welding or torches unless fire safety precautions are provided and the Airport Owner has approved their use.
3. No use of electrical blasting caps or explosives of any kind on or within 1,000 ft (300 m) of the airport property.
4. No use of flare pots within the AOA.

b. Restrictions.

1. Construction suspension required during specific airport operations – Not Applicable
2. Areas that cannot be worked on simultaneously: See Section 3.2 above and the CSPP drawings.
3. Day or night construction restrictions:

   Equipment for nighttime lighting of construction areas shall be sufficient to adequately illuminate the work area in order to ensure quality construction. The lights shall be positioned to provide the most natural color illumination and contrast with a minimum of shadows. Lighting pavements from both sides is considered preferable as lighting from only one side can result in objectionable shadows. Light towers shall be positioned and adjusted to aim away from ATCT cabs, active runways, and active taxiways to prevent blinding effects. The Contractor shall prepare a plan showing the locations, heights and aiming points of light towers for review by the Airport Owner, RPR and ATCT personnel. The final location and aiming of light towers shall be determined by trial, therefore, the Contractor must be aware that several attempts at locations and aiming angles may be necessary before the light towers can be operational. Light towers shall be removed from the construction site prior to opening the pavement to aircraft operations.

   It is recommended that all equipment, except haul trucks, be equipped with artificial illumination to safely illuminate the area immediately surrounding their location.

   Unless provided for elsewhere, the cost of nighttime lighting of construction areas shall be considered a subsidiary and incidental part of construction and as such, the Contractor shall include all costs associated with nighttime lighting of construction areas in the various pay items of work involved.

   Where work on this Contract is not scheduled for night work and the Contractor requests and receives permission to work at night, there will be no additional compensation allowed for the extra costs associated with night work.

4. Seasonal Construction Restrictions – To be determined by the Contractor and approved by the Owner and RPR.

APPENDIX 1

LOCATION MAP
(Sheet GI 001of the Contract Drawings)

GENERAL PLAN
(Sheet GI101 of the Contract Drawings)

CONSTRUCTION SAFETY DRAWINGS
(Sheets GC 001 & GC101 to GC 109 of the Contract Drawings)

CONSTRUCTION SAFETY DETAILS
(Sheet GC 501 & GC 502 of the Contract Drawings)

APPENDIX 2

CONSTRUCTION PROJECT DAILY SAFETY INSPECTION CHECKLIST

Construction Project Daily Safety Inspection Checklist

The situations identified below are potentially hazardous conditions that may occur during airport construction projects. Safety Area encroachments, unauthorized and improper ground vehicle operations, and unmarked or uncovers holes and trenches near aircraft operating surfaces pose the most prevalent threats to airport operational safety during airport construction projects. The list below is one tool that the Contractor may use to aid in identifying and correcting potentially hazardous conditions.

Potentially Hazardous Conditions

Item	Action Required	or	None
Excavation adjacent to runways, taxiways, and aprons improperly backfilled.			☐
Mounds of earth, construction materials, temporary structures, and other obstacles near any open runway, taxiway, or taxi lane; in the related Object Free area and aircraft approach or departure areas/zones; or obstructing any sign or marking.			☐
Runway resurfacing projects resulting in lips exceeding 3 in (7.6 cm) from pavement edges and ends.			☐
Heavy equipment (stationary or mobile) operating or idle near AOA, in runway approaches and departures areas, or in OFZ.			☐
Equipment or material near NAVAIDs that may degrade or impair radiated signals and/or the monitoring of navigation and visual aids. Unauthorized or improper vehicle operations in localizer or glide slope critical areas, resulting in electronic interference and/or facility shutdown.			☐
Tall and especially relatively low visibility units (that is, equipment with slim profiles) –cranes, drills, and similar objects—located in critical areas, such as OFZ and approach zones.			☐
Improperly positioned or malfunctioning lights or unlighted airport hazards, such as holes or excavations, on an apron, open taxiway, or open taxi lane or in related safety, approach, or departure area.			☐

Item	Action Required	or	None
Obstacles, loose pavement, trash, and other debris on or near AOA. Construction debris (gravel, sand, mud, paving materials) on airport pavements may result in aircraft propeller, turbine engine, or tire damage. Also, loose materials may blow about, potentially causing personal injury or equipment damage.			☐
Inappropriate or poorly maintained fencing during construction intended to deter human and animal intrusions into the AOA. Fencing and other markings that are inadequate to separate construction areas from open AOA create aviation hazards.			☐
Improper or inadequate marking or lighting of runways (especially thresholds that have been displaced or runways that have been closed) and taxiways that could cause pilot confusion and provide a potential for a runway incursion. Inadequate or improper methods of marking, barricading, and lighting of temporarily closed portions of AOA create aviation hazards.			☐
Wildlife attractants — such as trash (food scraps not collected from construction personnel activity), grass seeds, tall grass, or standing water — on or near airports.			☐
Obliterated or faded temporary markings on active operational areas.			☐
Misleading or malfunctioning obstruction lights. Unlighted or unmarked obstructions in the approach to any open runway pose aviation hazards.			☐
Failure to issue, update, or cancel NOTAMs about airport or runway closures or other construction related airport conditions.			☐
Failure to mark and identify utilities or power cables. Damage to utilities and power cables during construction activity can result in the loss of runway / taxiway lighting; loss of navigation, visual, or approach aids; disruption of weather reporting services; and/or loss of communications.			☐
Restrictions on ARFF access from fire stations to the runway / taxiway system or airport buildings.			☐

Item	Action Required	or	None
Lack of radio communications with construction vehicles in airport movement areas.			☐
Objects, regardless of whether they are marked or flagged, or activities anywhere on or near an airport that could be distracting, confusing, or alarming to pilots during aircraft operations.			☐
Water, snow, dirt, debris, or other contaminants that temporarily obscure or derogate the visibility of runway/taxiway marking, lighting, and pavement edges. Any condition or factor that obscures or diminishes the visibility of areas under construction.			☐
Spillage from vehicles (gasoline, diesel fuel, oil) on active pavement areas, such as runways, taxiways, aprons, and airport roadways.			☐
Failure to maintain drainage system integrity during construction (for example, no temporary drainage provided when working on a drainage system).			☐
Failure to provide for proper electrical lockout and tagging procedures. At larger airports with multiple maintenance shifts/workers, construction contractors should make provisions for coordinating work on circuits.			☐
Failure to control dust. Consider limiting the amount of area from which the Contractor is allowed to strip turf.			☐
Exposed wiring that creates an electrocution or fire ignition hazard. Identify and secure wiring, and place it in conduit or bury it.			☐
Site burning, which can cause possible obscuration.			☐
Construction work taking place outside of designated work areas and out of phase.			☐

APPENDIX 3

CONTRACTORS SAFETY PLAN COMPLIANCE DOCUMENT (SPCD)

SAFETY PLAN COMPLIANCE DOCUMENT (SPCD) CERTIFICATION

Project Location: Syracuse Hancock International Airport

Project Name: Centralized Deicing Facility (CDF)

Contractor's Official Name: _____

Contact Person: _____ Telephone: _____

Street Address: _____

City:_____State:_____Zip: _____

Certification Statement:

I certify that I have read the Construction Safety and Phasing Plan (CSPP) included in the Contract Documents and if awarded this Contract, I will abide by its requirements as written.

I certify that I have read the Safety Plan Compliance Document (SPCD) included in the Contract Documents and if awarded this Contract, I will abide by its requirements as written;

I certify that I will provide the information required in the SPCD prior to the start of construction work, if awarded this Contract, and that I will provide any additional information requested by the Owner.

_____	_____
Printed Name of Signer	Signature
_____	_____
Title	Date

SAFETY PLAN COMPLIANCE DOCUMENT (SPCD)

Project Location: Syracuse Hancock International Airport

Project Name: Centralized Deicing Facility (CDF) Project

General Statement:

The Construction Safety and Phasing Plan (CSPP), identified as Attachment "A" to Section 70-08, has been prepared in accordance with FAA Advisory Circular 150/5370-2, *Operational Safety on Airports During Construction and the requirements of the Airport Owner*. The CSPP has been submitted to the FAA for review and comment. Any comments from the FAA which were received prior to bid opening have been incorporated into the CSPP.

In the event that the FAA transmits comments which require that the CSPP be revised after bid opening, I understand that I am obligated to abide by the conditions and statements contained in the revised CSPP. I further understand that I will be given the opportunity to evaluate the revised CSPP as it relates to my contract and request appropriate compensation in accordance with the provisions of the contract.

Supplemental Information:

Where the CSPP covers a subject and no additional information is needed, the statement below reads, "No supplemental information required". Where additional information is required by the Contractor, the information shall be provided in the spaces below.

The section numbers below correspond with the section numbers in the CSPP.

3.1 Coordination

Statement: [Explain how you will distribute information and details of meetings to employees and subcontractors.]

_____
_____
_____
_____

3.2 Phasing

Statement: [List the number of days each Work Area will take. State the time day work will start and finish for each work area.]

_____
_____
_____
_____

3.3 Areas and operations affected by the construction activity

Statement: Information is provided in the CSPP. No supplemental information is required.

3.4 Protection of NAVAIDs

Statement: Information is provided in the CSPP. No supplemental information is required.

3.5 Contractor Access

Security Statement: [Explain how you will maintain integrity of the airport security fence at the access gate, e.g.: Gate guards, closed and locked gates, temporary fencing, etc.]

Training Statement: [List individuals who will receive driver training (for certificated airports and as requested.]

Communication Statement: [Identify types of radios, if any, you will use to communicate with drivers and personnel. Identify who will be monitoring radios. Identify a contact person and phone number if ATCT cannot reach the contractor's designated person by radio.]

Escort Statement: [Identify who will escort material delivery vehicles.]

3.6 Wildlife Management

Statement: [Identify who will be monitoring wildlife in the construction area. Identify who will be monitoring wildlife at the construction gate.]

3.7 Foreign Object Debris (FOD) Management

Statement: [Identify who will be preparing a FOD Management Plan. (Plan must be approved prior to the start of construction activities.)]

3.8 Hazardous material (HAZMAT) management

Statement: [Identify who will be preparing a Spill Prevention Plan. (Plan must be approved prior to the start of construction activities.)]

3.9 Notification of construction activities. Provide the following:

Key Personnel Statement: [Identify your key personnel points of contact with phone numbers.]

Emergency Contacts Statement: [Identify your emergency contacts with 24 hour phone numbers.]

Equipment Statement: [Part 77: Identify equipment you will be using that is taller than work area restriction heights identified on plan GC101, including on-site batch plants. Identify the maximum height it will be extended to during construction for each Work Area and the expected duration. Identify when during the day it will be used.]

3.10 Inspection requirements.

Statement: [Identify the person who will be responsible for daily inspections to ensure conformance with the CSPP. Describe additional inspections you will employ, if any, to ensure conformance.]

3.11 Underground utilities.

Statement: [Discuss proposed methods of identifying and protecting underground utilities.]

3.12 Penalties

Statement: Information is provided in the CSPP. No supplemental information is required.

3.13 Special conditions.

Statement: [Identify who will be responsible for moving equipment and personnel from the work area and vacating the area in the event of a special condition listed in the CSPP.]

3.14 Runway and taxiway visual aids. Including marking, lighting, signs, and visual NAVAIDs.

Statement: Information is provided in the CSPP. No supplemental information is required.

3.15 Marking and signs for access routes. Discuss proposed methods of demarcating access routes for vehicle drivers.

Statement: Information is provided in the CSPP. No supplemental information is required.

3.16 Hazard marking and lighting.

Statement: [Identify who will be responsible for maintaining hazard marking and lighting. Include a 24 hour phone number.]

3.17 Protection of taxiway and runway safety areas. Include object free areas, obstacle free zones, approach/departure surfaces and safety areas as required. Discuss proposed methods of identifying, demarcating, and protecting airport surfaces including:

Equipment and methods for maintaining Taxiway/Taxilane Safety Area standards.

Statement: Information is provided in the CSPP. No supplemental information is required.

Equipment and methods for separation of construction operations from aircraft operations, including details of barricades.

Statement: Information is provided in the CSPP. No supplemental information is required.

3.18 Other limitations on construction.

Other limitations are identified in the CSPP and do not require an entry in this document.

Section 80 Execution and Progress

80-01 Subletting of contract. The Owner will not recognize any subcontractor on the work. The Contractor shall at all times when work is in progress be represented either in person, by a qualified superintendent, or by other designated, qualified representative who is duly authorized to receive and execute orders of the Resident Project Representative (RPR).

The Contractor shall perform, with his organization, an amount of work equal to at least 25 percent of the total contract cost.

Should the Contractor elect to assign their contract, said assignment shall be concurred in by the surety, shall be presented for the consideration and approval of the Owner, and shall be consummated only on the written approval of the Owner.

The Contractor shall provide copies of all subcontracts to the RPR 14 days prior to being utilized on the project. As a minimum, the information shall include the following:

- Subcontractor's legal company name.
- Subcontractor's legal company address, including County name.
- Principal contact person's name, telephone and fax number.
- Complete narrative description, and dollar value of the work to be performed by the subcontractor.
- Copies of required insurance certificates in accordance with the specifications.
- Minority/ non-minority status.

80-02 Notice to proceed (NTP). The Owners notice to proceed will state the date on which contract time commences. The Contractor is expected to commence project operations within one day of the NTP date. The Contractor shall notify the RPR at least 24 hours in advance of the time contract operations begins. The Contractor shall not commence any actual operations prior to the date on which the notice to proceed is issued by the Owner.

80-03 Execution and progress. Unless otherwise specified, the Contractor shall submit their coordinated construction schedule showing all work activities for the RPR's review and acceptance at least 10 days prior to the start of work. The Contractor's progress schedule, once accepted by the RPR, will represent the Contractor's baseline plan to accomplish the project in accordance with the terms and conditions of the Contract. The RPR will compare actual Contractor progress against the baseline schedule to determine that status of the Contractor's performance. The Contractor shall provide sufficient materials, equipment, and labor to guarantee the completion of the project in accordance with the plans and specifications within the time set forth in the proposal.

If the Contractor falls significantly behind the submitted schedule, the Contractor shall, upon the RPR's request, submit a revised schedule for completion of the work within the contract time and modify their operations to provide such additional materials, equipment, and labor necessary to meet the revised schedule. Should the execution of the work be discontinued for any reason, the Contractor shall notify the RPR at least 24 hours in advance of resuming operations.

The Contractor shall not commence any actual construction prior to the date on which the NTP is issued by the Owner.

The project schedule shall be prepared as a network diagram in Critical Path Method (CPM), Program Evaluation and Review Technique (PERT), or other format, or as otherwise specified. It shall include information on the sequence of work activities, milestone dates, and activity duration. The schedule shall show all work items identified in the project proposal for each work area and shall include the project start date and end date.

80-03.1 Requirements.

A. Nomenclature and Definitions

B. Schedule Personnel

C. Software Compatibility Requirements

D. Preconstruction Schedule Meeting

E. Baseline Schedule Development

F. Progress Schedule Update

G. Schedule for Submittals

80-03.1.A Nomenclature and Definitions

Actual Start date- At the task level, the Actual Start date represents the point in time that meaningful work actually started on a task.

Actual Finish date - At the task level, the Actual Finish date represents the point in time that work actually ended on a task.; At the Project level, the Actual Finish date represents the point in time that the Contractor completes all Work in accordance with the time standards described in the CSPP.

Baseline Progress Schedule - The Progress Schedule submitted by the Contractor and accepted by the RPR that shows the plan to complete the construction contract work. The Baseline Schedule represents the Contractor's plan at the time of Contract Award for completing the Project.

Bid Date – The date that bids will be publically opened and read aloud.

Constraint - A schedule restriction imposed on the Start or Finish date(s) of a task that modifies or overrides a task's relationships.

Critical Task – A task on the critical path.

Critical Path – In the Progress Schedule, the critical path shall be those tasks being on the longest path. In a project network diagram, the series of tasks determines the earliest completion of the project.

Critical Delay - An event, action, or other factor that delays the critical path of the Progress Schedule and extends the time needed for completion of the construction project.

Critical Path Method (CPM) – A network analysis technique used to predict Project duration by analyzing which sequence of tasks (which path) has the least amount of scheduling flexibility (the least amount of float or slack). A scheduling technique utilizing tasks, durations, and interrelationships/dependencies (logic), such that all tasks are interrelated with logic ties from the beginning of the project to the completion of the project. Early dates are calculated by means of a forward pass using a specified start date. Late dates are calculated by means of a backward pass

starting from a specified completion date (usually the forward pass's calculated project early finish date).

Duration, Original - The original estimated number of Working Days (not including holidays or other nonworking periods) in which the work task associated with the task is expected to be performed. (The number of calendar days may be different based on the calendar assigned to the task.) For certain tasks such as concrete curing, or others approved by the RPR, the calendar shall reflect no non-working days.

Duration, Remaining - The estimated time, expressed in Working Days (not including holidays or other nonworking periods), needed to complete a task that has started but has not finished

Early Dates – The earliest date a task can start or finish based upon logic and durations. They are calculated by the software application when scheduling the project. Progress Schedules.

Final Baseline Progress Schedule @ Award - The original plan against which the Contractor's progress is measured. The Final Baseline Progress Schedule @ Award represents the original plan at the award of the Contract, of what is expected to happen. Once the Final Baseline Progress Schedule @ Award is accepted by the RPR it is saved and used as a basis to compare against Progress Schedules Updates. (See also Section 80-3 of the FAA's General Provisions.)

Fragnet – A subdivision of a project network diagram usually representing some portion of the project.

Late Dates – The latest a task can start or finish without delaying the time standards contained in the CSPP.

Longest Path - The sequence of tasks through the Progress Schedule network that establishes the Milestones contained in the CSPP.

Look-Ahead Schedule – Commonly a one or two week time segment generated from the accepted Progress Schedule that forecasts the work planned for the one or two week period following the Status Date, and includes any major materials to be delivered anticipated shifts in Work Areas.

Milestone – A task with zero duration that typically represents a significant event, usually the beginning and end of the project, milestones set forth in the contract proposal, construction stages, a major work package, or the contract interim time-related clauses.

Notice to Proceed– The actual date the Contractor starts fieldwork of a contract pay item, which is entered as a Start milestone task in the schedule. Contractually no work may start until after the Contract is awarded by the Owner, and the Contractor has received a written Notice to Proceed.

Open End - The condition that exists when a task has either no predecessor or no successor, or when a task's only predecessor relationship is a finish-to-finish relationship or only successor relationship is a start-to-start relationship.

Predecessor – A task that is defined by Schedule logic to precede another task. A predecessor may control the Start Date or Finish Date of its successor.

Progress Schedule –Also referred to as the Project's Schedule.

Progress Schedule Update – Changes to the Progress Schedule that reflect the status of tasks that have commenced or have been completed, including the following items: (a) Actual Start date and or Actual Finish date as appropriate; (b) Remaining Duration for tasks commenced and not complete; and (c) Suspend or Resume dates for tasks commenced and not complete.

Progress Schedule Revision – Revisions to the Progress Schedule ensures it accurately reflects the current means and methods of how the Project is anticipated to progress, including modifications made to any of the following items: (a) changes in logic connections between tasks; (b) changes in constraints; (c) changes to task descriptions; (d) task additions or deletions; (e) changes in calendar assignments.

Project Scheduler – The person that is responsible for developing and maintaining the Progress Schedule.

Recovery Schedule – A schedule depicting the plan for recovery of significant time lost on the project. This separate CPM schedule submission shall provide the resolution and include appropriate changes in network logic, task and calendar adjustments.

Relationships - The interdependence among tasks relationships link a task to its predecessors and successors. Relationships are defined as:

- **Finish to Start -** The successor task can start only when the current task finishes.
- **Finish to Finish –** The finish of the successor task depends on the finish of the current task.
- **Start to Start –** The start of the successor task depends on the start of the current task.
- **Start to Finish –** The successor task cannot finish until the current task starts.

Slack (Float), Free - The amount a task can slip without delaying the immediate successor task. Free Float is the property of a task and not the network path. The Owner owns the Project's Free Slack (Float).

Slack (Float) Suppression - Utilization of zero free slack (float) constraints which allows a task to start as late as possible by using all of its' available free slack (float). This technique allows tasks to appear more critical than if the task's total float was based on early dates. Assigning zero free float prevents true sharing of total float between the Owner and the Contractor. Utilization of overly generous task durations and overly restrictive calendar non-working periods are also considered to cause slack (float) suppression.

Slack (Float), Total - The amount of time a task (or chain of tasks) can be delayed from its early start without delaying the contract completion date. Float is a mathematical calculation and can change as the project progresses and changes are made to the project plan. Total Slack (Float) is calculated and reported for each task in a network, however, Total Float is an attribute of a network path and not associated with any one specific task along that path. The Owner owns the Project's Total Slack (Float).

Status Date – The date used to update a project. The Status Date is used as the starting point to calculate the schedule.

Task- A discrete, identifiable task or event that usually has an expected duration, has a definable Start Date and/or Finish Date, and can be used to plan, schedule, and monitor a project.

Work Breakdown Structure (WBS) - A deliverable-oriented grouping of project elements, which organizes and defines the total scope of the project. Each descending level represents an increasingly detailed definition of project components or work packages.

Work Package - A deliverable that is a group of related tasks within a project at the lowest level of the work breakdown structure.

Work Day - A calendar day scheduled for active prosecution of contract work by the Contractor or the Contractor's representative. (See Section 10-65 of the FAA's General Provisions.)

80-03.1.B Scheduling Personnel. The Contractor shall designate a Project scheduler to have all scheduling responsibilities for the Work. The Project scheduler must have had previous scheduling responsibilities on similar projects of similar size and complexities.

80-03-1.C Software Compatibility Requirements. The Owner uses Microsoft Project to schedule and monitor its construction program. All schedules submitted shall be in a format compatible with this program and version.

80-03.1.D Preconstruction Schedule Coordination. The Contractor shall contact the RPR after notification they are the low bidder, but no later than two (2) Work Days following Contract award to coordinate schedule development. The purpose of this will be to discuss essential matters pertaining to the satisfactory scheduling of project tasks, and to resolve any known questions regarding interpretation of the contract requirements for this work. The Project Scheduler shall be prepared to discuss the following:

- The proposed hierarchal Work Breakdown Structure (WBS) for the Progress Schedules.
- The proposed Project calendars.
- The factors that the Contractor determines to control the completion of the project and any milestone task completion dates contained therein.
- File naming Procedures for submissions.

80-03.1.E Baseline Schedule Development. The Contractor shall prepare, furnish, and maintain a computer-generated Progress Schedule using the Critical Path Method on Microsoft Project scheduling software The Contractor and the Owner shall use the Progress Schedule to manage the Work. No Work other than installation of the Engineer's Field Office, mobilization, procurement and administrative tasks, will be permitted to start until the RPR in writing has approved the Baseline Progress Schedule.

The purpose of the Progress Schedule, and scheduling provisions in the Contract, shall be to:

- Ensure that the Contractor and the Owner have a detailed plan to complete the Project in accordance with time standards contained in the CSPP;
- Provide a means of monitoring the progress of Work;
- Aid in communication and coordination of tasks among all affected parties;
- Analyze the effect of changed conditions on the time standards contained in the CSPP;
- Analyze the impact of proposed Contract Amendments.
- Establish a standard methodology for time adjustment analysis based on the principles of the Critical Path Method of scheduling, to analyze delays and resolve construction disputes concerning time;
- Determine appropriate extensions or reductions of Contract Time.

In scheduling and executing the work, the Contractor shall:

- Sequence the Work to commensurate with the Contractor's abilities, resources and the Contract Documents. The scheduling of tasks is the responsibility of the Contractor.
- Ensure that Progress Schedules prepared by the Project Scheduler for submission to the Owner are in compliance with the Contract. The intent should be that Schedule submissions are timely, complete, accurate, and in compliance with the Contract.

- Communicate all Contract changes, and decisions or actions taken by the Contractor and all subcontractors, fabricators, etc., that effect the Progress Schedule to the Project Scheduler in a timely manner to allow appropriate development, maintenance, and update of the Progress Schedule.
- Include all Work contained in the Contract and all Work directed in writing by the RPR. Work tasks directed by the RPR to be added to the Contract shall be included in the next Monthly Progress Schedule submission.
- Assure that Progress Schedule Updates reflect the actual dates that work tasks started and were completed in the field.
- Break a schedule task into multiple tasks to reflect a discontinuity in the work if a work task is suspended in the field and restarted at a later date, and the break between when the Work was suspended to when it was resumed is significant compared to the original task duration.
- Ensure the Progress Schedule contains all Work constraints and Milestones defined in the Contract including the CSPP.
- Schedule the Work using such procedures and staging or phasing as required by the Contract. Work designated as part of separate stages may be performed concurrently with other stages where allowed by the Contract or where approved by the RPR. Failure by the Contractor to include any element of Work required by the Contract in the accepted Progress Schedule does not relieve the Contractor from its responsibility to perform such Work.

The schedule shall be developed utilizing the following elements:

- **Work Breakdown Structure (WBS)** - A multi-level hierarchal WBS shall be incorporated that provides a deliverable-oriented grouping of tasks and defines the total scope of the project. The Contractor shall develop a detailed project specific WBS for the RPR's review and approval prior to the development of the Baseline Schedule. The RPR shall make the final determination on the number of levels of the WBS, and how the tasks shall be grouped to represent the deliverables of the project. A minimum WBS shall consist of the following Levels (X)
    - PRECONSTRUCTION (1)
        - GENERAL(2)
        - SHOP DRAWING AND SUBMITTALS (2)
        - PROCUREMENT/FABRICATION/DELIVERY(2)
    - CONSTRUCTION (1)
        - WORK PHASE (2)
            - CONSTRUCTION COMPONENT (3) (earthwork, drainage, paving, etc.)
    - POST CONSTRUCTION(1)
        - PUNCHLIST (2)
        - DEMOBILIZATION (2)
        - PROJECT DOCUMENTATION (2)
- **Task ID** - Include a unique identification number for each task. Task ID numbers shall not be changed, or reassigned for the duration of the contract.
- **Task** - Clearly and uniquely define each task with a description of the work that is readily identifiable to inspection staff and the progress of each task can be measured.

- **Milestone Tasks** – To the extent not specifically addressed in the CSPP, this term include tasks for all Contract milestones that define significant contractual events such as Contract Award, Notice to Proceed, Contractor Start Work, Substantial Completion, Contract Completion, and coordination points with outside entities such as utilities, the FAA, Time-Related Contract Provisions, etc.
- **Task Durations** – Define the Original Duration of each task in units of whole work days. With the exception of submittal/procurement tasks, durations shall not exceed 15 work days unless approved by the RPR. Durations for RPR submittal reviews shall meet the requirements set forth in the contract documents. If requested by the RPR, the Contractor shall justify the reasonableness of planned task time durations.
- **Relationships** - Clearly assign predecessors and successors relationships to each task, and assign appropriate logic ties between tasks (Finish to Start, Start to Start, Finish to Finish, etc.). Open-ended tasks are not permitted, with the exception of the first and last tasks in the schedule. Do not include inappropriate logic ties with Milestone Tasks (For a finish milestone task: a predecessor shall only be assigned a Finish to Finish logic tie, a successor shall only be assigned a Finish to Start or Finish to Finish logic tie. For a start milestone: a predecessor shall only be assigned a Finish to Start or Start to Start logic tie, a successor shall only be assigned with a Start to Start logic tie). Lag time may not exceed 10 days. The Contractor shall assign the "Contract Award Date" task as a predecessor to all Review and Approval type tasks to be performed by the RPR.
- **Task Constraint Dates** – The Contractor shall not have any constrained tasks, with the exception of contractual dates, unless the RPR accepts such constraints in writing.
- **Task Dates** – With the exception of contract Milestone dates, "Actual Start" and "Actual Finish" dates and "Start" and "Finish" dates, task dates shall be calculated by the Project scheduler tool within the scheduling software.
- **Calendars** – Notwithstanding the Contractor's assigned risk for delays due to weather (See Section Nos. 80-6 and 80-7 of the FAA's General Provisions), use clearly defined calendars that account for expected seasonal weather conditions (including winter shutdown periods) and environmental permit requirements, for the planning and scheduling of tasks. Do not incorporate a task with a description of "Winter Shutdown" that requires constraints rather utilize non-working periods utilizing a Base Calendar.

80-03-1.F Progress Schedule Update

In addition to the detailed schedule requirements for the submission of the Baseline Progress Schedule, the Contractor shall complete the following additional requirements for Monthly Progress Schedule submissions:

Durations – The Original Duration shall not be changed without prior written justification by the Contractor, and written approval by the RPR. The Contractor shall edit the Remaining Duration to reflect progress made on work tasks, and shall not use Duration percentage. If a proposed change to Original Duration is due to additional or changed work to the Contract, the Contractor shall instead add a task to reflect this additional work. The Contractor shall not use zero durations for Task Dependent tasks.

Started and Finished dates – For each task where work was begun during the Monthly reporting period, the Contractor shall check the box adjacent to Started and enter the date the work began. For each task where work was completed during the Monthly reporting period.

If the Contractor fails to submit the required Progress Schedule updates and revisions, the Contractor waives its rights to adjustments of time and related compensation for delays that accrue during the

period in which the progress schedule has not been submitted in accordance with the detailed CPM scheduling requirements.

The Owner will have no liability for any subsequent Contractor time related disputes which occurred during the period of time in which the Contractor failed to submit monthly progress schedule updates and revisions in a timely manner.

80-03.1.G Schedule for Submittals.

Progress Schedule submissions will only be considered complete when all documents and data have been provided to the RPR. When preparing a formal submission of the Progress Schedule, the Contractor shall make a pdf of the current Progress Schedule and name it according to the file naming convention determined at the Preconstruction Scheduling Meeting.

A. Submittals shall be uploaded to a designated location on the Project FTP Site as directed by the RPR with sufficient time to allow for review.

B. Allow five (5) calendar days for review and turnaround of Progress Schedule submittals.

C. Monthly submission of updated Progress Schedule shall be completed prior to processing of monthly pay requisition.

D. Immediate Rejection of Progress Schedule submissions**.** The following deficiencies in a Contractor's Progress Schedule submission shall be grounds for the immediate rejection by the RPR, without further review, analysis and/or comments.

- Failure of the Project Scheduler to "schedule" the Project, as of the status date.
- Any tasks without predecessors or tasks without successors, appearing in the Schedule with the exception of the first and last task in the schedule.
- Any task constraints appearing in the Schedule that have not been approved in writing by the RPR, or that are not specifically allowed by this specification.
- Any Tasks with Actual Dates > Status Date
- Any Milestone Tasks with invalid relationships
- Failure to have a clearly defined Critical Path from the Status Date to the last task in the schedule, using the Longest Path method. This would reflect logic errors in the project schedule.
- If any of these deficiencies are found, the Contractor's submission shall be considered deficient, and RPR will notify the Contractor immediately.

No direct payment will be made for the coordinated construction schedule. The cost of creating, revising, maintaining, updating, etc. the coordinated construction schedule shall be included in the price of the bid for the various items of the Contract.

The Contractor shall maintain the work schedule and provide an update and analysis of the progress schedule on a monthly basis, or as otherwise specified in the contract. Submission of the work schedule shall not relieve the Contractor of overall responsibility for scheduling, sequencing, and coordinating all work to comply with the requirements of the contract.

The Contractor shall maintain the work schedule and provide an update and analysis of the progress schedule on a twice monthly basis, or as otherwise specified in the contract. Submission of the work schedule shall not relieve the Contractor of overall responsibility for scheduling, sequencing, and coordinating all work to comply with the requirements of the contract.

80-04 Limitation of operations. The Contractor shall control their operations and the operations of their subcontractors and all suppliers to provide for the free and unobstructed movement of aircraft in the air operations areas (AOA) of the airport.

When the work requires the Contractor to conduct their operations within an AOA of the airport, the work shall be coordinated with airport operations (through the RPR) at least 48 hours prior to commencement of such work. The Contractor shall not close an AOA until so authorized by the RPR and until the necessary temporary marking, signage and associated lighting is in place as provided in Section 70, paragraph 70-08, *Construction Safety and Phasing Plan (CSPP)*.

When the contract work requires the Contractor to work within an AOA of the airport on an intermittent basis (intermittent opening and closing of the AOA), the Contractor shall maintain constant communications as specified; immediately obey all instructions to vacate the AOA; and immediately obey all instructions to resume work in such AOA. Failure to maintain the specified communications or to obey instructions shall be cause for suspension of the Contractor's operations in the AOA until satisfactory conditions are provided. The areas of the AOA identified in the Construction Safety Phasing Plan (CSPP) and as listed below, cannot be closed to operating aircraft to permit the Contractor's operations on a continuous basis and will therefore be closed to aircraft operations intermittently as follows:

See Attachment "A" to Section 70-08 - Construction Safety and Phasing Plan (CSPP) at the end of Section 70.

The Contractor shall be required to conform to safety standards contained in AC 150/5370-2, Operational Safety on Airports During Construction and the approved CSPP.

80-04.1 Operational safety on airport during construction. All Contractors' operations shall be conducted in accordance with the approved project Construction Safety and Phasing Plan (CSPP) and the Safety Plan Compliance Document (SPCD) and the provisions set forth within the current version of AC 150/5370-2, Operational Safety on Airports During Construction. The CSPP included within the contract documents conveys minimum requirements for operational safety on the airport during construction activities. The Contractor shall prepare and submit a SPCD that details how it proposes to comply with the requirements presented within the CSPP.

The Contractor shall implement all necessary safety plan measures prior to commencement of any work activity. The Contractor shall conduct routine checks to assure compliance with the safety plan measures.

The Contractor is responsible to the Owner for the conduct of all subcontractors it employs on the project. The Contractor shall assure that all subcontractors are made aware of the requirements of the CSPP and SPCD and that they implement and maintain all necessary measures.

No deviation or modifications may be made to the approved CSPP and SPCD unless approved in writing by the Owner. The necessary coordination actions to review Contractor proposed modifications to an approved CSPP or approved SPCD can require a significant amount of time.

If the Contractor requests changes to the CSPP and the requested changes are acceptable to the Owner, the Engineer, and the RPR, the Engineer will request a modification to the CSPP from the FAA. The Contractor shall plan on a minimum of 90 days for this process to be completed. No deviation to the original CSPP shall be made without FAA approval.

80-05 Character of workers, methods, and equipment. The Contractor shall, at all times, employ sufficient labor and equipment for prosecuting the work to full completion in the manner and time required by the contract, plans, and specifications.

All workers shall have sufficient skill and experience to perform properly the work assigned to them. Workers engaged in special work or skilled work shall have sufficient experience in such work and in the operation of the equipment required to perform the work satisfactorily.

Any person employed by the Contractor or by any subcontractor who violates any operational regulations or operational safety requirements and, in the opinion of the RPR, does not perform his work in a proper and skillful manner or is intemperate or disorderly shall, at the written request of the RPR, be removed immediately by the Contractor or subcontractor employing such person, and shall not be employed again in any portion of the work without approval of the RPR.

Should the Contractor fail to remove such person or persons, or fail to furnish suitable and sufficient personnel for the proper execution of the work, the RPR may suspend the work by written notice until compliance with such orders.

All equipment that is proposed to be used on the work shall be of sufficient size and in such mechanical condition as to meet requirements of the work and to produce a satisfactory quality of work. Equipment used on any portion of the work shall not cause injury to previously completed work, adjacent property, or existing airport facilities due to its use.

When the methods and equipment to be used by the Contractor in accomplishing the work are not prescribed in the contract, the Contractor is free to use any methods or equipment that will accomplish the work in conformity with the requirements of the contract, plans, and specifications.

When the contract specifies the use of certain methods and equipment, such methods and equipment shall be used unless otherwise authorized by the RPR. If the Contractor desires to use a method or type of equipment other than specified in the contract, the Contractor may request authority from the RPR to do so. The request shall be in writing and shall include a full description of the methods and equipment proposed and of the reasons for desiring to make the change. If approval is given, it will be on the condition that the Contractor will be fully responsible for producing work in conformity with contract requirements. If, after trial use of the substituted methods or equipment, the RPR determines that the work produced does not meet contract requirements, the Contractor shall discontinue the use of the substitute method or equipment and shall complete the remaining work with the specified methods and equipment. The Contractor shall remove any deficient work and replace it with work of specified quality, or take such other corrective action as the RPR may direct. No change will be made in basis of payment for the contract items involved nor in contract time as a result of authorizing a change in methods or equipment under this paragraph.

80-06 Temporary suspension of the work. The Owner shall have the authority to suspend the work wholly, or in part, for such period or periods the Owner may deem necessary, due to unsuitable weather, or other conditions considered unfavorable for the execution of the work, or for such time necessary due to the failure on the part of the Contractor to carry out orders given or perform any or all provisions of the contract.

In the event that the Contractor is ordered by the Owner, in writing, to suspend work for some unforeseen cause not otherwise provided for in the contract and over which the Contractor has no control, the Contractor may be reimbursed for actual money expended on the work during the period of shutdown. No allowance will be made for anticipated profits. The period of shutdown shall be computed from the effective date of the written order to suspend work to the effective date of the written order to resume the work. Claims for such compensation shall be filed with the RPR within the time period stated in the RPR's order to resume work. The Contractor shall submit with their own claim information substantiating the amount shown on the claim. The RPR will forward the Contractor's claim to the Owner for consideration in accordance with local laws or ordinances. No provision of this article shall be construed as entitling the Contractor to compensation for delays due to inclement weather or for any other delay provided for in the contract, plans, or specifications.

If it becomes necessary to suspend work for an indefinite period, the Contractor shall store all materials in such manner that they will not become an obstruction nor become damaged in any way. The Contractor shall take every precaution to prevent damage or deterioration of the work performed and provide for

normal drainage of the work. The Contractor shall erect temporary structures where necessary to provide for traffic on, to, or from the airport.

80-07 Determination and extension of contract time. The number of calendar days shall be stated in the proposal and contract and shall be known as the Contract Time.

80-08 Failure to complete on time.

Section not used.

80-09 Default and termination of contract. The Contractor shall be considered in default of their contract and such default will be considered as cause for the Owner to terminate the contract for any of the following reasons, if the Contractor:

a. Fails to begin the work under the contract within the time specified in the Notice to Proceed, or

b. Fails to perform the work or fails to provide sufficient workers, equipment and/or materials to assure completion of work in accordance with the terms of the contract, or

c. Performs the work unsuitably or neglects or refuses to remove materials or to perform anew such work as may be rejected as unacceptable and unsuitable, or

d. Discontinues the execution of the work, or

e. Fails to resume work which has been discontinued within a reasonable time after notice to do so, or

f. Becomes insolvent or is declared bankrupt, or commits any act of bankruptcy or insolvency, or

g. Allows any final judgment to stand against the Contractor unsatisfied for a period of 10 days, or

h. Makes an assignment for the benefit of creditors, or

i. For any other cause whatsoever, fails to carry on the work in an acceptable manner.

Should the Owner consider the Contractor in default of the contract for any reason above, the Owner shall immediately give written notice to the Contractor and the Contractor's surety as to the reasons for considering the Contractor in default and the Owner's intentions to terminate the contract.

If the Contractor or surety, within a period of 10 days after such notice, does not proceed in accordance therewith, then the Owner will, upon written notification from the RPR of the facts of such delay, neglect, or default and the Contractor's failure to comply with such notice, have full power and authority without violating the contract, to take the execution of the work out of the hands of the Contractor. The Owner may appropriate or use any or all materials and equipment that have been mobilized for use in the work and are acceptable and may enter into an agreement for the completion of said contract according to the terms and provisions thereof, or use such other methods as in the opinion of the RPR will be required for the completion of said contract in an acceptable manner.

All costs and charges incurred by the Owner, together with the cost of completing the work under contract, will be deducted from any monies due or which may become due the Contractor. If such expense exceeds the sum which would have been payable under the contract, then the Contractor and the surety shall be liable and shall pay to the Owner the amount of such excess.

80-10 Termination for national emergencies. The Owner shall terminate the contract or portion thereof by written notice when the Contractor is prevented from proceeding with the construction contract as a direct result of an Executive Order of the President with respect to the execution of war or in the interest of national defense.

When the contract, or any portion thereof, is terminated before completion of all items of work in the contract, payment will be made for the actual number of units or items of work completed at the contract

price or as mutually agreed for items of work partially completed or not started. No claims or loss of anticipated profits shall be considered.

Reimbursement for organization of the work, and other overhead expenses, (when not otherwise included in the contract) and moving equipment and materials to and from the job will be considered, the intent being that an equitable settlement will be made with the Contractor.

Acceptable materials, obtained or ordered by the Contractor for the work and that are not incorporated in the work shall, at the option of the Contractor, be purchased from the Contractor at actual cost as shown by receipted bills and actual cost records at such points of delivery as may be designated by the RPR.

Termination of the contract or a portion thereof shall neither relieve the Contractor of their responsibilities for the completed work nor shall it relieve their surety of its obligation for and concerning any just claim arising out of the work performed.

80-11 Work area, storage area and sequence of operations. The Contractor shall obtain approval from the RPR prior to beginning any work in all areas of the airport. No operating runway, taxiway, or air operations area (AOA) shall be crossed, entered, or obstructed while it is operational. The Contractor shall plan and coordinate work in accordance with the approved CSPP and SPCD.

END OF SECTION 80

Section 90 Measurement and Payment

90-01 Measurement of quantities. All work completed under the contract will be measured by the RPR, or their authorized representatives, using United States Customary Units of Measurement.

The method of measurement and computations to be used in determination of quantities of material furnished and of work performed under the contract will be those methods generally recognized as conforming to good engineering practice.

Unless otherwise specified, longitudinal measurements for area computations will be made horizontally, and no deductions will be made for individual fixtures (or leave-outs) having an area of 9 square feet (0.8 square meters) or less. Unless otherwise specified, transverse measurements for area computations will be the neat dimensions shown on the plans or ordered in writing by the RPR.

Unless otherwise specified, all contract items which are measured by the linear foot such as electrical ducts, conduits, pipe culverts, underdrains, and similar items shall be measured parallel to the base or foundation upon which such items are placed.

The term "lump sum" when used as an item of payment will mean complete payment for the work described in the contract. When a complete structure or structural unit (in effect, "lump sum" work) is specified as the unit of measurement, the unit will be construed to include all necessary fittings and accessories.

When requested by the Contractor and approved by the RPR in writing, material specified to be measured by the cubic yard (cubic meter) may be weighed, and such weights will be converted to cubic yards (cubic meters) for payment purposes. Factors for conversion from weight measurement to volume measurement will be determined by the RPR and shall be agreed to by the Contractor before such method of measurement of pay quantities is used.

Measurement and Payment Terms

Term	Description
Excavation and Embankment Volume	In computing volumes of excavation, the average end area method will be used unless otherwise specified.
Measurement and Proportion by Weight	The term "ton" will mean the short ton consisting of 2,000 pounds (907 kg) avoirdupois. All materials that are measured or proportioned by weights shall be weighed on accurate, independently certified scales by competent, qualified personnel at locations designated by the RPR. If material is shipped by rail, the car weight may be accepted provided that only the actual weight of material is paid for. However, car weights will not be acceptable for material to be passed through mixing plants. Trucks used to haul material being paid for by weight shall be weighed empty daily at such times as the RPR directs, and each truck shall bear a plainly legible identification mark.
Measurement by Volume	Materials to be measured by volume in the hauling vehicle shall be hauled in approved vehicles and measured therein at the point of delivery. Vehicles for this purpose may be of any size or type acceptable for the materials hauled, provided that the body is of such shape that the actual contents may be readily and accurately determined. All vehicles

Term	Description
	shall be loaded to at least their water level capacity, and all loads shall be leveled when the vehicles arrive at the point of delivery.
Asphalt Material	Asphalt materials will be measured by the gallon (liter) or ton (kg). When measured by volume, such volumes will be measured at 60°F (16°C) or will be corrected to the volume at 60°F (16°C) using ASTM D1250 for asphalts. Net certified scale weights or weights based on certified volumes in the case of rail shipments will be used as a basis of measurement, subject to correction when asphalt material has been lost from the car or the distributor, wasted, or otherwise not incorporated in the work. When asphalt materials are shipped by truck or transport, net certified weights by volume, subject to correction for loss or foaming, will be used for computing quantities.
Cement	Cement will be measured by the ton (kg) or hundredweight (km).
Structure	Structures will be measured according to neat lines shown on the plans or as altered to fit field conditions.
Timber	Timber will be measured by the thousand feet board measure (MFBM) actually incorporated in the structure. Measurement will be based on nominal widths and thicknesses and the extreme length of each piece.
Plates and Sheets	The thickness of plates and galvanized sheet used in the manufacture of corrugated metal pipe, metal plate pipe culverts and arches, and metal cribbing will be specified and measured in decimal fraction of inch.
Miscellaneous Items	When standard manufactured items are specified such as fence, wire, plates, rolled shapes, pipe conduit, etc., and these items are identified by gauge, unit weight, section dimensions, etc., such identification will be considered to be nominal weights or dimensions. Unless more stringently controlled by tolerances in cited specifications, manufacturing tolerances established by the industries involved will be accepted.
Scales	Scales must be tested for accuracy and serviced before use. Scales for weighing materials which are required to be proportioned or measured and paid for by weight shall be furnished, erected, and maintained by the Contractor, or be certified permanently installed commercial scales. Platform scales shall be installed and maintained with the platform level and rigid bulkheads at each end. Scales shall be accurate within 0.5% of the correct weight throughout the range of use. The Contractor shall have the scales checked under the observation of the RPR before beginning work and at such other times as requested. The intervals shall be uniform in spacing throughout the graduated or marked length of the beam or dial and shall not exceed 0.1% of the nominal rated capacity of the scale, but not less than one pound (454 grams). The use of spring balances will not be permitted. In the event inspection reveals the scales have been “overweighing” (indicating more than correct weight) they will be immediately adjusted. All materials received subsequent to the last previous correct weighting-accuracy test will be reduced by the percentage of error in excess of 0.5%. In the event inspection reveals the scales have been under-weighing (indicating less than correct weight), they shall be immediately adjusted. No additional payment to the Contractor will be allowed for materials previously weighed and recorded. Beams, dials, platforms, and other scale equipment shall be so arranged that the operator and the RPR can safely and conveniently view them.

Term	Description
	Scale installations shall have available ten standard 50-pound (2.3 km) weights for testing the weighing equipment or suitable weights and devices for other approved equipment. All costs in connection with furnishing, installing, certifying, testing, and maintaining scales; for furnishing check weights and scale house; and for all other items specified in this subsection, for the weighing of materials for proportioning or payment, shall be included in the unit contract prices for the various items of the project.
Pay Quantities	When the estimated quantities for a specific portion of the work are designated as the pay quantities in the contract, they shall be the final quantities for which payment for such specific portion of the work will be made, unless the dimensions of said portions of the work shown on the plans are revised by the RPR. If revised dimensions result in an increase or decrease in the quantities of such work, the final quantities for payment will be revised in the amount represented by the authorized changes in the dimensions.

90-02 Scope of payment. The Contractor shall receive and accept compensation provided for in the contract as full payment for furnishing all materials, for performing all work under the contract in a complete and acceptable manner, and for all risk, loss, damage, or expense of whatever character arising out of the nature of the work or the execution thereof, subject to the provisions of Section 70, paragraph 70-18, *No Waiver of Legal Rights*.

When the "basis of payment" subsection of a technical specification requires that the contract price (price bid) include compensation for certain work or material essential to the item, this same work or material will not also be measured for payment under any other contract item which may appear elsewhere in the contract, plans, or specifications.

90-03 Compensation for altered quantities. When the accepted quantities of work vary from the quantities in the proposal, the Contractor shall accept as payment in full, so far as contract items are concerned, payment at the original contract price for the accepted quantities of work actually completed and accepted. No allowance, except as provided for in Section 40, paragraph 40-02, *Alteration of Work and Quantities,* will be made for any increased expense, loss of expected reimbursement, or loss of anticipated profits suffered or claimed by the Contractor which results directly from such alterations or indirectly from their own unbalanced allocation of overhead and profit among the contract items, or from any other cause.

90-04 Payment for omitted items. As specified in Section 40, paragraph 40-03, *Omitted Items,* the RPR shall have the right to omit from the work (order nonperformance) any contract item, except major contract items, in the best interest of the Owner.

Should the RPR omit or order nonperformance of a contract item or portion of such item from the work, the Contractor shall accept payment in full at the contract prices for any work actually completed and acceptable prior to the RPR's order to omit or non-perform such contract item.

Acceptable materials ordered by the Contractor or delivered on the work prior to the date of the RPR's order will be paid for at the actual cost to the Contractor and shall thereupon become the property of the Owner.

In addition to the reimbursement hereinbefore provided, the Contractor shall be reimbursed for all actual costs incurred for the purpose of performing the omitted contract item prior to the date of the RPR's order. Such additional costs incurred by the Contractor must be directly related to the deleted contract item and shall be supported by certified statements by the Contractor as to the nature the amount of such costs.

90-05 Payment for extra work. Section not used.

90-06 Partial payments. Partial payments will be made to the Contractor at least once each month as the work progresses. Said payments will be based upon estimates, prepared by the RPR, of the value of the work performed and materials complete and in place, in accordance with the contract, plans, and specifications. Such partial payments may also include the delivered actual cost of those materials stockpiled and stored in accordance with paragraph 90-07, *Payment for Materials on Hand*. No partial payment will be made when the amount due to the Contractor since the last estimate amounts to less than five hundred dollars.

a. From the total of the amount determined to be payable on a partial payment, 5 percent of such total amount will be deducted and retained by the Owner for protection of the Owner's interests. Unless otherwise instructed by the Owner, the amount retained by the Owner will be in effect until the final payment is made except as follows:

(1) Contractor may request release of retainage on work that has been partially accepted by the Owner in accordance with Section 50-03. Contractor must provide a certified invoice to the RPR that supports the value of retainage held by the Owner for partially accepted work.

(2) In lieu of retainage, the Contractor may exercise at its option the establishment of an escrow account per paragraph 90-08.

b. The Contractor is required to pay all subcontractors for satisfactory performance of their contracts no later than 7 days after the Contractor has received a partial payment. Contractor must provide the Owner evidence of prompt and full payment of retainage held by the prime Contractor to the subcontractor within 7 days after the subcontractor's work is satisfactorily completed. A subcontractor's work is satisfactorily completed when all the tasks called for in the subcontract have been accomplished and documented as required by the Owner. When the Owner has made an incremental acceptance of a portion of a prime contract, the work of a subcontractor covered by that acceptance is deemed to be satisfactorily completed.

c. When at least 95% of the work has been completed to the satisfaction of the RPR, the RPR shall, at the Owner's discretion and with the consent of the surety, prepare estimates of both the contract value and the cost of the remaining work to be done. The Owner may retain an amount not less than twice the contract value or estimated cost, whichever is greater, of the work remaining to be done. The remainder, less all previous payments and deductions, will then be certified for payment to the Contractor.

It is understood and agreed that the Contractor shall not be entitled to demand or receive partial payment based on quantities of work in excess of those provided in the proposal or covered by approved change orders or supplemental agreements, except when such excess quantities have been determined by the RPR to be a part of the final quantity for the item of work in question.

No partial payment shall bind the Owner to the acceptance of any materials or work in place as to quality or quantity. All partial payments are subject to correction at the time of final payment as provided in paragraph 90-09, *Acceptance and Final Payment*.

The Contractor shall deliver to the Owner a complete release of all claims for labor and material arising out of this contract before the final payment is made. If any subcontractor or supplier fails to furnish such a release in full, the Contractor may furnish a bond or other collateral satisfactory to the Owner to indemnify the Owner against any potential lien or other such claim. The bond or collateral shall include all costs, expenses, and attorney fees the Owner may be compelled to pay in discharging any such lien or claim.

No partial payments will be made for work items lacking approved submittals, or lacking acceptable manufacturer's material certifications.

Any delay or postponement of payment from the above referenced time frame may occur only for good cause following written approval of the Airport Sponsor. This clause applies to both DBE and non-DBE subcontractors.

Contractors shall include in their subcontracts language providing that Contractors and subcontractors will use appropriate alternative dispute resolution mechanisms to resolve payment disputes.

The Contractor will not be reimbursed for work performed by subcontractors unless and until the Contractor ensures that the subcontractors are promptly paid for the work they have performed.

The same requirement for prompt payment shall be applied to all tier subcontractors.

90-07 Payment for materials on hand. Partial payments may be made to the extent of the delivered cost of materials to be incorporated in the work, provided that such materials meet the requirements of the contract, plans, and specifications and are delivered to acceptable sites on the airport property or at other sites in the vicinity that are acceptable to the Owner. Such delivered costs of stored or stockpiled materials may be included in the next partial payment after the following conditions are met:

a. The material has been stored or stockpiled in a manner acceptable to the RPR at or on an approved site.

b. The Contractor has furnished the RPR with acceptable evidence of the quantity and quality of such stored or stockpiled materials.

c. The Contractor has furnished the RPR with satisfactory evidence that the material and transportation costs have been paid.

d. The Contractor has furnished the Owner legal title (free of liens or encumbrances of any kind) to the material stored or stockpiled.

e. The Contractor has furnished the Owner evidence that the material stored or stockpiled is insured against loss by damage to or disappearance of such materials at any time prior to use in the work.

It is understood and agreed that the transfer of title and the Owner's payment for such stored or stockpiled materials shall in no way relieve the Contractor of their responsibility for furnishing and placing such materials in accordance with the requirements of the contract, plans, and specifications.

In no case will the amount of partial payments for materials on hand exceed the contract price for such materials or the contract price for the contract item in which the material is intended to be used.

No partial payment will be made for stored or stockpiled living or perishable plant materials.

The Contractor shall bear all costs associated with the partial payment of stored or stockpiled materials in accordance with the provisions of this paragraph.

90-08 Payment of withheld funds. At the Contractor's option, if an Owner withholds retainage in accordance with the methods described in paragraph 90-06 *Partial Payments*, the Contractor may request that the Owner deposit the retainage into an escrow account. The Owner's deposit of retainage into an escrow account is subject to the following conditions:

a. The Contractor shall bear all expenses of establishing and maintaining an escrow account and escrow agreement acceptable to the Owner.

b. The Contractor shall deposit to and maintain in such escrow only those securities or bank certificates of deposit as are acceptable to the Owner and having a value not less than the retainage that would otherwise be withheld from partial payment.

c. The Contractor shall enter into an escrow agreement satisfactory to the Owner.

d. The Contractor shall obtain the written consent of the surety to such agreement.

e. Deposits in escrow shall be maintained for a period of time described in the subsection titled GUARANTY of this section, or the Contractor shall furnish a bond as described in the subsection titled SECURITY FOR GUARANTEE of this section.

90-09 Acceptance and final payment. When the contract work has been accepted in accordance with the requirements of Section 50, paragraph 50-15, *Final Acceptance*, the RPR will prepare the final estimate of the items of work actually performed. The Contractor shall approve the RPR's final estimate or advise the RPR of the Contractor's objections to the final estimate which are based on disputes in measurements or computations of the final quantities to be paid under the contract as amended by change order or supplemental agreement. The Contractor and the RPR shall resolve all disputes (if any) in the measurement and computation of final quantities to be paid within 30 calendar days of the Contractor's receipt of the RPR's final estimate. If, after such 30-day period, a dispute still exists, the Contractor may approve the RPR's estimate under protest of the quantities in dispute, and such disputed quantities shall be considered by the Owner as a claim in accordance with Section 50, paragraph 50-16, *Claims for Adjustment and Disputes*.

After the Contractor has approved, or approved under protest, the RPR's final estimate, and after the RPR's receipt of the project closeout documentation required in paragraph 90-11, *Contractor Final Project Documentation*, final payment will be processed based on the entire sum, or the undisputed sum in case of approval under protest, determined to be due the Contractor less all previous payments and all amounts to be deducted under the provisions of the contract. All prior partial estimates and payments shall be subject to correction in the final estimate and payment.

If the Contractor has filed a claim for additional compensation under the provisions of Section 50, paragraph 50-16, *Claims for Adjustments and Disputes,* or under the provisions of this paragraph, such claims will be considered by the Owner in accordance with local laws or ordinances. Upon final adjudication of such claims, any additional payment determined to be due the Contractor will be paid pursuant to a supplemental final estimate.

90-10 Construction warranty.

a. In addition to any other warranties in this contract, the Contractor warrants that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, workmanship, or design furnished, or performed by the Contractor or any subcontractor or supplier at any tier.

b. This warranty shall continue for a period of one year from the date of final acceptance of the work, except as noted. If the Owner takes possession of any part of the work before final acceptance, this warranty shall continue for a period of one year from the date the Owner takes possession. However, this will not relieve the Contractor from corrective items required by the final acceptance of the project work. Light Emitting Diode emitting diode (LED) light fixtures with the exception of obstruction lighting, must be warranted by the manufacturer for a minimum of four (4) years after date of installation inclusive of all electronics.

c. The Contractor shall remedy at the Contractor's expense any failure to conform, or any defect. In addition, the Contractor shall remedy at the Contractor's expense any damage to Owner real or personal property, when that damage is the result of the Contractor's failure to conform to contract requirements; or any defect of equipment, material, workmanship, or design furnished by the Contractor.

d. The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for one year from the date of repair or replacement.

e. The Owner will notify the Contractor, in writing, within seven (7) days after the discovery of any failure, defect, or damage.

f. If the Contractor fails to remedy any failure, defect, or damage within 14 days after receipt of notice, the Owner shall have the right to replace, repair, or otherwise remedy the failure, defect, or damage at the Contractor's expense.

g. With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall: (1) Obtain all warranties that would be given in normal commercial practice; (2) Require all warranties to be executed, in writing, for the benefit of the Owner, as directed by the Owner, and (3) Enforce all warranties for the benefit of the Owner.

h. This warranty shall not limit the Owner's rights with respect to latent defects, gross mistakes, or fraud.

i. The Owner and Engineer will perform a warranty inspection with the Contractor approximately three (3) months before the end of the one year warranty period.

90-11 Contractor Final Project Documentation. Approval of final payment to the Contractor is contingent upon completion and submittal of the items listed below. The final payment will not be approved until the RPR approves the Contractor's final submittal. The Contractor shall:

a. Provide two (2) copies of all manufacturers warranties specified for materials, equipment, and installations.

b. Provide weekly payroll records (not previously received) from the general Contractor and all subcontractors.

c. Complete final cleanup in accordance with Section 40, paragraph 40-08, *Final Cleanup*.

d. Complete all punch list items identified during the Final Inspection.

e. Provide complete release of all claims for labor and material arising out of the Contract.

f. Provide a certified statement signed by the subcontractors, indicating actual amounts paid to the Disadvantaged Business Enterprise (DBE) subcontractors and/or suppliers associated with the project.

g. When applicable per state requirements, return copies of sales tax completion forms.

h. Manufacturer's certifications for all items incorporated in the work.

i. All required record drawings, as-built drawings or as-constructed drawings.

j. Project Operation and Maintenance (O&M) Manual(s). The Contractor shall prepare a project O&M Manual for the Owner. The O&M Manual shall consist of approved certification submittals, approved shop and setting drawing submittals, approved catalogue data submittals, circuit test results in accordance with Item L-108, and O&M Manuals for equipment installed that have operating procedures and/or maintenance requirements associated with them. The O&M manual shall be neatly bound in a properly sized 3-ring binder and tabbed by specification section. The O&M Manual shall be submitted to the Engineer prior to final payment to facilitate project closeout.

k. Security for Construction Warranty.

l. Equipment commissioning documentation submitted, if required.

m. Contractor's Affidavit of Payment of Debts and Claims (AIA Document G706) from the Prime Contractor.

n. Contractor's Affidavit of Release of Liens (AIA Document G706A) from the Prime Contractor.

o. Contractor's Affidavit of Payment of Debts and Claims (AIA Document G706) from each subcontractor.

p. Contractor’s Affidavit of Release of Liens (AIA Document G706A) from each subcontractor.

q. Consent of Surety to Final Payment (AIA Document G707) from the Prime Contractor.

r. Prime Contractor's Certification (New York State Labor Law Section 220-a).

s. Subcontractor's Certification (New York State Labor Law Section 220-a).

END OF SECTION 90

Special Provisions to the General Provisions

SP 20-17 Sales tax exemption. The Owner is exempt from payment of Sales and Compensating Use Taxes of the State of New York and of cities and counties on all materials and supplies sold to the Owner pursuant to the provisions of this Contract. These taxes are not to be included in bids. This exemption does not, however, apply to tools, machinery, equipment or other property leased by or to the Contractor or a Subcontractor to materials and supplies of any kind which will not be incorporated into the completed project, and the Contractor and his Subcontractors shall be responsible for and pay any and all applicable taxes including Sales and Compensating Use Taxes on such leased tools, machinery, equipment or other property or on such unincorporated materials and supplies, and the provisions set forth below will not be applicable to such tools, machinery, equipment, property and unincorporated materials and supplies.

The Contractor agrees to sell, free of encumbrances, and the Owner agrees to purchase all of the materials and supplies (except as above set forth) required, necessary or proper for or incidental to the construction of the Project covered by this agreement. Title to all materials and supplies to be sold by the Contractor to the Owner, pursuant to the provisions of the Contract, shall immediately vest in and become the sole property of the Owner upon delivery of such materials and supplies to the Project site. The Contractor shall mark or otherwise identify all such materials and supplies as the property of the Owner. The Contractor, at the request of the Owner, shall furnish to the Owner such confirmatory bills of sale and other instruments as may be required by it, properly executed, acknowledged and delivered, confirming to the Owner, title to such materials and supplies free of encumbrances.

In the event that after title has passed to the Owner any of such materials and supplies are rejected as being defective or otherwise unsatisfactory, title to all such materials and supplies shall upon such rejection revest in the Contractor.

The sum paid under this Agreement shall be deemed to be in full consideration for the performance by the Contractor of all his duties and obligations under this Agreement in connection with said sale.

The Contractor agrees to construct the Project and to furnish and perform all work and labor required, necessary or proper for or incidental thereto, except that the materials and supplies sold to the Owner under the preceding paragraph shall be furnished by the Owner to the Contractor for use in the performance of said work and labor, and the sum paid pursuant to this Agreement shall be deemed to be in full consideration for the performances by the Contractor of all his duties and obligations under this Agreement in connection with said work and labor.

The purchase by the Contractor of the materials and supplies sold hereunder will be a purchase or procurement for resale to the Owner (an organization described in subdivision (a) of Sec. 1116 of the Tax Law of the State of New York) and therefore not subject to the New York State Sales or Compensating Use or any such taxes of cities and counties. The sale of such materials and supplies by the Contractor to the Owner will not be subject to the aforesaid Sales and Compensating Use Taxes.

The purchase by Subcontractors of materials and supplies to be sold hereunder will also be a purchase or procurement for resale to the Contractor (either directly or through other Subcontractors), and ultimately to the Owner, and therefore not subject to the aforesaid Sales and Compensating Use Taxes, provided that the Subcontract Agreements provide for the resale of such materials and supplies prior to and separate and apart from the incorporation of such materials and supplies into the permanent construction and that such Subcontract Agreements are in a form similar to this Contract with respect to the separation of the sale of materials and supplies from the work and labor to be provided.

If as a result of such sale of materials and supplies (l) any claim is made against the Contractor or any Subcontractor by the State of New York or any city or county for Sales or Compensating Use Taxes on the aforementioned materials and supplies or (2) any claim is made against the Contractor or any Subcontractor by a materialman or a Subcontractor on account of a claim against such materialman or Subcontractor by the State of New York or any city or county for Sales or Compensation Use Taxes on the aforementioned materials and supplies, then, if the Contractor and Subcontractor have complied with the provisions of this Contract relating thereto, the Owner will reimburse the Contractor or any Subcontractor, as the case may be, for an amount equal to the amount of such tax required to be paid in accordance with the requirements of law, provided that:

A. 1. The Subcontract Agreements in connection with this Contract, provide for the resale of such materials and supplies, prior to and separate and apart from the incorporation of such materials and supplies into the permanent construction.

2. Such Subcontract Agreements are in a form similar to this Contract with respect to the separation of the sale of materials and supplies from the other work and labor to be provided, and

3. Such separation is actually followed in practice, including the separation of payments for materials and supplies from the payments for other work and labor, and

B. The Contractor and his Subcontractors and materialmen complete New York State Sales Tax Form ST120.1. (Contractor Exempt Purchase Certificate), and furnish such certificate to all persons, firms or corporations from which they purchase materials and supplies for the performance of the work covered by this Contract, and

C. The Contractor and all Subcontractors maintain and keep, for a period of six (6) years after the date of final payment for the sale, or, if a claim for Sales or Compensating Use Tax is pending or threatened at the end of such six (6) year period, until such claim is finally settled, records, which in the judgment of the Department of Taxation and Finance, adequately show (l) all materials and supplies purchased by them for resale, pursuant to the provisions of this Contract and (2) all materials and supplies sold to the Owner pursuant to the provisions of this Contract, and

D. The Owner is afforded the opportunity, before any payment of tax is made, to contest said claim in the manner and to the extent that the Owner may choose and to settle or satisfy said claims, and such attorney as the Owner may designate is authorized to act for the purpose of contesting, settling and satisfying said claim, and

E. The Contractor and Subcontractor give immediate notice to the Owner of any such claim, cooperate with the Owner and its designated attorney in contesting said claim and furnish promptly to the Owner and said attorney all information and documents necessary or convenient for contesting said claim, said information and documents to be preserved for six (6) years after date of final payment for the sale, or if such a claim is pending or threatened at the end of such six (6) years, until such claim is finally settled. If the Owner elects to contest any such claim, it will bear the expense of such contest.

Nothing in this Article is intended or shall be construed as relieving the Contractor from his obligations under this Agreement and the Contractor shall have the full continuing responsibility to install the materials and supplies purchased in accordance with the provisions of this Contract, to protect the same, to maintain them in proper condition and to forthwith repair, replace and make good any damage thereto without cost to the Owner until such time as the work covered by the Contract is fully accepted by the Owner.

SP 30-09 Conformed Contract Documents. Conformed Contract Documents sent to the successful bidder for execution will consist of the original contract documents with a copy of the successful bidder's Proposal section inserted. In addition, the Form of Contract will be edited to include a contract date, the Contractor's name and address, the contract parts that are being awarded: Total Bid; Total Base Bid; Total Base Bid plus Add-On No. 1; Total Alternate No. 1 Bid plus Add-On No. 1; etc., the total contract amount awarded, the list of Addenda and dates, the contractor's company name on the signature page, a copy of the Contractor's Performance Bond, Labor and Material Payment Bond and Insurance Certificates will be inserted. The original completed and signed Proposal will be kept on file with the Owner or Engineer.

The Conformed Contracts Documents may incorporate changes to the General Provisions and the Technical Specifications which were made by addendum. If changes are so included, the addendum cover sheets will be included in the Conformed Contract Documents before the Table of Contents, otherwise the full addendum will be included before the Table of Contents.

The cover of the Contract Documents will be labeled "Issued for Construction".

SP 30-10 Issued for Construction Contract Documents. Issued for Construction (IFC) Contact Documents will be distributed prior to the start of construction. The IFC contract documents consist of the Conformed Contract Documents and the Contract Drawings. The IFC Contract Documents will include a copy of the executed Form of Contract. The original filled out and signed Form of Contract will be kept on file with the Owner or Engineer. The IFC Construction Drawings will incorporate any changes made by addendum during the bidding process.

The cover of the Contract Documents will be labeled "Issued for Construction".

SP 50-18 Removal of water. The Contractor shall at all times during construction, provide and maintain proper and satisfactory means and devices for the removal of all water entering the excavations, and shall remove all such water as fast as it may collect, in such manner as shall not interfere with the prosecution of the work or the proper placing of materials or other work.

Removal of water includes the construction and removal of cofferdams, sheeting and bracing, the furnishing of materials and labor necessary therefore, the excavation and maintenance of ditches and sluiceways and the furnishing and operation of pumps, wellpoints and appliances needed to maintain thorough drainage of the work in a satisfactory manner.

Water shall not be allowed to rise over or come in contact with any masonry, concrete or mortar, until at least twenty-four (24) hours after placement and no stream of water shall be allowed to flow over such work until such time as the RPR may permit.

Unless otherwise specified, all excavations which extend down to or below the static groundwater elevations at the sites of structures shall be dewatered by lowering and maintaining the groundwater beneath such excavations at an elevation not less than that specified herein at all times when work thereon is in progress, during subgrade preparation and the placing of the structure or other materials thereon.

Where the presence of fine granular subsurface materials and a high groundwater table may cause the upward flow of water into the excavation with a resulting quick condition, the Contractor shall install and operate a suitable dewatering system to prevent the upward flow of water during construction.

When the water table is within the capillary rise of silt/clay subsurface material, the Contractor shall select and operate his equipment in a manner to prevent the deterioration of the working surface due to the upward flow of water during construction.

The effluent pumped from the dewatering system shall be examined periodically by qualified personnel to determine if the system is operating satisfactorily without the removal of fines.

Unless otherwise directed by the RPR or shown on the Contract Documents, the water level shall not be permitted to rise until construction in the immediate area is completed and the excavation backfilled to the original grade or proposed grade.

Where well points are used, the groundwater shall be lowered and maintained continuously (day and night) at a level not less than two (2) feet below the bottom of the excavation. Excavation will not be permitted at a level lower than two (2) feet above the water level as indicated by the observation wells.

The wellpoint system shall be designed or installed by or under the supervision of an organization whose principal business is wellpointing and has at least five (5) consecutive years of similar experience and can furnish a representative list of satisfactory similar operations. Wellpoint headers, points and other pertinent equipment shall not be placed within the limits of the excavation in such a manner or location as to interfere with the laying of pipe or trenching operations or with the excavation for and/or construction of other structures. Standby gasoline or diesel powered equipment shall be provided so that in the event of failure of the operating equipment, the standby equipment can be readily connected to the dewatering system. The standby equipment shall be maintained in good order and actuated regularly not less than twice a week when directed.

Wellpoints shall be installed in the center of a sand wick drain which shall be placed by means of a sanding shell or other approved means to provide a sand core not less than ten (10) inches in diameter.

Detached observation wells of similar construction to the wellpoints shall be installed at intervals of not less than fifty (50) feet along the opposite side of the trench from the header pipe and line of wellpoints, or around the excavation for a structure or as shown on the Contract Drawings, to a depth of at least five (5) feet below the proposed excavation. In addition, one wellpoint in every fifty (50) feet shall be fitted with a tee, plug and valve so that the wellpoint can be converted for use as an observation well. Observation wells shall be not less than one and one-half (12) inch in diameter.

Water pumped or drained from excavations, or any sewers, drains, or water courses encountered in the work, shall be disposed of in a suitable manner without injury to adjacent property, the work under construction, or to pavements, roads and drives. No water shall be discharged to sanitary sewers. Sanitary sewage shall be pumped to sanitary sewers or shall be disposed of by an approved method.

Any damage caused by improper handling of water shall be repaired by the Contractor at his/her own expense.

SP 50-19 Sheeting and bracing. The Contractor shall furnish, place and maintain such sheeting, bracing and shoring as required to support the sides and ends of excavations in such a manner as to prevent any movement which would in any way damage the pipe, sewers, masonry or other work, diminish the width necessary, otherwise damage or delay the work, or endanger existing structures, pipes or pavements, or to occasion a hazard to persons engaged on the project or to the general public.

Sheeting and bracing or other trench protection shall be utilized as required for the safety of employees exposed to the hazard of falling or sliding material from any trench or excavation in conformance with the provisions of Industrial Code Rule 23 as amended, and OSHA. Sheeting and bracing must be designed by, signed and stamped by a Professional Engineer licensed to practice in the State in which the project is located.

The Contractor shall be responsible for the adequacy of all trench support systems used and for all damage to persons or property resulting from improper quality, strength, placing, maintenance and removal.

All material used for sheeting and bracing shall be sound and free from defects which might impair its strength or effectiveness. All timber sheeting and bracing shall be sound and straight, free from cracks, shakes and large or loose knots. All steel sheeting and bracing shall be sound and straight, free from bends, twists or splits, having square and undamaged ends. Sheeting shall be driven vertically from the original ground surface as the excavation progresses. Sufficient toe support shall be sustained so as to maintain pressure against the original ground at all times. Timber sheeting shall be driven so that edges are tight together and steel sheeting driven with the individual members interlocking. All bracing shall be of such design and strength as to maintain the sheeting in its proper position.

The Contractor shall be solely responsible for the adequacy of all sheeting and bracing. In general, all sheeting and bracing, whether of steel, timber or other material, used to support the sides of trenches or other open excavations, shall be withdrawn as the trenches or other open excavations are being refilled. That portion of the sheeting extending below the top of a pipe, sewer or structure shall be withdrawn, unless otherwise directed, before more than 6 inches of earth is placed above the top of the pipe, sewer or structure and before any bracing is removed. The voids left by the sheeting shall be carefully refilled with selected material and rammed tight with tools especially adapted for the purpose or otherwise as may be approved.

The Contractor shall be responsible for the adequate shoring and/or bracing of any existing utilities encountered during the excavation. Such utilities shall be braced or shored in a manner acceptable to the local jurisdictional agency having authority over the utility encountered. It shall be the responsibility of the Contractor to prevent damage to or displacement of utilities, and to work with and request the concurrence of the utility's company representative in this matter.

SP 60-09 Shop and setting drawings and catalogue data. All materials and equipment used in the work shall be submitted to the RPR, unless otherwise directed. The RPR will forward the submittals to Engineer for their review and approval prior to ordering the equipment. All information required for the Engineer's review of each particular pay item shall be sent as one submittal. In addition, if the pay item interfaces with other pay items (as in the case of electrical equipment), then the submittals covering the interfacing pay items shall be sent at the same time. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify pertinent products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be boldly and clearly made with arrows or circles (highlighting is not acceptable). Drawings and data shall be submitted sufficiently in advance of the work to permit proper review, including time for necessary revisions and re-submittals. The Contractor is solely responsible for delays in the project accruing directly or indirectly from late submissions or resubmissions of submittals.

Shop and setting drawings shall present complete and accurate information relative to all working dimensions, equipment weight assembly and sectional view, all the necessary details, pertaining to coordinating the work of the Contract, lists of materials and finishes, parts lists and the description thereof, lists of spare parts and tools where such parts or tools are required, no-scale control diagrams for control wiring and control piping, and any other items of information that are required to demonstrate detail compliance with the Plans and Specifications. Each drawing shall be dated and shall show the name of the Project, Contract Number and the name of the manufacturer of the equipment covered by the drawing or drawings. The Engineer will not review any drawings that are not properly identified or that

do not contain complete data on the work or that have not been checked, stamped and signed by the Contractor for compliance with the Contract Documents.

The Engineer's review of the Contractor's Shop Drawings signifies only that such drawings appear to be in substantial conformity with the Contract Drawings and Contract Documents. Such review does not indicate approval of every detail of the drawings nor of the work methods of the Contractor which are indicated thereon. Regardless of the corrections made in or made of such drawings by the Engineer, the Contractor will nevertheless be responsible for the accuracy of such drawings, for their conformity to the Plans and Specifications and for the proper fitting and construction of the work.

No work covered by shop and setting drawings shall be done until the drawings have been reviewed and found acceptable by the Engineer. No payment shall be made on any item for which submittals are not received and found acceptable by the Engineer.

SP 60-10 Electrical shop drawings. Drawings for electrical equipment shall show physical dimensions and installation details and shall include elementary and connection diagrams for each control assembly and the interconnection diagrams for all equipment. The drawings shall show clearly the coordination of control work, shall identify the components external to electrical equipment and shall define the contact arrangement and control action of the primary and final control elements.

Where standard electrical control equipment having complex internal wiring is required, such as control panels, generator transfer panels, electric or electronic instruments and similar items, the detail shop wiring diagrams for such equipment will not be required, and, if submitted, will in general not be reviewed. The submittal for each such item of equipment shall, however, include an elementary diagram of the input and output elements which require connections to external equipment, and/or a complete step by step description of the control action of the equipment being submitted. In the event that any questions arise as to the type of information to be presented on the submittal, the supplier shall direct inquiries to the RPR through the Prime Contractor in advance of the preparation of his/her submittal.

SP 60-11 Substitute items. If in the Engineer’s sole judgment an item of material or equipment proposed by the Contractor does not qualify as an “or-equal” item, it will be considered a substitute item. The Contractor shall submit sufficient information as provided below to allow the Engineer to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefore. The procedure for review by the Engineer will include the following and as the Engineer may decide is appropriate under the circumstances. Requests for review of substitute items of material or equipment will not be accepted by the Engineer from anyone other than the Contractor. If the Contractor wishes to furnish or use a substitute item of material or equipment, the Contractor shall first make a written application through the RPR to the Engineer for acceptance thereof, certifying that the substitute will perform adequately the functions and achieve the results called for by the general design, be similar in substance to that specified and be suited to the same use as that specified. The application will state the extent, if any, to which the evaluation and acceptance of the substitute will prejudice the Contractor's achievement of completion on time, whether or not acceptance of the substitute for use in the Work will require a change in any of the Contract Documents or Contract Drawings (or in the provisions of any other direct contract with the Owner for work on the Project) to adapt the design to the substitute and whether or not incorporation or use of the substitute in connection with the work is subject to payment of any license fee or royalty. If the substitute item requires modifications to any existing features or to any proposed work, the application shall also include details of proposed modifications necessary to accommodate the substitute item. Such details shall include scaled layouts, dimensions and other pertinent information to enable the Engineer to accurately assess the entire application. If the substitute item and proposed modifications are approved, the Contractor, at no additional cost to the Owner, shall do all work necessary to make such modifications and absorb all costs of any related changes imposed on other Contractor's. All variations of the substitute from that specified will be identified in the application and available maintenance, repair and replacement service will be indicated. The application will also

contain an itemized estimate of all costs or credits that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other contractors affected by the resulting change, all of which will be considered by the Engineer in evaluating the substitute. The Engineer may require the Contractor to furnish additional data about the substitute.

A. Engineer's Evaluation. The Engineer will be the sole judge of acceptability. No substitute will be ordered, installed or utilized without the Engineer's prior written acceptance which will be evidenced by either a Change Order or an approved Shop Drawing. The Engineer will record time required by the Engineer and the Engineer's Consultants in evaluating substitutes proposed or submitted by the Contractor and in making changes in the Contract Documents or Contract Drawings (or in the provisions of any other direct contract with Owner for work on the Project) occasioned thereby. The Engineer's charges shall be at the same rates the Engineer charges for such services to the Owner.

B. Contractor's Expense. All data to be provided by the Contractor in support of any substitute item will be at the Contractor's expense. In order to aid the Engineer in determining the equality of an or substitute item (when compared to the item actually specified), the Contractor shall arrange for the performance of any tests requested by the Engineer. The Engineer shall determine the nature, extent, tester and degree of supervision of such tests. Certified test results shall be mailed directly to the Engineer for all tests requested. All costs of such tests, including engineering costs, shall be borne by the Contractor. The Owner may require the Contractor to furnish at the Contractor's expense a special performance guarantee or other surety with respect to any substitute. Whether or not the Engineer accepts a substitute item so proposed or submitted by the Contractor, the Contractor shall reimburse the Owner for the charges of the Engineer and the Engineer's Consultants for evaluating each such substitute item. The costs for evaluating substitute items shall be deducted from the Owner's payment to the Contractor.

SP 60-12 Submittal procedure. The following procedure has been established for the submittal and processing of shop and setting drawings, working drawings, and catalogue data. Departures from this procedure may result in delay and misunderstandings.

A. All information required for the Engineer's review of each particular pay item shall be sent as one submittal to the RPR with an attached submittal cover sheet. In addition, if the pay item interfaces with other pay items (as in the case of electrical equipment), then the submittals covering the interfacing pay items shall be sent at the same time.

B. In submitting certifications, drawings, catalog data, and similar items for review, one (1) electronic copy shall be submitted to DocExpress. Access to DocExpress will be provided by the RPR upon award of the Contract. The submittal will be reviewed by the Engineer, stamped and signed. The submittal bearing the reviewed stamp and signature will be reloaded back to DocExpress by the Engineer. It will be the Contractor's responsibility to check DocExpress for updated submittals.

The Contractor shall provide one (1) hard copy of each of the stamped and signed submittals for inclusion in the O&M Manual prior to contract closeout.

The RPR shall be responsible for printing sufficient copies of each submittal for their own records. The Contractor shall be responsible for printing sufficient copies of each submittal for their own records and distributing to each of the other prime or subcontractors whose work is to be correlated with such submittals.

C. Submittals will be stamped by the Engineer as follows:

1. "Approved", if no change or rejection is made.

2. "Approved as Noted", if minor changes or additions are made, but re-submittal is not considered necessary. All copies will bear the corrective marks.

3. "Revise and Resubmit", if the changes requested are extensive. In this case, re-submittal after correction is necessary and the same number of copies shall be included in the re-submittal as in the first submittal.

4. "Rejected", if it is considered that the data submitted cannot with reasonable revision meet the requirements of the Plans and Specifications.

5. "Submit Specified Item", if the data submitted is not clear, complete, or for other reasons cannot be examined by the Engineer to establish compliance with the Plans and Specifications.

D. Unless otherwise approved in specific cases, all submittals must be transmitted by the Prime Contractor, not by the Subcontractors or vendors.

Any changes in re-submittals, other than those indicated as requested, must be specifically brought to the attention of the RPR. Changes or additions shall not be made in, or to, any fabricated item, part or material without having a re-review.

SP 70-22 Additional sanitary, health, and safety provisions.

New York State Labor Law requires for every contract for the construction, reconstruction, maintenance and/or repair of public work to which the State or a municipality is a party, where the total cost of all work to be performed under the contract is at least $250,000, all laborers, workers and mechanics employed performing work of the contract on the work site be certified as having successfully completed an OSHA 10-hour Construction Safety course. This requirement applies to the contractor, subcontractors and other persons.

SP 90-12 Security for construction warranty. The Contractor shall upon final acceptance of the work, furnish a bond to the Owner in a penal sum equal to five percent (5%) of the amount of the Contract price, executed by a surety company authorized by the Department of Insurance of the State of New York to execute such a bond in this State, and which bond shall be approved as to form and manner of execution by the Owner's attorney. This bond shall be conditioned for the faithful performance by the said Contractor of the conditions and stipulations of the subsection titled ACCEPTANCE AND FINAL PAYMENT of this section, thereof relating to maintenance and repair, for a period of one (1) year from the date of the final acceptance of the work. In default of the filing of such bond, a sum of money equal to said five percent (5%) may be retained out of any monies due to the Contractor and be held for one (1) year, or until the bond above described is filed.

For Contractors who have elected to set up an escrow account, they may elect to maintain the escrow account for a period of one (1) year from the date of final acceptance of the work in lieu of providing a bond for security of guarantee as described above.

SP 90-13 Lien law. If, at any time before or within thirty (30) days after the work of this Contract has been completed and accepted by the Owner, any person or persons claiming to have performed any labor or furnished any material toward the performance or completion of this Contract shall file with the RPR and with the financial officer of the Owner, or other officer or person charged with the custody and disbursement of the Owner's funds applicable to this Contract under which the claim is made, such notice as is prescribed in the Act of Legislature of the State of New York passed February 17, 1909, entitled an "Act in Relation to Liens", and the acts amendatory thereof or supplementary thereto, then and in every such case the party of the first part shall retain (anything herein contained to the contrary thereof

notwithstanding) from the monies under its control and due or to grow due under this Agreement, as much of such monies as shall be sufficient to pay, satisfy and discharge the amount in such notice claimed to be due to the person or persons filing such lien, together with the reasonable cost of any actions brought to enforce such claim or the lien creating by the filing of such notice. The monies so retained shall be retained by the party of the first part until the lien thereon created by the said act and filing of said notice shall be discharged pursuant to the provisions of said act or acts.

END OF SPECIAL PROVISIONS

Item C-100 Contractor Quality Control Program (CQCP)

100-1 General. Quality is more than test results. Quality is the combination of proper materials, testing, workmanship, equipment, inspection, and documentation of the project. Establishing and maintaining a culture of quality is key to achieving a quality project. The Contractor shall establish, provide, and maintain an effective Contractor Quality Control Program (CQCP) that details the methods and procedures that will be taken to assure that all materials and completed construction required by this contract conform to contract plans, technical specifications and other requirements, whether manufactured by the Contractor, or procured from subcontractors or vendors. Although guidelines are established and certain minimum requirements are specified here and elsewhere in the contract technical specifications, the Contractor shall assume full responsibility for accomplishing the stated purpose.

The Contractor shall establish a CQCP that will:

a. Provide qualified personnel to develop and implement the CQCP.

b. Provide for the production of acceptable quality materials.

c. Provide sufficient information to assure that the specification requirements can be met.

d. Document the CQCP process.

The Contractor shall not begin any construction or production of materials to be incorporated into the completed work until the CQCP has been reviewed and approved by the Resident Project Representative (RPR). No partial payment will be made for materials subject to specific quality control (QC) requirements until the CQCP has been reviewed and approved.

The QC requirements contained in this section and elsewhere in the contract technical specifications are in addition to and separate from the quality assurance (QA) testing requirements. QA testing requirements are the responsibility of the RPR or Contractor as specified in the specifications.

A Quality Control (QC)/Quality Assurance (QA) workshop with the Engineer, Resident Project Representative (RPR), Contractor, subcontractors, testing laboratories, and Owner's representative must be held prior to start of construction. The QC/QA workshop will be facilitated by the Contractor. The Contractor shall coordinate with the Airport and the RPR on time and location of the QC/QA workshop. Items to be addressed, at a minimum, will include:

a. Review of the CQCP including submittals, QC Testing, Action & Suspension Limits for Production, Corrective Action Plans, Distribution of QC reports, and Control Charts.

b. Discussion of the QA program.

c. Discussion of the QC and QA Organization and authority including coordination and information exchange between QC and QA.

d. Establish regular meetings to discuss control of materials, methods and testing.

e. Establishment of the overall QC culture.

100-2 Description of program.

a. General description. The Contractor shall establish a CQCP to perform QC inspection and testing of all items of work required by the technical specifications, including those performed by subcontractors. The CQCP shall ensure conformance to applicable specifications and plans with respect to materials, off-

site fabrication, workmanship, construction, finish, and functional performance. The CQCP shall be effective for control of all construction work performed under this Contract and shall specifically include surveillance and tests required by the technical specifications, in addition to other requirements of this section and any other activities deemed necessary by the Contractor to establish an effective level of QC.

b. Contractor Quality Control Program (CQCP). The Contractor shall describe the CQCP in a written document that shall be reviewed and approved by the RPR prior to the start of any production, construction, or off-site fabrication. The written CQCP shall be submitted to the RPR for review and approval at least 10 calendar days before the CQCP Workshop. The Contractor's CQCP and QC testing laboratory must be approved in writing by the RPR prior to the Notice to Proceed (NTP).

The CQCP shall be organized to address, as a minimum, the following:

1. QC organization and resumes of key staff
2. Project progress schedule
3. Submittals schedule
4. Inspection requirements
5. QC testing plan
6. Documentation of QC activities and distribution of QC reports
7. Requirements for corrective action when QC and/or QA acceptance criteria are not met
8. Material quality and construction means and methods. Address all elements applicable to the project that affect the quality of the pavement structure including subgrade, subbase, base, and surface course. Some elements that must be addressed include, but is not limited to mix design, aggregate grading, stockpile management, mixing and transporting, placing and finishing, quality control testing and inspection, smoothness, laydown plan, equipment, and temperature management plan.

The Contractor must add any additional elements to the CQCP that is necessary to adequately control all production and/or construction processes required by this contract.

100-3 CQCP organization. The CQCP shall be implemented by the establishment of a QC organization. An organizational chart shall be developed to show all QC personnel, their authority, and how these personnel integrate with other management/production and construction functions and personnel.

The organizational chart shall identify all QC staff by name and function, and shall indicate the total staff required to implement all elements of the CQCP, including inspection and testing for each item of work. If necessary, different technicians can be used for specific inspection and testing functions for different items of work. If an outside organization or independent testing laboratory is used for implementation of all or part of the CQCP, the personnel assigned shall be subject to the qualification requirements of paragraphs 100-03a and 100-03b. The organizational chart shall indicate which personnel are Contractor employees and which are provided by an outside organization.

The QC organization shall, as a minimum, consist of the following personnel:

a. Program Administrator. The Contractor Quality Control Program Administrator (CQCPA) must be a full-time employee of the Contractor, or a consultant engaged by the Contractor. The CQCPA must have a minimum of five (5) years of experience in QC pavement construction with prior QC experience on a project of comparable size and scope as the contract.

Included in the five (5) years of paving/QC experience, the CQCPA must meet at least one of the following requirements:

(1) Professional Engineer with one (1) year of airport paving experience.

(2) Engineer-in-training with two (2) years of airport paving experience.

(3) National Institute for Certification in Engineering Technologies (NICET) Civil Engineering Technology Level IV with three (3) years of airport paving experience.

(4) An individual with four (4) years of airport paving experience, with a Bachelor of Science Degree in Civil Engineering, Civil Engineering Technology or Construction.

The CQCPA must have full authority to institute any and all actions necessary for the successful implementation of the CQCP to ensure compliance with the contract plans and technical specifications. The CQCPA authority must include the ability to immediately stop production until materials and/or processes are in compliance with contract specifications. The CQCPA must report directly to a principal officer of the construction firm. The CQCPA may supervise the Quality Control Program on more than one project provided that person can be at the job site within two (2) hours after being notified of a problem.

b. QC technicians. A sufficient number of QC technicians necessary to adequately implement the CQCP must be provided. These personnel must be either Engineers, engineering technicians, or experienced craftsman with qualifications in the appropriate field equivalent to NICET Level II in Civil Engineering Technology or higher, and shall have a minimum of two (2) years of experience in their area of expertise.

The QC technicians must report directly to the CQCPA and shall perform the following functions:

(1) Inspection of all materials, construction, plant, and equipment for conformance to the technical specifications, and as required by paragraph 100-6.

(2) Performance of all QC tests as required by the technical specifications and paragraph100-8.

(3) Performance of tests for the RPR when required by the technical specifications.

Certification at an equivalent level of qualification and experience by a state or nationally recognized organization will be acceptable in lieu of NICET certification.

c. Staffing levels. The Contractor shall provide sufficient qualified QC personnel to monitor each work activity at all times. Where material is being produced in a plant for incorporation into the work, separate plant and field technicians shall be provided at each plant and field placement location. The scheduling and coordinating of all inspection and testing must match the type and pace of work activity. The CQCP shall state where different technicians will be required for different work elements.

100-4 Project progress schedule. Critical QC activities must be shown on the project schedule as required by Section 80, paragraph 80-03, *Execution and Progress*.

100-5 Submittals schedule. The Contractor shall submit a detailed listing of all submittals (for example, mix designs, material certifications) and shop drawings required by the technical specifications. The listing can be developed in a spreadsheet format and shall include as a minimum:

a. Specification item number

b. Item description

c. Description of submittal

d. Specification paragraph requiring submittal

e. Scheduled date of submittal

100-6 Inspection requirements. QC inspection functions shall be organized to provide inspections for all definable features of work, as detailed below. All inspections shall be documented by the Contractor as specified by paragraph 100-9.

Inspections shall be performed as needed to ensure continuing compliance with contract requirements until completion of the particular feature of work. Inspections shall include the following minimum requirements:

a. During plant operation for material production, QC test results and periodic inspections shall be used to ensure the quality of aggregates and other mix components, and to adjust and control mix proportioning to meet the approved mix design and other requirements of the technical specifications. All equipment used in proportioning and mixing shall be inspected to ensure its proper operating condition. The CQCP shall detail how these and other QC functions will be accomplished and used.

b. During field operations, QC test results and periodic inspections shall be used to ensure the quality of all materials and workmanship. All equipment used in placing, finishing, and compacting shall be inspected to ensure its proper operating condition and to ensure that all such operations are in conformance to the technical specifications and are within the plan dimensions, lines, grades, and tolerances specified. The CQCP shall document how these and other QC functions will be accomplished and used.

100-7 Contractor QC testing facility.

a. For projects that include Item P-401, Item P-403, and Item P-404, the Contractor shall ensure facilities, including all necessary equipment, materials, and current reference standards, are provided that meet requirements in the following paragraphs of ASTM D3666, *Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials*:

- 8.1.3 Equipment Calibration and Checks;
- 8.1.9 Equipment Calibration, Standardization, and Check Records;
- 8.1.12 Test Methods and Procedures

b. For projects that include P-501, the Contractor shall ensure facilities, including all necessary equipment, materials, and current reference standards, are provided that meet requirements in the following paragraphs of ASTM C1077, Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation:

- 7 Test Methods and Procedures
- 8 Facilities, Equipment, and Supplemental Procedures

100-8 QC testing plan. As a part of the overall CQCP, the Contractor shall implement a QC testing plan, as required by the technical specifications. The testing plan shall include the minimum tests and test frequencies required by each technical specification Item, as well as any additional QC tests that the Contractor deems necessary to adequately control production and/or construction processes.

The QC testing plan can be developed in a spreadsheet fashion and shall, as a minimum, include the following:

a. Specification item number (e.g., P-401)

b. Item description (e.g., Hot Mix Asphalt Pavements)

c. Test type (e.g., gradation, grade, asphalt content)

d. Test standard (e.g., ASTM or American Association of State Highway and Transportation Officials (AASHTO) test number, as applicable)

e. Test frequency (e.g., as required by technical specifications or minimum frequency when requirements are not stated)

f. Responsibility (e.g., plant technician)

g. Control requirements (e.g., target, permissible deviations)

The QC testing plan shall contain a statistically-based procedure of random sampling for acquiring test samples in accordance with ASTM D3665. The RPR shall be provided the opportunity to witness QC sampling and testing.

All QC test results shall be documented by the Contractor as required by paragraph 100-9.

100-9 Documentation. The Contractor shall maintain current QC records of all inspections and tests performed. These records shall include factual evidence that the required QC inspections or tests have been performed, including type and number of inspections or tests involved; results of inspections or tests; nature of defects, deviations, causes for rejection, etc.; proposed remedial action; and corrective actions taken.

These records must cover both conforming and defective or deficient features, and must include a statement that all supplies and materials incorporated in the work are in full compliance with the terms of the contract. Legible copies of these records shall be furnished to the RPR daily. The records shall cover all work placed subsequent to the previously furnished records and shall be verified and signed by the CQCPA.

Contractor QC records required for the contract shall include, but are not necessarily limited to, the following records:

a. Daily inspection reports. Each Contractor QC technician shall maintain a daily log of all inspections performed for both Contractor and subcontractor operations. These technician's daily reports shall provide factual evidence that continuous QC inspections have been performed and shall, as a minimum, include the following:

(1) Technical specification item number and description

(2) Compliance with approved submittals

(3) Proper storage of materials and equipment

(4) Proper operation of all equipment

(5) Adherence to plans and technical specifications

(6) Summary of any necessary corrective actions

(7) Safety inspection.

(8) Photographs and/or video

The daily inspection reports shall identify all QC inspections and QC tests conducted, results of inspections, location and nature of defects found, causes for rejection, and remedial or corrective actions taken or proposed.

The daily inspection reports shall be signed by the responsible QC technician and the CQCPA. The RPR shall be provided at least one copy of each daily inspection report on the work day following the day of record. When QC inspection and test results are recorded and transmitted electronically, the results must be archived.

b. Daily test reports. The Contractor shall be responsible for establishing a system that will record all QC test results. Daily test reports shall document the following information:

(1) Technical specification item number and description

(2) Test designation

(3) Location

(4) Date of test

(5) Control requirements

(6) Test results

(7) Causes for rejection

(8) Recommended remedial actions

(9) Retests

Test results from each day's work period shall be submitted to the RPR prior to the start of the next day's work period. When required by the technical specifications, the Contractor shall maintain statistical QC charts. When QC daily test results are recorded and transmitted electronically, the results must be archived.

100-10 Corrective action requirements. The CQCP shall indicate the appropriate action to be taken when a process is deemed, or believed, to be out of control (out of tolerance) and detail what action will be taken to bring the process into control. The requirements for corrective action shall include both general requirements for operation of the CQCP as a whole, and for individual items of work contained in the technical specifications.

The CQCP shall detail how the results of QC inspections and tests will be used for determining the need for corrective action and shall contain clear rules to gauge when a process is out of control and the type of correction to be taken to regain process control.

When applicable or required by the technical specifications, the Contractor shall establish and use statistical QC charts for individual QC tests. The requirements for corrective action shall be linked to the control charts.

100-11 Inspection and/or observations by the RPR. All items of material and equipment are subject to inspection and/or observation by the RPR at the point of production, manufacture or shipment to determine if the Contractor, producer, manufacturer or shipper maintains an adequate QC system in conformance with the requirements detailed here and the applicable technical specifications and plans. In addition, all items of materials, equipment and work in place shall be subject to inspection and/or observation by the RPR at the site for the same purpose.

Inspection and/or observations by the RPR does not relieve the Contractor of performing QC inspections of either on-site or off-site Contractor's or subcontractor's work.

100-12 Noncompliance.

a. The Resident Project Representative (RPR) will provide written notice to the Contractor of any noncompliance with their CQCP. After receipt of such notice, the Contractor must take corrective action.

b. When QC activities do not comply with either the CQCP or the contract provisions or when the Contractor fails to properly operate and maintain an effective CQCP, and no effective corrective actions have been taken after notification of non-compliance, the RPR will recommend the Owner take the following actions:

(1) Order the Contractor to replace ineffective or unqualified QC personnel or subcontractors and/or

(2) Order the Contractor to stop operations until appropriate corrective actions are taken.

METHOD OF MEASUREMENT

100-13 Basis of measurement and payment. Contractor Quality Control Program (CQCP) is for the personnel, tests, facilities and documentation required to implement the CQCP. The CQCP will be paid as a lump sum with the following schedule of partial payments:

a. With first pay request, 25% with approval of CQCP and completion of the Quality Control (QC)/Quality Assurance (QA) workshop.

b. When 25% or more of the original contract is earned, an additional 25%.

c. When 50% or more of the original contract is earned, an additional 20%.

d. When 75% or more of the original contract is earned, an additional 20%

e. After final inspection and acceptance of project, the final 10%.

BASIS OF PAYMENT

100-14 Payment will be made under:

Item C-100-1 Contractor Quality Control Program (CQCP) – per Lump Sum

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

National Institute for Certification in Engineering Technologies (NICET)

ASTM International (ASTM)

ASTM C1077	Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
ASTM D3665	Standard Practice for Random Sampling of Construction Materials
ASTM D3666	Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials

END OF ITEM C-100

Item C-102 Temporary Air and Water Pollution, Soil Erosion, and Siltation Control

DESCRIPTION

102-1. This item shall consist of temporary control measures as shown on the plans or as ordered by the Resident Project Representative (RPR) during the life of a contract to control pollution of air and water, soil erosion, and siltation through the use of silt fences, berms, dikes, dams, sediment basins, fiber mats, gravel, mulches, grasses, slope drains, and other erosion control devices or methods. Control measures shall also be in accordance with the Storm Water Pollution Prevention Plan (SWPPP) included hereafter as Attachment "A".

Temporary erosion control shall be in accordance with the approved erosion control plan; the approved Construction Safety and Phasing Plan (CSPP) and AC 150/5370-2, *Operational Safety on Airports During Construction*. The temporary erosion control measures contained herein shall be coordinated with the permanent erosion control measures specified as part of this contract to the extent practical to assure economical, effective, and continuous erosion control throughout the construction period.

Temporary control may include work outside the construction limits such as borrow pit operations, equipment and material storage sites, waste areas, and temporary plant sites.

Temporary control measures shall be designed, installed and maintained to minimize the creation of wildlife attractants that have the potential to attract hazardous wildlife on or near public-use airports.

MATERIALS

102-2.1 Grass. Grass that will not compete with the grasses sown later for permanent cover per Item T-901 shall be a quick-growing species (such as ryegrass, Italian ryegrass, or cereal grasses) suitable to the area providing a temporary cover. Selected grass species shall not create a wildlife attractant.

102-2.2 Mulches. Mulches may be hay, straw, fiber mats, netting, bark, wood chips, or other suitable material reasonably clean and free of noxious weeds and deleterious materials per Item T-908. Mulches shall not create a wildlife attractant.

102-2.3 Fertilizer. Fertilizer shall be a standard commercial grade and shall conform to all federal and state regulations and to the standards of the Association of Official Agricultural Chemists.

102-2.4 Storm drain inlet protection. Storm drain inlet protection shall be provided and installed as shown on the details and plans.

102-2.5 Compost filter sock. Compost filter sock shall be 12-inches in diameter and be provided and installed as shown on the plans and details. Materials shall meet the requirements of Table 5.1 and Table 5.2 of the NYSDEC Standards and Specifications for Erosion and Sediment Control – Blue Book.

102-2.6 Preformed check dam. Temporary check dams shall be triangular-shaped, having a height of at least eight inches in the center with equal sides and a sixteen- to twenty-inch base. The triangular-shaped inner material shall be urethane foam or foam rubber. The outer cover shall be a woven geotextile fabric placed around the inner material and allowed to extend beyond both sides of the triangle two to three feet. Standard length of each dike will be seven feet unless otherwise indicated on the plans. The dikes shall be attached to the ground with wire staples. The staples shall be no. 11 gauge wire and be at least six to eight inches long. Staples shall be placed as indicated by the manufacturer.

102-2.7 Stone check dam. Permanent stone check dams shall be provided and installed as shown on the plans and details.

102-2.8 Dry Swale/ Bio retention soil. Permeable soil shall be a sandy loam, loamy sand, loam (USDA), or a loam/sand mix (should contain a minimum 35% to 60% sand, by volume). The clay content for these soils should be less than 25% by volume. Soils should fall within the SM, or ML classifications of the Unified Soil Classification System (USCS). A permeability of at least 1.0 ft per day (0.5 in/hr) is required. The soil shall be free of stones, stumps, roots, or other woody material over 1" in diameter, and shall be free of brush and seeds from noxious weeds. Placement of the permeable soil should be in lifts of 12" to 18", loosely compacted. Permeable soil shall have the characteristics shown in the following table:

Parameter	**Value**
pH	5.2 to 7.0
Organic Matter	1.5 to 4.0%
Magnesium	35 lbs per acre, minimum
Phosphorus	75 lbs per acre, minimum
Potassium	85 lbs per acre, minimum
Soluble Salts	500 ppm
Clay	10% to 25%
Silt	30% to 55%
Sand	35% to 60%

102-2.7 Other. All other materials shall meet commercial grade standards and shall be approved by the RPR before being incorporated into the project.

CONSTRUCTION REQUIREMENTS

102-3.1 General. In the event of conflict between these requirements and pollution control laws, rules, or regulations of other federal, state, or local agencies, the more restrictive laws, rules, or regulations shall apply.

A Storm Water Pollution Prevention Plan (SWPPP) is included as part of this specification. Refer to Attachment A.

The RPR shall be responsible for assuring compliance to the extent that construction practices, construction operations, and construction work are involved.

102-3.2 Schedule. Prior to the start of construction, the Contractor shall submit schedules in accordance with the approved Construction Safety and Phasing Plan (CSPP) and the plans for accomplishment of temporary and permanent erosion control work for clearing and grubbing; grading; construction; paving; and structures at watercourses. The Contractor shall also submit a proposed method of erosion and dust control on haul roads and borrow pits and a plan for disposal of waste materials. Work shall not be started until the erosion control schedules and methods of operation for the applicable construction have been accepted by the RPR.

102-3.3 Construction details. The Contractor will be required to incorporate all permanent erosion control features into the project at the earliest practicable time as outlined in the plans and approved CSPP. Except where future construction operations will damage slopes, the Contractor shall perform the permanent seeding and mulching and other specified slope protection work in stages, as soon as substantial areas of exposed slopes can be made available. Temporary erosion and pollution control measures will be used to correct conditions that develop during construction that were not foreseen during the design stage; that are needed prior to installation of permanent control features; or that are needed temporarily to control erosion that develops during normal construction practices, but are not associated with permanent control features on the project.

Where erosion may be a problem, schedule and perform clearing and grubbing operations so that grading operations and permanent erosion control features can follow immediately if project conditions permit. Temporary erosion control measures are required if permanent measures cannot immediately follow grading operations. The RPR shall limit the area of clearing and grubbing, excavation, borrow, and embankment operations in progress, commensurate with the Contractor's capability and progress in keeping the finish grading, mulching, seeding, and other such permanent control measures current with the accepted schedule. If seasonal limitations make such coordination unrealistic, temporary erosion control measures shall be taken immediately to the extent feasible and justified as directed by the RPR.

The Contractor shall provide immediate permanent or temporary pollution control measures to minimize contamination of adjacent streams or other watercourses, lakes, ponds, or other areas of water impoundment as directed by the RPR. If temporary erosion and pollution control measures are required due to the Contractor's negligence, carelessness, or failure to install permanent controls as a part of the work as scheduled or directed by the RPR, the work shall be performed by the Contractor and the cost shall be incidental to this item.

The RPR may increase or decrease the area of erodible earth material that can be exposed at any time based on an analysis of project conditions.

The erosion control features installed by the Contractor shall be maintained by the Contractor during the construction period.

Provide temporary structures whenever construction equipment must cross watercourses at frequent intervals. Pollutants such as fuels, lubricants, bitumen, raw sewage, wash water from concrete mixing operations, and other harmful materials shall not be discharged into any waterways, impoundments or into natural or manmade channels.

METHOD OF MEASUREMENT

102-4.1 Temporary and permanent erosion and pollution control work required will be performed as scheduled or directed by the RPR. Completed and accepted work will be measured as follows:

a. Measures and practices required for compliance with this specification for protection of construction areas outside the construction limits shall be measured on a lump sum basis. Measures and practices shall include, but not be limited to, air pollution prevention, water pollution prevention, temporary seeding, temporary mulching, construction road stabilization, dust control, protecting vegetation, and erosion and sediment control practices required due to the Contractor's means and methods of construction, and for borrow and waste areas, haul roads, equipment and material storage sites, and temporary plant sites.

b. Installation and removal of storm drain inlet protection will be measured per each.

c. Installation and removal of compost filter sock will be measured by the linear foot.

d. Installation and removal of preformed check dam will be measured per each.

e. Installation of stone check dam will be measured per cubic yard.

f. Installation of dry swales, including bioretention soil, porous backfill, filter fabric, underdrain pipe and all other work and materials required to complete will be measured by the linear foot.

102-4.2 Control work performed for protection of construction areas outside the construction limits, such as borrow and waste areas, haul roads, equipment and material storage sites, and temporary plant sites, will not be measured and paid for directly but shall be considered as a subsidiary obligation of the Contractor.

BASIS OF PAYMENT

102-5.1 Accepted quantities of temporary water pollution, soil erosion, and siltation control work ordered by the RPR and measured as provided in paragraph 102-4.1 will be paid for under:

Item C-102-1	Compliance with Temporary Air and Water Pollution, Soil Erosion and Siltation Control - per lump sum
Item C-102-2	Installation and Removal of Storm Drain Inlet Protection - per each
Item C-102-3	Installation and Removal of Compost Filter Sock - per linear foot
Item C-102-4	Installation and Removal of Preformed Check Dam - per each
Item C-102-5	Installation of Stone Check Dam - per cubic yard
Item C-102-6	Installation of Dry Swale - per linear foot

Where other directed work falls within the specifications for a work item that has a contract price, the units of work shall be measured and paid for at the contract unit price bid for the various items.

Temporary control features not covered by contract items that are ordered by the RPR will be paid for in accordance with Section 90, paragraph 90-05 *Payment for Extra Work*.

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

AC 150/5200-33 *Hazardous Wildlife Attractants on or Near Airports*

AC 150/5370-2 *Operational Safety on Airports During Construction*

ASTM International (ASTM)

ASTM D6461 *Standard Specification for Silt Fence Materials*

United States Department of Agriculture (USDA)

FAA/USDA Wildlife Hazard Management at Airports, A Manual for Airport Personnel

END OF ITEM C-102

ATTACHMENT "A"

TO

ITEM C-102 TEMPORARY AIR AND WATER POLLUTION, SOIL EROSION, AND SILTATION CONTROL

STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

FOR THE CONSTRUCTION OF

CENTRALIZED DEICING FACILITY (CDF) PROJECT

AT THE

SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

Bid Documents
April 29, 2026

TABLE OF CONTENTS

1.0 Introduction
2.0 Notice of Intent Requirements
3.0 Storm Water Pollution Prevention Plan
- 3.1 Site Description
- 3.2 Erosion and Sediment Control Practices
  - A. Temporary Structural Measures
    1. Dust Control
    2. Preformed Check Dams
    3. Compost Filter Sock
    4. Storm Drain Inlet Protection
  - B. Vegetative Measures
    1. Mulching
    2. Seeding
    3. Protecting Vegetation
    4. Topsoiling
  - C. Permanent Structural Measures
    1. Stone Check Dams
- 3.3 Water Quality and Quantity Control
  - A. Open Channels
    1. Dry Swales (O-1)
  - B. Grass Filter Strips
  - C. Infiltration
    1. Underground Infiltration Chambers (I-4)
  - D. Stormwater Hotspots
- 3.4 Stormwater Management
- 3.5 Post Construction Water Quality & Quantity Controls
- 3.6 Other Requirements
- 3.7 Inspections
- 3.8 Maintenance
- 3.9 Contractors

4.0 Retention of Records

5.0 Notice of Termination Requirements

APPENDICES:

Appendix A NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity (GP-0-25-001)

Appendix B Location Plan
General Plan
Soil Erosion Control Plans
Grading Plans
Drainage and Utility Plans
Soil Erosion Control Details
Drainage & Stormwater Management System Details

Appendix C Soils Information

Appendix D Stormwater Management Calculations

Appendix E Weekly Soil Erosion and Siltation Control Inspection Checklist

Appendix F Contractor's SWPPP Certification Form
Appendix G Notice of Intent w/ Owner & MS4 Certification
Appendix H Notice of Termination *(sample form, NYSDEC portal submission required)*

1.0 INTRODUCTION.

The Clean Water Act states that storm water discharges associated with an industrial activity from a point source, including through a separate municipal storm water sewer system, is unlawful unless authorized by a National Pollutant Discharge Elimination System (NPDES) permit. In New York State, the New York State Department of Environmental Conservation (NYSDEC) administers the NPDES through the State Pollution Discharge Elimination System (SPDES) program. According to the SPDES General Permit, construction sites or common plans of development that result in disturbance of one or more acres are subject to permitting requirements.

This plan outlines the manner in which to reduce the potential of storm water runoff pollution during construction activities and assigns responsibilities to ensure that the contractor and his subcontractors implement the requirements of the Storm Water Pollution Prevention Plan (SWPPP). The SWPPP was developed based on the NYSDEC Stormwater Discharge Associated with Construction Activities (SPDES) General Permit #GP-0-25-001, effective January 29, 2025.

GP-0-25-001 is a five (5) year general permit for discharges of stormwater to surface waters of the State from construction activities as defined in 40 CFR 122.26(b)(14)(x) and (b)(15)(i - ii). Pursuant to Section 402 of the Clean Water Act (CWA), stormwater discharges from certain construction activities (including discharges through a municipal separate storm sewer system) are unlawful unless they are authorized by a National Pollutant Discharge Elimination System (NPDES) permit or by a state permit program. New York administers the approved SPDES program with permits issued in accordance with the New York State Environmental Conservation Law (ECL) Article 17, Titles 7, 8 and Article 70. An owner or operator of a construction activity must operate under an effective individual SPDES permit, which addresses the stormwater discharges, or obtain coverage under GP-0-25-001.

2.0 NOTICE OF INTENT REQUIREMENTS.

To obtain coverage under a general permit, an electronic Notice of Intent (eNOI) must be submitted by the owner at least 5 days prior to commencement of construction activities. Contractor shall not begin work on any portion of this project that requires implementation of SWPPP procedures until after the time period has elapsed following NYSDEC's receipt of the NOI.

3.0 STORM WATER POLLUTION PREVENTION PLAN.

This Storm Water Pollution Prevention Plan (SWPPP) was developed to set guidelines during construction activities to minimize erosion and sediment laden runoff. A copy of this SWPPP shall be retained at the construction site throughout the duration of this project.

The Contractor shall meet all conditions of this SWPPP and all conditions within the NYSDEC Stormwater Discharge Associated with Construction Activities (SPDES) General Permit #GP-0-25-001. The contractor shall be responsible for implementation of SWPPP procedures including being responsible for any subcontractors who are performing work that requires implementation of SWPPP procedures.

During the course of the project and upon approval by the Owner, the Contractor shall amend the plan whenever there is a change in construction operations, or site conditions which may have an effect on the potential for the discharge of pollutants.

3.1 Site Description.

This project aims to centralize aircraft deicing efforts into the existing south deicing pad through the expansion and reconstruction of the south deicing pad. The full depth pavement reconstruction area is approx. 349,000 sf with an additional 440,000 sf of new asphalt pavement which is expected to accommodate 7 narrow and 2 large body aircraft. Incidental project components include site demolition, glycol diversion and pumping system, abandoned ARFF building demolition, airfield light and guidance sign fixtures with foundations, airfield cable and conduit, apron area flood lighting, electrical power and control equipment, surface and subsurface drainage improvements, stormwater collection structures and piping, stormwater management, turf grading, municipal utility service modifications, pavement markings and sawcut grooving. The project also includes approximately 37,000 sf of new pavement for a snow storage/staging area, vehicle access, and operations building (by others). A bulk glycol and potassium acetate tank storage facility which includes approximately 39,000 sf of new pavement is included as Add On. No.1

B. Below is a description of the intended sequence of major construction activities which involve soil disturbance:

- Install temporary erosion and sediment controls.
- Demolish existing abandoned ARFF building
- Excavate and grade site.
- Mill and excavate existing apron asphalt pavement.
- Excavation and subbase preparation for new full depth asphalt pavement areas.
- Install pavement underdrain, stormwater and deicing fluid collection structures and pipe
- Install and relocate underground utilities
- Install taxiway/apron lights and signage, including cable and conduit, power systems
- Install apron overhead light fixtures and poles on concrete bases
- Install aggregate base course at new full depth asphalt pavement areas.
- Install permanent stormwater controls (underground infiltration chambers, dry swales).
- Install asphalt pavement.
- Pavement sawcut grooving and pavement markings
- Seed and mulch (hydroseed) all areas disturbed from construction activities.
- After stabilization, remove temporary erosion and sediment controls.

C. The total project area is approximately 26.3 acres of which approximately 1.5 acres will undergo an asphalt mill and overlay (not considered disturbance), 11.8 acres will include new asphalt pavement, 8.0 acres will undergo full depth reconstruction of existing asphalt pavement, and the remaining 5.0 acres of turf area is expected to be disturbed from excavation and grading operations during construction.

D. The existing soil is primarily SM – silty sand. The soils are expected to be moderately well drained to somewhat excessively well drained, variable and non-cohesive. The existing soils are classified as Hydrologic Soil Group (HSG) Type A or A/D. For soils that are assigned a dual HSG (A/D, B/D or C/D), the first letter is for drained areas and the second is for undrained areas. The runoff coefficient utilized for pavement is 0.90 and for turf is 0.25. The runoff coefficient within the grading area limits will not change as a result of this project. Soils information is provided in Appendix C.

E. A location plan, general plan, soil erosion control plans, grading plans, utility and drainage plans, soil erosion control details, and drainage details have been included in Appendix A.

The location plan shows the project location while the general plan identifies the overall project site. Soil erosion control plans have been provided to show the location/sizing of soil erosion and sediment control measures. Project grading plans and drainage and utility have been included to indicate grading limits, drainage patterns, grade slopes, catch basins, and underground infiltration chambers (stormwater discharge points). The soil erosion control details and drainage details have been included to identify controls to be utilized on this project.

F. The storm water runoff from this project will be discharged into the North Branch of Ley Creek via overland sheet flow and an existing enclosed storm drainage system. The North Branch of Ley Creek ultimately discharges into Onondaga Lake via Ley Creek. Review of the existing topography reveals that this drainage area before development discharges across this same general area and therefore, the drainage patterns have not been altered.

G. The present owner is: Syracuse Regional Airport Authority
Syracuse Hancock International Airport
1000 Col. Eileen Collins Boulevard
Syracuse, New York 13212

The contact person for the project is: Mr. Arjun Nair
(315) 455-3652

3.2 Erosion and Sediment Control Practices. The following control practices have been incorporated into the Contract Documents. The Contractor shall be required to construct and maintain the erosion and sediment controls in accordance with this document and the associated Contract Documents for this project. If the total area of disturbed soil at any one time is greater than five acres, then the portion of the site in excess of five acres shall be temporarily or permanently stabilized. Written permission may be obtained from the NYSDEC in advance of construction to allow land disturbance greater than five acres.

A. Temporary Structural Measures. Temporary structural measures have been incorporated into the Contract Documents. The quantities required to complete the work have been estimated, however, there is no guarantee of the actual quantities used during construction. Other measures may be ordered by the Engineer, Owner or NYSDEC which are not listed below. Temporary structural measures not covered by contract items will be paid for in accordance with Section 90-05 PAYMENT FOR EXTRA AND FORCE ACCOUNT WORK. The temporary structural measures included in this contract are as follows:

1. Dust Control.
   - Dust resulting from land-disturbing activities shall be controlled to prevent surface and air movement of dust from disturbed soil surfaces.
   - Dust control measures shall be employed on construction roads, access points and other disturbed areas subject to dust movement.
   - On non-driving areas, measures such as vegetative cover, mulch or sprayed adhesives shall be employed.
   - On driving areas, water shall be applied by sprinkling until the surface is wet.
   - Dust control measures shall be applied constantly through dry weather until all disturbed areas are stabilized.

2. Preformed Check Dams

- Check dams shall be constructed across drainage swales to reduce erosion by restricting the flow velocity.
- Check dams shall be inspected after each runoff event. All damage shall be corrected immediately. If significant erosion has occurred between structures, a liner of stone or other suitable material shall be installed in that portion of the channel.
- Sediment accumulated behind the check dams shall be removed as required to allow the channel to drain through the preformed check dam and prevent large flows from carrying sediment over the dam.
- Preformed check dams shall be replaced as needed to maintain the design cross section of the structures.

3. Compost Filter Sock
   - Compost filter sock shall be installed to intercept sediment laden runoff from small drainage areas of disturbed soils. The silt fence also reduces runoff velocity and effects deposition of transported sediment load.
   - Compost filter sock shall be maintained to prevent sediment bypass.
   - Compost filter sock shall be removed when bulges develop, and the sock shall be repaired or replaced when needed.

4. Storm Drain Inlet Protection.
   - A storm drain inlet protection shall be installed around inlets. The purpose is to prevent sediment-laden water from entering inlets to a storm drain system.
   - Inspect the structure after every storm event.
   - Clean the structure when sediment accumulates.
   - Remove sediment when and dispose at a protected location in a manner that will prevent sediment from entering storm drains, ditches or watercourses.
   - Replace any missing stone, check for proper anchoring and secure as necessary.

B. Vegetative Measures.

1. Mulching.
   - Mulching is used to provide initial erosion control while seeding. Mulch can be used alone for temporary stabilization in non-growing months.
   - Apply mulch directly after seeding.
   - Anchor mulch where needed.
   - Re-apply mulch as needed.

2. Seeding.
   - Immediately after completion of grading operations, topsoil shall be replaced and all areas disturbed from grading operations shall be seeded and mulched in an effort to stabilize the site.
   - Temporary stabilization measures (including topsoil, seed and mulch) shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than 14 days after construction activity has ceased.
   - Repair areas where soil erosion occurs.
   - Re-apply seed and mulch after repairs, and in areas where grass does not begin to grow.
   - Where construction activity will resume on a portion of the site within 21 days from when activities ceased, (e.g. the total time period that construction activity is temporarily ceased is less than 21 days) then stabilization measures do not have to be

initiated on that portion of the site by the 14th day after construction activity temporarily ceased.
- Where snow cover precludes the initiation of stabilization measures by the 14th day after construction activity, the area shall be stabilized as soon as possible. Measures shall be taken to eliminate erosion and siltation while the area is covered with snow.

3. Protecting Vegetation.
   - The Contractor shall make every effort to protect trees, shrubs, ground cover and any other vegetation adjacent to the work areas. The purpose of preserving existing vegetation where obtainable is to reduce soil erosion and enhance water quality.
   - Mark trees and other valuable vegetation to be protected with suitable barriers.
   - Place barriers far enough away to avoid contact with tall construction equipment.
   - Avoid hauling over or unnecessarily excavating the root system.
   - Avoid spills of oil, gas and other contaminants near the root system.

4. Topsoiling.
   - Topsoil is required to provide acceptable plant cover growing conditions.
   - Topsoil placed on slopes greater than 5% shall be promptly fertilized, seeded, mulched and "tracked" with suitable equipment.

C. Permanent Structural Measures

1. Stone Check Dams
   - Check dams shall be constructed within dry swales as shown on plans to provide storage volume and to reduce erosion by restricting the flow velocity.
   - Check dams shall be inspected after each runoff event. All damage shall be corrected immediately. If significant erosion has occurred between structures, a liner of stone or other suitable material shall be installed in that portion of the channel.
   - Sediment accumulated behind the check dams shall be removed as required to allow the channel to drain through the stone check dam and prevent large flows from carrying sediment over the dam.
   - Stones shall be replaced as needed to maintain the design cross section of the structures.

3.3 Water Quality & Quantity Controls. Post-construction storm water management practices have been developed with the intention of reducing the risk of increased runoff velocity, erosion and point source discharges once the project has been completed (i.e. there will be no change to hydrology that increases the discharge rate from the site). The post-construction practices that have been developed contain permanent structural and vegetative measures that are intended for soil stabilization, runoff control and sediment control. This project is primarily a redevelopment project with a net increase in impervious cover. Full water quality & quantity controls have been designed for new development areas (new asphalt pavement). Hydraulic calculations are included in Appendix D of this plan.

A. Open Channels

1. Dry Swales (O-1) - The dry swale will be excavated to a depth of 2.0 to 3.0 feet and width of 5.0 feet. The excavated trench will be lined with filter fabric and then backfilled with a permeable media consisting of crushed stone material around a 6" underdrain pipe and NYSDOT Bioretention soil to within 3 inches of proposed finished grade. The crushed stone backfill surrounding the underdrain pipe will be covered with filter fabric

to allow water to infiltrate the dry swale bioretention soil without carrying sediments. The entire detention area surrounding the dry swale will be seeded and mulched. The detention area will hold runoff from a storm event and release it at a reduced rate to avoid affecting downstream properties. The dry swale will act as a filtering device to eliminate sediments from discharging from the site.

- The dry swales shall be inspected periodically for collection of sediments.
- Sediment that accumulates will be periodically removed.

B. Grass Filter Strips will be located between the edge of pavement and dry swales, providing pretreatment for the dry swales.

C. Infiltration

1. Underground Infiltration Chambers (I-4) – Premanufactured infiltration chambers will be constructed below grade to store and infiltrate the water quality volume (WQv) and attenuate peak flow rates. The open bottom chambers will be placed on 6" of crushed stone and backfilled with crushed stone to 6" above the chambers. The bottom of the chambers will be placed 6 to 7 ft below grade. The crushed stone will be covered with geotextile fabric before backfilling to finished grade with approved onsite fill material. Runoff that is directed to the underground infiltration chambers will enter a series of separator rows wrapped in geotextile fabric, providing the required pretreatment volume (25% of WQv for UG SWD #2 and #3, 50% of WQv for UG SWD #1 and #1A). A high flow bypass pipe will be provided at the inlet of the chambers to direct all storm events greater than the water quality storm around the separator rows and into the balance of the chamber system. Each chamber system will have an outlet pipe sized and located in order to control peak flows so that historic rates are maintained.
   - The underground infiltration chambers shall be inspected periodically, and all debris or obstructions shall be removed from the separator rows and infiltration chambers.

D. Stormwater Hotspots. Airports can contain activities that may be classified as a stormwater hotspot per the New York Stormwater Management Design Manual. A stormwater hotspot is defined as a land use or activity that generates higher concentrations of hydrocarbons, trace metals or toxicants than are found in typical stormwater runoff. These types of land uses and activities include fueling stations, service and maintenance facilities, and deicing facilities. The closest catch basin within the project area is 350 ft away from deicing and/or fueling facilities (terminal apron). Most catch basins within the project area are greater than 500 ft away from deicing and/or fueling (terminal apron) areas. Furthermore, the deicing and fueling areas slope/drain away from the project area. Runoff in these "hotspot" areas is collected by a network of catch basins and underground drainage pipes that direct flow to a storage and treatment system before being discharged. There will be no deicing, fueling, or maintenance activities within the project area other than routine turf mowing. This project does not qualify as a "hotspot".

3.4 Storm Water Management. The best approach to storm water management for construction activities is through the use of a self-designed Storm Water Pollution Prevention Plan (SWPPP). The development of the SWPPP through the use of Best Management Practices (BMP) is to prevent erosion and pollutants from the construction materials mixing with storm water runoff and being discharged from the project site. BMP's should be designed to prevent, or at least control, the pollution of storm water before it has a chance to affect receiving waters. Using BMP's in this way improves the discharge water quality.

Specific requirements for management of storm water and maintaining water quality include, but are not limited to:

A. There shall be no increase in turbidity that will cause a substantial visible contrast to natural condition;
B. There shall be no suspended, colloidal, and settleable solids that will cause deposition or impair the waters for their best usages, and;
C. There shall be no residue from oil and floating substances, visible oil film, globules or grease. In addition, local ordinances may affect these Best Management Practices. Any conditions or specific local ordinances are to be included in the development of the BMP's for the project.

The following steps will help ensure proper handling of construction wastes:

A. Contractor shall designate a waste collection area onsite.
B. An adequate number of containers with lids or covers shall be placed in the collection area.
C. When required, containers shall be located in a covered area.
D. Waste collection shall be coordinated when containers are full. If a container does overflow, cleanup shall be performed immediately.

The following steps will help ensure proper handling of hazardous construction products and materials:

A. Check with local waste management authorities to determine what the requirements are for disposing of hazardous materials.
B. Use all of the product before disposing of the container
C. Do not remove the original product label from the container as it contains important information.
D. Surplus products will not be mixed together prior to disposal unless specifically recommended by the manufacturer.
E. The manufacturer's recommended disposal methods, printed on the label, shall be followed.
F. Contaminated soils may be encountered onsite during earthmoving activities or during the cleanup of a spill or leak of a hazardous product. A sample of the contaminated material will require laboratory analysis. Disposal methods will be determined following the review of the analytical results. The excavated material shall be stored in a roll-off. The roll-off shall be covered to prevent precipitation from entering it.
G. Residual concrete remaining in concrete mixing trucks may be emptied or washed onsite. Excess concrete and wash water shall be disposed of in a manner that prevents contact between these materials and storm water which will be discharged from the site. Dikes shall be constructed around the area to contain these materials until they harden, at which time they may be incorporated into the fill on site, or disposed of off-site. Excess concrete, or concrete that does not meet the project specifications shall be handled in a similar manner.

On a construction site, the material storage area can become a major source of risk due to possible mishandling of materials or accidental spills. The following steps will help ensure proper material management:

A. Pesticides will be handled as infrequently as possible. All applicable Federal, State, and local regulations shall be observed when using, handling, or disposing of these materials.
B. Oil, gasoline, and lubricants shall be handled carefully to minimize their exposure to stormwater.
C. Equipment shall be available to contain and clean up petroleum spills in fuel storage areas, and shall be on board maintenance and fueling vehicles.
D. Petroleum products shall be stored in covered areas. Dikes shall be constructed around fuel vehicle storage areas to contain spills.
E. The application of fertilizers shall be limited to the area specified and the minimum recommended application rate.
F. Soil erosion and sediment control practices will reduce the amount of fertilizers that can leave the site in runoff.
G. Use of detergents onsite shall be limited to only that which is essential to perform the work. Wash water containing detergents shall not be discharged to the storm sewer system.
H. Equipment shall be available to contain and clean up spills of hazardous materials in the areas where these materials are stored or used. Spills shall be cleaned up immediately. Materials shall be stored in a dry covered area.
I. Store and handle material to prevent spills. Keep materials in tightly seal containers in a well ventilated area.
J. All containers shall be clearly labeled.
K. Exposure to storm water contact shall be reduced if there is a spill.
L. Cleanup procedures shall be clearly posted.
M. Personnel responsible for responding to a spill of toxic or hazardous materials shall be identified and properly trained, or a private firm that specializes in spill cleanup shall be identified.

3.5 Post Construction Water Quality & Quantity Controls

A. Chapters 3-5 of the NYSDEC Stormwater Management Design Manual (SMDM) provides a green infrastructure approach to stormwater management to reduce a site's impact on the aquatic ecosystem through the use of site planning techniques, runoff reduction techniques, and standard SMP's. Runoff Reduction Volume (RRv) is the reduction of the total Water Quality Volume (WQv) by application of green infrastructure techniques and SMP's to replicate pre-development hydrology.

Outlined below is the NYSDEC SMDM site planning flowchart in relation to this site.

Step 1: Site Planning – Green Infrastructure Method to Preserve Natural Resources and Reduce Impervious Cover

1. Preservation of Undisturbed Areas
    - Site has been previously developed.
2. Preservation of Buffer
    - No natural buffer – project is located on fully developed site on the airport.
3. Reduction of Clearing and Grading
    - N/A-Site is fully developed.
4. Locating Development in Less Sensitive Areas
    - N/A-Site is fully developed.
5. Open Space Design

- The impervious cover has been reduced from existing condition.

6. Soil Restoration
    - Soil restoration will be applied to all landscaped areas.
7. Roadway Reduction
    - Roadway/Taxiway widths and lengths have been minimized to the maximum extent possible while still maintaining the intended use of the site.
8. Sidewalk Reduction
    - There are no sidewalks on this project.
9. Driveway Reduction
    - There are no driveways on this project.
10. Cul-de-sac Reduction
    - This project does not include a cul-de-sac.
11. Building Footprint Reduction
    - Existing buildings will remain.
12. Parking Reduction
    - There is no automobile parking on this project.

Step 2: Water Quality Volume

- This project is a redevelopment project with a net increase in impervious cover. Per Section 9.2.1.A.II of the NYSDEC SWDM 100% WQv is captured and treated, for a minimum of 25% of the disturbed redevelopment impervious area, by implementation of standard SMP or reduced by application of runoff reduction techniques. 100% WQv treatment has been provided for any new impervious areas.

Step 3: Runoff Reduction by Applying Green Infrastructure Techniques and Standard SMPs with RRv Capacity:

- Although encouraged, meeting the RRv sizing criteria is not required for the redevelopment activity portion of a project. The need to provide RRv has been considered separately for each design point. For design points with a net increase in impervious area, RRv has been provided for the increase in impervious area only. For design points with a net decrease in impervious area, RRv is not required for that design point.

B. New York State Department of Environmental Conservation regulations require design of stormwater detention facilities to limit the peak discharge produced by the 10-year and 100-year storm events to the pre-developed runoff rates, as well as provide extended detention of the 1-year, 24-hour storm event (Channel Protection Volume).

- Per the NYSDEC SMDM, Section 9.2.1.C.VI, "If redevelopment activities result in no change to hydrology that increases the discharge rate from the site, the ten-year and hundred-year criteria do not apply"

- Additionally, per Section 9.2.1.C.VII, "Channel protection for redevelopment activities is not required if there are no changes to hydrology that increase the discharge rate from

the project site"

Below is a summary of the pre- versus post-development discharge rates at the three (3) discharge locations. Town of DeWitt code requires that the post-development 100-YR discharge rate does not exceed the pre-development 10-YR discharge rate. This criterion has been met:

DEICE PAD-WEST D8 DRAINAGE AREA TOTAL		
STORM EVENT	EXISTING RUNOFF (CFS)	PROPOSED RUNOFF (CFS)
1-YR	5.58	1.83
10-YR	14.90	4.53
100-YR	27.15	8.93

DEICE PAD-EAST F7 DRAINAGE AREA TOTAL		
STORM EVENT	EXISTING RUNOFF (CFS)	PROPOSED RUNOFF (CFS)
1-YR	10.80	9.57
10-YR	24.32	17.51
100-YR	44.62	32.43

SOUTH E59 DRAINAGE AREA TOTAL		
STORM EVENT	EXISTING RUNOFF (CFS)	PROPOSED RUNOFF (CFS)
1-YR	0.25	0.00
10-YR	5.57	0.00
100-YR	15.79	0.00

TOTAL SITE DISCHARGE (D8 + F7 + E59)		
STORM EVENT	EXISTING RUNOFF (CFS)	PROPOSED RUNOFF (CFS)
1-YR	16.63	11.40
10-YR	44.79	22.04
100-YR	87.56	41.36

3.6 Other Requirements.

A. Any discharges other than storm water must be in compliance with the appropriate SPDES permit (other than this permit).
B. No solid materials, including building materials, shall be discharged to waters of the United States, except as authorized by a federal or state law.
C. All construction activities shall be in compliance with all federal, state and local laws as required.
D. The contractor shall be responsible to insure that the plan has been approved by local officials and any other authorizing agency.

3.7 Inspections. Inspections are important for visually evaluating potential storm water runoff pollution sources at the facility. All projects should be inspected periodically to ensure contaminants are not present in the storm water exiting a project site. On projects which apply for coverage under the SPDES General Permit, qualified professionals of the Owner shall inspect and evaluate the site. Qualified professionals are persons knowledgeable in the principles and practices of erosion and sediment control such as a licensed professional engineer, Certified Professional in Erosion and Sediment Control (CPESC), or a soil scientist.

The Owner shall have a qualified professional conduct an assessment of the site prior to the commencement of construction and certify in an inspection report that the erosion and sediment controls described in the SWPPP have been installed or implemented. Following the commencement of construction, site inspections shall occur at least once every seven calendar days as well as within 24 hours of the end of a rain storm where the total rainfall is 0.5 inches or greater. Where portions of the construction area have been finally stabilized, the inspection of such portions shall be conducted at least once every month, until the entire site is finally stabilized. A copy of the erosion and sediment control inspection checklist has been included in Appendix E.

The Owner shall prepare a written summary of the project status with respect to compliance with the Permit at a minimum frequency of every three months during which coverage under the Permit exists. The summary should address the status of achieving each component of the SWPPP.

The Owner shall post at the site, in a publicly accessible location, a summary of the site inspection activities on a monthly basis.

Each inspection shall, at the minimum, include the following:

- On a site map, indicate the extent of all disturbed site areas and drainage pathways. Indicate site areas that are expected to undergo initial disturbance or significant site work within the next 14-day period.
- Indicate on a site map all areas that have undergone temporary or permanent stabilization.
- Indicate all disturbed site areas that have not undergone active site work during the previous 14-day period.
- Inspect all soil erosion and sediment control practices and record the approximate degree of sediment accumulation as a percentage of the sediment storage volume.
- Inspect all erosion and sediment control practices and record all maintenance requirements such as verifying the integrity of barrier or diversion systems (silt fencing) and containment systems (sediment basins).
- Identify any evidence of rill or gully erosion occurring on slopes and any loss of stabilizing vegetation or seeding/mulching.
- Document any excessive deposition of sediment or ponding water along barriers or diversion systems. Record the depth of sediment within containment structures, any erosion near outlet and overflow structures, and verify the ability of rock filters around perforated riser pipes to pass water.
- Discharge locations shall be inspected to ensure erosion control measures are effective in preventing significant impacts to receiving waters.
- Location where vehicles enter or exit the site shall be inspected for evidence of offsite sediment tracking.

The process for conducting the evaluation shall follow these steps:

- Review the Storm Water Pollution Prevention Plan and draw up a list of any items of concern.
- List all specified control measures and areas covered in the plan.
- Conduct inspections to determine whether all storm water pollution prevention measures are accurately identified in the plan, are in place, and working properly.
- Document findings and inspections in a site log book.

- Modify SWPPP as appropriate. (Note: The plan shall be modified by the contractor and site inspector within 7 days of the inspection).

3.8 Maintenance. The contractor is required to inspect and maintain all soil erosion and sediment controls throughout the duration of the project and until final stabilization of the site. "Final Stabilization" means that all soil disturbing activities at the site have been completed, and that a uniform, perennial vegetative cover with a density of 80% has been obtained.

Maintenance shall include, but not be limited to, repair or replacement of any existing controls, removal of sediment and any other measures deemed necessary, which would reduce soil erosion and sediment runoff. Sediment shall be removed from sediment traps or sediment ponds whenever their capacity has been reduced by fifty percent from the design capacity. Refer to Section 3.2 for maintenance of individual controls.

3.9 Contractors. The Contractor must sign a SWPPP certification form before undertaking any construction activity at the site which requires implementation of the soil erosion and sediment control practices. This certification states that the Contractor has thoroughly read and understands all components of the SWPPP. The Contractor is responsible for any and all subcontractors working on the project. A copy of the Contractor's Certification Form has been included in Appendix F.

4.0 RECORD RETENTION.

A copy of the SWPPP shall be retained at the job site throughout the duration of the project. The Owner shall retain copies of the SWPPP, all reports, and records of data used to complete Notice of Intent (NOI), for three years from the date the site is finally stabilized. The NOI is included in Appendix G.

5.0 NOTICE OF TERMINATION REQUIREMENTS.

Prior to filing an electronic Notice of Termination (eNOT) the Owner shall have a qualified professional perform a final site inspection. The qualified professional shall certify that the site has undergone "Final Stabilization" using either vegetative or structural stabilization methods and that all temporary erosion and sediment controls have been removed. In addition, the qualified professional must certify that the permanent structure(s) have been constructed as described in the SWPPP.

When the project is completed and the site has been stabilized, the Owner must submit an eNOT. A sample copy of the eNOT form has been included in Appendix E. The most current version of the eNOT shall be submitted by the Engineer and uploaded via the online portal.

APPENDIX A

NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity (GP-0-25-001)

Link to Permit:
https://dec.ny.gov/sites/default/files/2025-01/permit_swdischargesfromconst.pdf

APPENDIX B

LOCATION PLAN
(See Sheet GI001 of Contract Drawings)

GENERAL PLAN
(See Sheet GI101 of Contract Drawings)

SOIL EROSION CONTROL PLANS
(See Sheet's CE100 – CE105 of Contract Drawings)

GRADING PLANS
(See Sheet's CG100 – CG104 of Contract Drawings)

DRAINAGE AND UTILITY PLANS
(See Sheet's CU100 – CU104 of Contract Drawings)

SOIL EROSION CONTROL DETAILS
(See Sheet CE501 of Contract Drawings)

DRAINAGE & STORMWATER MANAGEMENT SYSTEM DETAILS
(See Sheet's CU401 – CU510 of Contract Drawings)

APPENDIX C

SOILS INFORMATION

Custom Soil Resource Report
Map—Hydrologic Soil Group



Map Scale: 1:7,880 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 350 700 1400 2100

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Onondaga County, New York
Survey Area Data: Version 17, Sep 10, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 3, 2021—Nov 7, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
AlA	Alton gravelly fine sandy loam, 0 to 3 percent slopes	A	2.6	0.8%
AlB	Alton gravelly fine sandy loam, 3 to 8 percent slopes	A	3.8	1.1%
CFL	Cut and fill land	A	13.3	4.1%
CrB	Croghan loamy fine sand, 0 to 6 percent slopes	A/D	116.0	35.3%
Lm	Lamson very fine sandy loam	A/D	7.4	2.3%
MtA	Minoa fine sandy loam, 0 to 2 percent slopes	B/D	17.1	5.2%
Na	Naumburg loamy fine sand	A/D	103.0	31.4%
Ub	Urban land		65.0	19.8%
Totals for Area of Interest			**328.2**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

APPENDIX D

STORM WATER MANAGEMENT CALCULATIONS

Step 2 - Calculate Water Quality Volume

Is this project subject to Section 4.3 of the NYS Design Manual for Enhanced Phosphorus Removal?			Yes
What is the nature of this construction project?			Redevelopment with increase in impervious area
Design Point:	1, 2, 3, 4, 5		
P=	2.00	inches	*Enter 1 Year 24 Hour Design Storm as P*

Calculate Required WQv

Drainage Area Number	Contributing Area (Acres)	Impervious Area (Acres)	Percent Impervious %	Rv	WQv (cf)	SMP Description
1	7.89	3.16	40	0.41	23,495	Underground Infiltration System
2	3.41	2.60	76	0.74	18,226	Underground Infiltration System
3	6.75	5.22	77	0.75	36,558	Underground Infiltration System
4	1.26	0.36	28	0.30	2,777	Dry Swale
5	1.55	0.56	36	0.38	4,222	Dry Swale
6	1.31	0.89	68	0.66	6,274	Dry Swale
7	1.19	0.91	76	0.74	6,382	Dry Swale
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
Total	23.36	13.69	59	0.58	**97934**	**Required WQv** **2.25** **af**

Steps 3 and 5 - Apply RR Techniques and Standard SMPs

Runoff Reduction Volume and Treated Volumes						
	Runoff Reduction Techiques/Standard SMPs		**Total Contributing Area**	**Total Contributing Impervious Area**	**WQv Reduced (RRv)**	**WQv Treated**
			(acres)	**(acres)**	**(cf)**	**(cf)**
RR Techniques	Conservation of Natural Areas	RR-1	0.00		0	
	Sheet Flow to Riparian Buffer/Filter Strip	RR-2	0.00	0.00	0	
	Tree Planting/Tree Pit/Tree Trench	RR-3	0.00	0.00	0	
	Disconnection of Rooftop Runoff	RR-4		0.00	0	
	Vegetated Swale	RR-5	0.00	0.00	0	
	Rain Garden	RR-6	0.00	0.00	0	
	Stormwater Planter	RR-7	0.00	0.00	0	
	Rainwater Harvesting Systems	RR-8	0.00	0.00	0	
	Porous Pavement	RR-9	0.00	0.00	0	
	Green Roof (Extensive & Intensive)	RR-10	0.00	0.00	0	
	Stream Daylighting	RR-11				
Standard SMPs w/ RRv Capacity	Infiltration Trench	I-1	0.00	0.00	0	0
	Infiltration Basin	I-2	0.00	0.00	0	0
	Dry Well	I-3	0.00	0.00	0	0
	Underground Infiltration System	I-4	18.05	10.98	78,279	0
	Infiltration Bioretention	F-4	0.00	0.00	0	0
	Filtration Bioretention	F-5	0.00	0.00	0	0
	Bioslope	F-6	0.00	0.00	0	0
	Dry swale	O-1	2.81	0.92	7,862	11,793
Standard SMPs	Micropool Extended Detention	P-1	0.00	0.00		0
	Wet Pond	P-2	0.00	0.00		0
	Wet Extended Detention	P-3	0.00	0.00		0
	Multiple Pond System	P-4	0.00	0.00		0
	Shallow Wetland	W-1	0.00	0.00		0
	Extended Detention Shallow Wetland	W-2	0.00	0.00		0
	Pond/Wetland System	W-3	0.00	0.00		0
	Pocket Wetland	W-4	0.00	0.00		0
	Gravel Wetland	W-5	0.00	0.00		0
	Surface Sand Filter	F-1	0.00	0.00		0
	Underground Sand Filter	F-2	0.00	0.00		0
	Perimeter Sand Filter	F-3	0.00	0.00		0
	Wet Swale	O-2	0.00	0.00		0
Alt. SMPs	Flow Based Alternative Practice	-	0.00	0.00		0
	Volume Based Alternative Practice	-				
	Totals by RR Technique →		0.00	0.00	0	
	Totals by Standard SMP w/RRV →		20.86	11.89	86,141	11,793
	Totals by Standard SMP →		0.00	0.00		0
	Totals by Alternative SMP →		0.00	0.00		0
	Totals (RR Techniques + all SMPs) →		20.86	11.89	86,141	11,793

Step 4 - Calcuate Minimum RRv Required

Enter the Soils Data for the site		
Hydrologic Soil Group	Acres	S
A	13.69	55%
B		40%
C		30%
D		20%
Total Area	13.69	

Calculate the Minimum RRv		
S =	**0.55**	
Impervious =	13.69	*acres*
Precipitation	2.00	*inches*
Rv	0.95	
Minimum RRv	**1.192**	***af***
	51924	cf

Underground Infiltration (I-4)

Design Point:	1, 2, 3, 4, 5

Enter Site Data For Drainage Area to be Treated by Practice							
Drainage Area Number	**Contributing Area** (Acres)	**Impervious Area** (Acres)	**Percent Impervious** %	**Rv**	**WQv** (cf)	**Precipitation** (in)	**Description**
1	7.89	3.16	40	0.41	23,495	2.00	Underground Infiltration System

Design Criteria		
Enter underlying soil infiltration rate (based on geotechnical testing, refer to Appendix D)	13	
Is the contributing area to the practice an "Infiltration Restricted" stormwater hotspot?	No	
Is the contributing area to the practice an "Infiltration Prohibited" stormwater hotspot?	No	
Is the contributing area greater than 10 acres?	No	
Enter depth to seasonal high water table (ft)	8	
Enter depth to bedrock (ft)	15	
Enter pretreatment volume provided (cf)	11747.5	

Sizing Criteria				
		Value	Units	Notes
Water Quality Volume	WQv	23495	cf	
Depth of Bottom Stone	db	2.2	ft	
Required Surface Area	Ab	10,928	sf	
Enter Surface Area Provided	Ab	11083.4625	sf	
Enter Volume of Stone	Vs	9,658.50	cf	Volume of stone shall account for 40% voids
Enter Volume of System	Vsys	14,645.90	cf	Volume of system shall exclude stone
Water Quality Volume Provided	WQv	24304.4	cf	

Determine Runoff Reduction		
RRv Provided	**23,495**	***cf***

Underground Infiltration (I-4)

Design Point:	1, 2, 3, 4, 5

Enter Site Data For Drainage Area to be Treated by Practice							
Drainage Area Number	**Contributing Area** (Acres)	**Impervious Area** (Acres)	**Percent Impervious** %	**Rv**	**WQv** (cf)	**Precipitation** (in)	**Description**
2	3.41	2.60	76		18,226	2.00	Underground Infiltration System

Design Criteria		
Enter underlying soil infiltration rate (based on geotechnical testing, refer to Appendix D)	9.25	
Is the contributing area to the practice an "Infiltration Restricted" stormwater hotspot?	No	
Is the contributing area to the practice an "Infiltration Prohibited" stormwater hotspot?	No	
Is the contributing area greater than 10 acres?	No	
Enter depth to seasonal high water table (ft)	6	
Enter depth to bedrock (ft)	15	
Enter pretreatment volume provided (cf)	4556.5	

Sizing Criteria				
		Value	Units	Notes
Water Quality Volume	WQv	18226	cf	
Depth of Bottom Stone	db	2.2	ft	
Required Surface Area	Ab	8,380	sf	
Enter Surface Area Provided	Ab	8395.5	sf	
Enter Volume of Stone	Vs	7412.7	cf	Volume of stone shall account for 40% voids
Enter Volume of System	Vsys	10852.5	cf	Volume of system shall exclude stone
Water Quality Volume Provided	WQv	18265.2	cf	

Determine Runoff Reduction		
RRv Provided	**18,226**	***cf***

Underground Infiltration (I-4)

Design Point:	1, 2, 3, 4, 5

Enter Site Data For Drainage Area to be Treated by Practice							
Drainage Area Number	**Contributing Area** (Acres)	**Impervious Area** (Acres)	**Percent Impervious** %	**Rv**	**WQv** (cf)	**Precipitation** (in)	**Description**
3	6.75	5.22	77	0.00	36,558	2.00	Underground Infiltration System

Design Criteria		
Enter underlying soil infiltration rate (based on geotechnical testing, refer to Appendix D)	9.25	
Is the contributing area to the practice an "Infiltration Restricted" stormwater hotspot?	No	
Is the contributing area to the practice an "Infiltration Prohibited" stormwater hotspot?	No	
Is the contributing area greater than 10 acres?	No	
Enter depth to seasonal high water table (ft)	6	
Enter depth to bedrock (ft)	15	
Enter pretreatment volume provided (cf)	9139.5	

Sizing Criteria				
		Value	Units	Notes
Water Quality Volume	WQv	36558	cf	
Depth of Bottom Stone	db	2.2	ft	
Required Surface Area	Ab	16,617	sf	
Enter Surface Area Provided	Ab	16785.405	sf	
Enter Volume of Stone	Vs	14,595.90	cf	Volume of stone shall account for 40% voids
Enter Volume of System	Vsys	22,259.90	cf	Volume of system shall exclude stone
Water Quality Volume Provided	WQv	36855.8	cf	

Determine Runoff Reduction		
RRv Provided	**36,558**	***cf***

Dry Swale (O-1)

Design Point:	1, 2, 3, 4, 5

Enter Site Data For Drainage Area to be Treated by Practice							
Drainage Area Number	**Contributing Area** (Acres)	**Impervious Area** (Acres)	**Percent Impervious** %	**Rv**	**WQv** (ft^3)	**Precipitation** (in)	**Description**
4	1.26	0.36	28	0.30	2,777	2.00	Dry Swale

Design Criteria		
Select HSG	A	
Is the contributing area to the practice a designated hotspot?	No	
Is the practice the first in series for treatment of a Level 1 (Infiltration Restricted) hotspot?	No	
Is contributing area greater than 5 acres?	No	
Enter depth to seasonal high water table (ft)	6	
Enter depth to bedrock (ft)	15	
Enter pretreatment volume provided (cf)	277.7	
Enter depth of filter media (inches)	30	
Enter depth of drainage layer (inches)	36	
Is an underdrain proposed?	Yes	

Sizing Criteria				
		Value	Units	Notes
Enter Bottom Width	b	5.00	ft	
Enter Side Slopes	X:1	5.00	:1	
WQv Maximum Flow Depth	d	1.80	ft	
WQv Flow Top Width	Wwqv	23.00	ft	
Channel Area	Awqv	25.20	sf	
Required Channel Length	Lr	111.00	ft	
Enter Provided Channel Length	Lp	134.00	ft	
Channel Volume Provided	Vc	3376.80	cf	
Enter Check Dam Height	Ch	1.00	ft	
Check Dam Spacing	Cs	200.00	ft	
Number of Check Dams Required	C	1.00		
2-yr 24-hr Flow Depth	d2	1.21	ft	
2-yr Storm Flow Top Width	W2	17.10	ft	
Area of 2-yr 24-hr Flow	A2	13.37	sf	
2-yr Wetted Perimeter	Pw2	20.03	ft	
Enter Mannings Coef.	n	0.10		
Enter Longitudinal Slope	S	0.01	ft/ft	
2-yr Velocity	V	0.81	fps	
Enter 10-yr Freeboard		0.50	ft	

Determine Runoff Reduction			
RRv Provided	**1,111**	***cf***	
WQv Treated	***1,666***	***cf***	This is the portion of the WQv that is not reduced/infiltrated

Dry Swale (O-1)

Design Point:	1, 2, 3, 4, 5

Enter Site Data For Drainage Area to be Treated by Practice							
Drainage Area Number	**Contributing Area** (Acres)	**Impervious Area** (Acres)	**Percent Impervious** %	**Rv**	**WQv** (ft^3)	**Precipitation** (in)	**Description**
5	1.55	0.56	36	0.38	4,222	2.00	Dry Swale

Design Criteria		
Select HSG	A	
Is the contributing area to the practice a designated hotspot?	No	
Is the practice the first in series for treatment of a Level 1 (Infiltration Restricted) hotspot?	No	
Is contributing area greater than 5 acres?	No	
Enter depth to seasonal high water table (ft)	8	
Enter depth to bedrock (ft)	15	
Enter pretreatment volume provided (cf)	422.2	
Enter depth of filter media (inches)	30	
Enter depth of drainage layer (inches)	36	
Is an underdrain proposed?	Yes	

Sizing Criteria				
		Value	Units	Notes
Enter Bottom Width	b	5.00	ft	
Enter Side Slopes	X:1	5.00	:1	
WQv Maximum Flow Depth	d	2.00	ft	
WQv Flow Top Width	Wwqv	25.00	ft	
Channel Area	Awqv	30.00	sf	
Required Channel Length	Lr	141.00	ft	
Enter Provided Channel Length	Lp	142.00	ft	
Channel Volume Provided	Vc	4260.00	cf	
Enter Check Dam Height	Ch	1.00	ft	
Check Dam Spacing	Cs	200.00	ft	
Number of Check Dams Required	C	1.00		
2-yr 24-hr Flow Depth	d2	0.30	ft	
2-yr Storm Flow Top Width	W2	8.00	ft	
Area of 2-yr 24-hr Flow	A2	1.95	sf	
2-yr Wetted Perimeter	Pw2	8.18	ft	
Enter Mannings Coef.	n	0.10		
Enter Longitudinal Slope	S	0.01	ft/ft	
2-yr Velocity	V	0.41	fps	
Enter 10-yr Freeboard		0.50	ft	

Determine Runoff Reduction			
RRv Provided	**1,689**	***cf***	
WQv Treated	***2,533***	***cf***	This is the portion of the WQv that is not reduced/infiltrated

Dry Swale (O-1)

Design Point:	1, 2, 3, 4, 5

Enter Site Data For Drainage Area to be Treated by Practice							
Drainage Area Number	**Contributing Area** (Acres)	**Impervious Area** (Acres)	**Percent Impervious** %	**Rv**	**WQv** (ft^3)	**Precipitation** (in)	**Description**
6	1.31	0.89	68	0.66	6,274	2.00	Dry Swale

Design Criteria		
Select HSG	A	
Is the contributing area to the practice a designated hotspot?	No	
Is the practice the first in series for treatment of a Level 1 (Infiltration Restricted) hotspot?	No	
Is contributing area greater than 5 acres?	No	
Enter depth to seasonal high water table (ft)	8	
Enter depth to bedrock (ft)	15	
Enter pretreatment volume provided (cf)	627.4	
Enter depth of filter media (inches)	30	
Enter depth of drainage layer (inches)	36	
Is an underdrain proposed?	Yes	

Sizing Criteria				
		Value	Units	Notes
Enter Bottom Width	b	5.00	ft	
Enter Side Slopes	X:1	5.00	:1	
WQv Maximum Flow Depth	d	2.00	ft	
WQv Flow Top Width	Wwqv	25.00	ft	
Channel Area	Awqv	30.00	sf	
Required Channel Length	Lr	210.00	ft	
Enter Provided Channel Length	Lp	210.00	ft	
Channel Volume Provided	Vc	6300.00	cf	
Enter Check Dam Height	Ch	1.00	ft	
Check Dam Spacing	Cs	100.00	ft	
Number of Check Dams Required	C	3.00		
2-yr 24-hr Flow Depth	d2	0.02	ft	
2-yr Storm Flow Top Width	W2	5.20	ft	
Area of 2-yr 24-hr Flow	A2	0.10	sf	
2-yr Wetted Perimeter	Pw2	5.20	ft	
Enter Mannings Coef.	n	0.10		
Enter Longitudinal Slope	S	0.01	ft/ft	
2-yr Velocity	V	0.11	fps	
Enter 10-yr Freeboard		0.50	ft	

Determine Runoff Reduction			
RRv Provided	**2,510**	***cf***	
WQv Treated	***3,764***	***cf***	This is the portion of the WQv that is not reduced/infiltrated

Dry Swale (O-1)

Design Point:	1, 2, 3, 4, 5

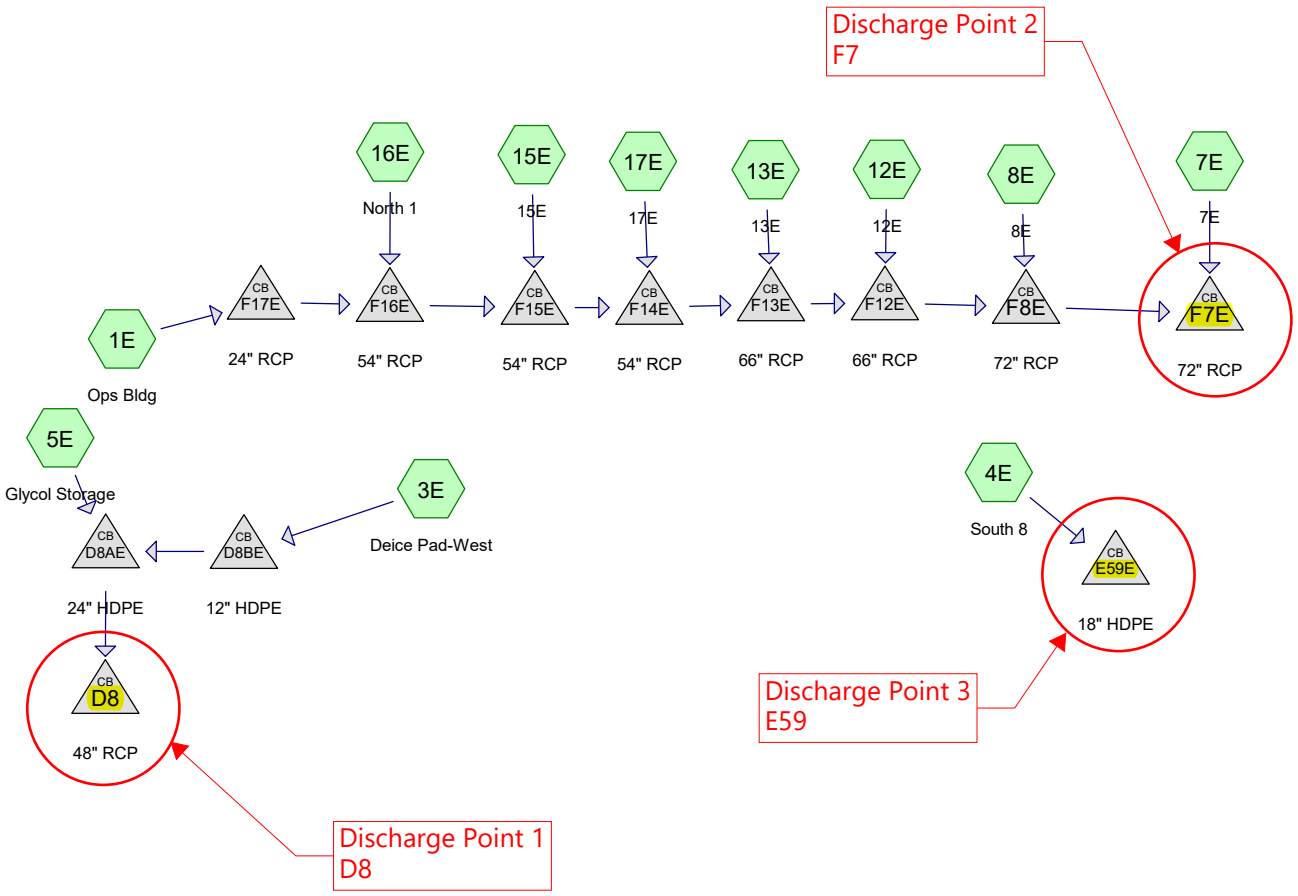
Enter Site Data For Drainage Area to be Treated by Practice							
Drainage Area Number	**Contributing Area** (Acres)	**Impervious Area** (Acres)	**Percent Impervious** %	**Rv**	**WQv** (ft^3)	**Precipitation** (in)	**Description**
7	1.19	0.91	76	0.74	6,382	2.00	Dry Swale

Design Criteria		
Select HSG	A	
Is the contributing area to the practice a designated hotspot?	No	
Is the practice the first in series for treatment of a Level 1 (Infiltration Restricted) hotspot?	No	
Is contributing area greater than 5 acres?	No	
Enter depth to seasonal high water table (ft)	8	
Enter depth to bedrock (ft)	15	
Enter pretreatment volume provided (cf)	638.2	
Enter depth of filter media (inches)	30	
Enter depth of drainage layer (inches)	36	
Is an underdrain proposed?	Yes	

Sizing Criteria				
		Value	Units	Notes
Enter Bottom Width	b	5.00	ft	
Enter Side Slopes	X:1	5.00	:1	
WQv Maximum Flow Depth	d	2.00	ft	
WQv Flow Top Width	Wwqv	25.00	ft	
Channel Area	Awqv	30.00	sf	
Required Channel Length	Lr	213.00	ft	
Enter Provided Channel Length	Lp	214.00	ft	
Channel Volume Provided	Vc	6420.00	cf	
Enter Check Dam Height	Ch	1.00	ft	
Check Dam Spacing	Cs	200.00	ft	
Number of Check Dams Required	C	2.00		
2-yr 24-hr Flow Depth	d2	1.13	ft	
2-yr Storm Flow Top Width	W2	16.30	ft	
Area of 2-yr 24-hr Flow	A2	12.03	sf	
2-yr Wetted Perimeter	Pw2	18.85	ft	
Enter Mannings Coef.	n	0.10		
Enter Longitudinal Slope	S	0.01	ft/ft	
2-yr Velocity	V	0.79	fps	
Enter 10-yr Freeboard		0.50	ft	

Determine Runoff Reduction			
RRv Provided	**2,553**	***cf***	
WQv Treated	***3,829***	***cf***	This is the portion of the WQv that is not reduced/infiltrated

EXISTING



Subcat Reach Pond Link

EXISTING

Routing Diagram for SYR Deice Pad

Prepared by C&S Companies, Printed 4/13/2026

HydroCAD® 10.20-7a s/n 02837 © 2025 HydroCAD Software Solutions LLC

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-Yr, 24-Hr	Type II 24-hr		Default	24.00	1	2.04	2
2	10-Yr, 24-Hr	Type II 24-hr		Default	24.00	1	3.45	2
3	100-Yr, 24-Hr	Type II 24-hr		Default	24.00	1	5.13	2

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1E: Ops Bldg Runoff Area=1.550 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=318' Tc=8.9 min CN=39 Runoff=0.00 cfs 0.000 af

Subcatchment 3E: Deice Pad-West Runoff Area=4.810 ac 70.48% Impervious Runoff Depth=0.63"
Tc=5.0 min CN=81 Runoff=5.58 cfs 0.253 af

Subcatchment 4E: South 8 Runoff Area=6.350 ac 40.63% Impervious Runoff Depth=0.11"
Flow Length=667' Tc=9.0 min CN=63 Runoff=0.25 cfs 0.059 af

Subcatchment 5E: Glycol Storage Runoff Area=1.191 ac 11.25% Impervious Runoff Depth=0.00"
Flow Length=100' Slope=0.0100 '/' Tc=15.0 min UI Adjusted CN=42 Runoff=0.00 cfs 0.000 af

Subcatchment 7E: 7E Runoff Area=1.540 ac 12.99% Impervious Runoff Depth=0.00"
Tc=20.0 min CN=47 Runoff=0.00 cfs 0.000 af

Subcatchment 8E: 8E Runoff Area=3.200 ac 45.00% Impervious Runoff Depth=0.17"
Tc=20.0 min CN=66 Runoff=0.23 cfs 0.044 af

Subcatchment 12E: 12E Runoff Area=1.730 ac 64.74% Impervious Runoff Depth=0.47"
Tc=10.0 min CN=77 Runoff=1.15 cfs 0.068 af

Subcatchment 13E: 13E Runoff Area=0.700 ac 100.00% Impervious Runoff Depth=1.81"
Tc=5.0 min CN=98 Runoff=2.05 cfs 0.106 af

Subcatchment 15E: 15E Runoff Area=1.220 ac 100.00% Impervious Runoff Depth=1.81"
Tc=5.0 min CN=98 Runoff=3.58 cfs 0.184 af

Subcatchment 16E: North 1 Runoff Area=1.550 ac 96.77% Impervious Runoff Depth=1.61"
Tc=5.0 min CN=96 Runoff=4.27 cfs 0.208 af

Subcatchment 17E: 17E Runoff Area=4.100 ac 45.12% Impervious Runoff Depth=0.17"
Tc=10.0 min CN=66 Runoff=0.47 cfs 0.057 af

Pond D8: 48" RCP Peak Elev=403.21' Inflow=5.58 cfs 0.253 af
48.0" Round Culvert n=0.015 L=272.0' S=0.0058 '/' Outflow=5.58 cfs 0.253 af

Pond D8AE: 24" HDPE Peak Elev=408.09' Inflow=5.58 cfs 0.253 af
24.0" Round Culvert n=0.013 L=114.0' S=0.0233 '/' Outflow=5.58 cfs 0.253 af

Pond D8BE: 12" HDPE Peak Elev=412.82' Inflow=5.58 cfs 0.253 af
12.0" Round Culvert n=0.013 L=100.0' S=0.0208 '/' Outflow=5.58 cfs 0.253 af

Pond E59E: 18" HDPE Peak Elev=407.61' Inflow=0.25 cfs 0.059 af
18.0" Round Culvert n=0.013 L=57.0' S=0.0168 '/' Outflow=0.25 cfs 0.059 af

Pond F12E: 66" RCP Peak Elev=400.59' Inflow=10.79 cfs 0.623 af
66.0" Round Culvert n=0.015 L=301.0' S=0.0018 '/' Outflow=10.79 cfs 0.623 af

Pond F13E: 66" RCP Peak Elev=401.77' Inflow=9.98 cfs 0.555 af
66.0" Round Culvert n=0.015 L=215.0' S=0.0066 '/' Outflow=9.98 cfs 0.555 af

Pond F14E: 54" RCP Peak Elev=402.48' Inflow=7.93 cfs 0.449 af
54.0" Round Culvert n=0.015 L=128.0' S=0.0049 '/' Outflow=7.93 cfs 0.449 af

Pond F15E: 54" RCP Peak Elev=403.36' Inflow=7.85 cfs 0.393 af
54.0" Round Culvert n=0.015 L=132.0' S=0.0069 '/' Outflow=7.85 cfs 0.393 af

Pond F16E: 54" RCP Peak Elev=404.63' Inflow=4.27 cfs 0.208 af
54.0" Round Culvert n=0.015 L=291.0' S=0.0052 '/' Outflow=4.27 cfs 0.208 af

Pond F17E: 24" RCP Peak Elev=411.87' Inflow=0.00 cfs 0.000 af
24.0" Round Culvert n=0.015 L=63.0' S=0.0138 '/' Outflow=0.00 cfs 0.000 af

Pond F7E: 72" RCP Peak Elev=398.35' Inflow=10.80 cfs 0.667 af
72.0" Round Culvert n=0.015 L=333.0' S=0.0017 '/' Outflow=10.80 cfs 0.667 af

Pond F8E: 72" RCP Peak Elev=399.87' Inflow=10.80 cfs 0.667 af
72.0" Round Culvert n=0.015 L=1,062.0' S=0.0013 '/' Outflow=10.80 cfs 0.667 af

Total Runoff Area = 27.941 ac Runoff Volume = 0.978 af Average Runoff Depth = 0.42"
49.41% Pervious = 13.807 ac 50.59% Impervious = 14.134 ac

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1E: Ops Bldg Runoff Area=1.550 ac 0.00% Impervious Runoff Depth=0.01"
Flow Length=318' Tc=8.9 min CN=39 Runoff=0.00 cfs 0.001 af

Subcatchment 3E: Deice Pad-West Runoff Area=4.810 ac 70.48% Impervious Runoff Depth=1.67"
Tc=5.0 min CN=81 Runoff=14.90 cfs 0.669 af

Subcatchment 4E: South 8 Runoff Area=6.350 ac 40.63% Impervious Runoff Depth=0.64"
Flow Length=667' Tc=9.0 min CN=63 Runoff=5.57 cfs 0.336 af

Subcatchment 5E: Glycol Storage Runoff Area=1.191 ac 11.25% Impervious Runoff Depth=0.03"
Flow Length=100' Slope=0.0100 '/' Tc=15.0 min UI Adjusted CN=42 Runoff=0.00 cfs 0.003 af

Subcatchment 7E: 7E Runoff Area=1.540 ac 12.99% Impervious Runoff Depth=0.11"
Tc=20.0 min CN=47 Runoff=0.02 cfs 0.015 af

Subcatchment 8E: 8E Runoff Area=3.200 ac 45.00% Impervious Runoff Depth=0.77"
Tc=20.0 min CN=66 Runoff=2.35 cfs 0.206 af

Subcatchment 12E: 12E Runoff Area=1.730 ac 64.74% Impervious Runoff Depth=1.39"
Tc=10.0 min CN=77 Runoff=3.70 cfs 0.201 af

Subcatchment 13E: 13E Runoff Area=0.700 ac 100.00% Impervious Runoff Depth=3.22"
Tc=5.0 min CN=98 Runoff=3.53 cfs 0.188 af

Subcatchment 15E: 15E Runoff Area=1.220 ac 100.00% Impervious Runoff Depth=3.22"
Tc=5.0 min CN=98 Runoff=6.15 cfs 0.327 af

Subcatchment 16E: North 1 Runoff Area=1.550 ac 96.77% Impervious Runoff Depth=3.00"
Tc=5.0 min CN=96 Runoff=7.61 cfs 0.387 af

Subcatchment 17E: 17E Runoff Area=4.100 ac 45.12% Impervious Runoff Depth=0.77"
Tc=10.0 min CN=66 Runoff=4.45 cfs 0.264 af

Pond D8: 48" RCP Peak Elev=403.80' Inflow=14.90 cfs 0.672 af
48.0" Round Culvert n=0.015 L=272.0' S=0.0058 '/' Outflow=14.90 cfs 0.672 af

Pond D8AE: 24" HDPE Peak Elev=409.03' Inflow=14.90 cfs 0.672 af
24.0" Round Culvert n=0.013 L=114.0' S=0.0233 '/' Outflow=14.90 cfs 0.672 af

Pond D8BE: 12" HDPE Peak Elev=434.99' Inflow=14.90 cfs 0.669 af
12.0" Round Culvert n=0.013 L=100.0' S=0.0208 '/' Outflow=14.90 cfs 0.669 af

Pond E59E: 18" HDPE Peak Elev=408.58' Inflow=5.57 cfs 0.336 af
18.0" Round Culvert n=0.013 L=57.0' S=0.0168 '/' Outflow=5.57 cfs 0.336 af

Pond F12E: 66" RCP Peak Elev=401.26' Inflow=23.51 cfs 1.368 af
66.0" Round Culvert n=0.015 L=301.0' S=0.0018 '/' Outflow=23.51 cfs 1.368 af

Pond F13E: 66" RCP Peak Elev=402.25' Inflow=20.39 cfs 1.167 af
66.0" Round Culvert n=0.015 L=215.0' S=0.0066 '/' Outflow=20.39 cfs 1.167 af

Pond F14E: 54" RCP Peak Elev=403.02' Inflow=16.90 cfs 0.979 af
54.0" Round Culvert n=0.015 L=128.0' S=0.0049 '/' Outflow=16.90 cfs 0.979 af

Pond F15E: 54" RCP Peak Elev=403.71' Inflow=13.76 cfs 0.715 af
54.0" Round Culvert n=0.015 L=132.0' S=0.0069 '/' Outflow=13.76 cfs 0.715 af

Pond F16E: 54" RCP Peak Elev=404.89' Inflow=7.61 cfs 0.388 af
54.0" Round Culvert n=0.015 L=291.0' S=0.0052 '/' Outflow=7.61 cfs 0.388 af

Pond F17E: 24" RCP Peak Elev=411.88' Inflow=0.00 cfs 0.001 af
24.0" Round Culvert n=0.015 L=63.0' S=0.0138 '/' Outflow=0.00 cfs 0.001 af

Pond F7E: 72" RCP Peak Elev=399.04' Inflow=24.32 cfs 1.588 af
72.0" Round Culvert n=0.015 L=333.0' S=0.0017 '/' Outflow=24.32 cfs 1.588 af

Pond F8E: 72" RCP Peak Elev=400.60' Inflow=24.32 cfs 1.574 af
72.0" Round Culvert n=0.015 L=1,062.0' S=0.0013 '/' Outflow=24.32 cfs 1.574 af

Total Runoff Area = 27.941 ac Runoff Volume = 2.597 af Average Runoff Depth = 1.12"
49.41% Pervious = 13.807 ac 50.59% Impervious = 14.134 ac

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1E: Ops Bldg Runoff Area=1.550 ac 0.00% Impervious Runoff Depth=0.23"
Flow Length=318' Tc=8.9 min CN=39 Runoff=0.07 cfs 0.029 af

Subcatchment 3E: Deice Pad-West Runoff Area=4.810 ac 70.48% Impervious Runoff Depth=3.10"
Tc=5.0 min CN=81 Runoff=27.15 cfs 1.243 af

Subcatchment 4E: South 8 Runoff Area=6.350 ac 40.63% Impervious Runoff Depth=1.59"
Flow Length=667' Tc=9.0 min CN=63 Runoff=15.79 cfs 0.842 af

Subcatchment 5E: Glycol Storage Runoff Area=1.191 ac 11.25% Impervious Runoff Depth=0.35"
Flow Length=100' Slope=0.0100 '/' Tc=15.0 min UI Adjusted CN=42 Runoff=0.17 cfs 0.034 af

Subcatchment 7E: 7E Runoff Area=1.540 ac 12.99% Impervious Runoff Depth=0.58"
Tc=20.0 min CN=47 Runoff=0.56 cfs 0.075 af

Subcatchment 8E: 8E Runoff Area=3.200 ac 45.00% Impervious Runoff Depth=1.82"
Tc=20.0 min CN=66 Runoff=6.23 cfs 0.484 af

Subcatchment 12E: 12E Runoff Area=1.730 ac 64.74% Impervious Runoff Depth=2.73"
Tc=10.0 min CN=77 Runoff=7.28 cfs 0.394 af

Subcatchment 13E: 13E Runoff Area=0.700 ac 100.00% Impervious Runoff Depth=4.89"
Tc=5.0 min CN=98 Runoff=5.28 cfs 0.285 af

Subcatchment 15E: 15E Runoff Area=1.220 ac 100.00% Impervious Runoff Depth=4.89"
Tc=5.0 min CN=98 Runoff=9.20 cfs 0.497 af

Subcatchment 16E: North 1 Runoff Area=1.550 ac 96.77% Impervious Runoff Depth=4.66"
Tc=5.0 min CN=96 Runoff=11.53 cfs 0.602 af

Subcatchment 17E: 17E Runoff Area=4.100 ac 45.12% Impervious Runoff Depth=1.82"
Tc=10.0 min CN=66 Runoff=11.33 cfs 0.621 af

Pond D8: 48" RCP Peak Elev=404.38' Inflow=27.15 cfs 1.277 af
48.0" Round Culvert n=0.015 L=272.0' S=0.0058 '/' Outflow=27.15 cfs 1.277 af

Pond D8AE: 24" HDPE Peak Elev=411.29' Inflow=27.15 cfs 1.277 af
24.0" Round Culvert n=0.013 L=114.0' S=0.0233 '/' Outflow=27.15 cfs 1.277 af

Pond D8BE: 12" HDPE Peak Elev=495.14' Inflow=27.15 cfs 1.243 af
12.0" Round Culvert n=0.013 L=100.0' S=0.0208 '/' Outflow=27.15 cfs 1.243 af

Pond E59E: 18" HDPE Peak Elev=411.58' Inflow=15.79 cfs 0.842 af
18.0" Round Culvert n=0.013 L=57.0' S=0.0168 '/' Outflow=15.79 cfs 0.842 af

Pond F12E: 66" RCP Peak Elev=401.97' Inflow=41.45 cfs 2.429 af
66.0" Round Culvert n=0.015 L=301.0' S=0.0018 '/' Outflow=41.45 cfs 2.429 af

Pond F13E: 66" RCP Peak Elev=402.78' Inflow=35.01 cfs 2.035 af
66.0" Round Culvert n=0.015 L=215.0' S=0.0066 '/' Outflow=35.01 cfs 2.035 af

Pond F14E: 54" RCP Peak Elev=403.61' Inflow=29.83 cfs 1.750 af
54.0" Round Culvert n=0.015 L=128.0' S=0.0049 '/' Outflow=29.83 cfs 1.750 af

Pond F15E: 54" RCP Peak Elev=404.05' Inflow=20.72 cfs 1.129 af
54.0" Round Culvert n=0.015 L=132.0' S=0.0069 '/' Outflow=20.72 cfs 1.129 af

Pond F16E: 54" RCP Peak Elev=405.13' Inflow=11.53 cfs 0.631 af
54.0" Round Culvert n=0.015 L=291.0' S=0.0052 '/' Outflow=11.53 cfs 0.631 af

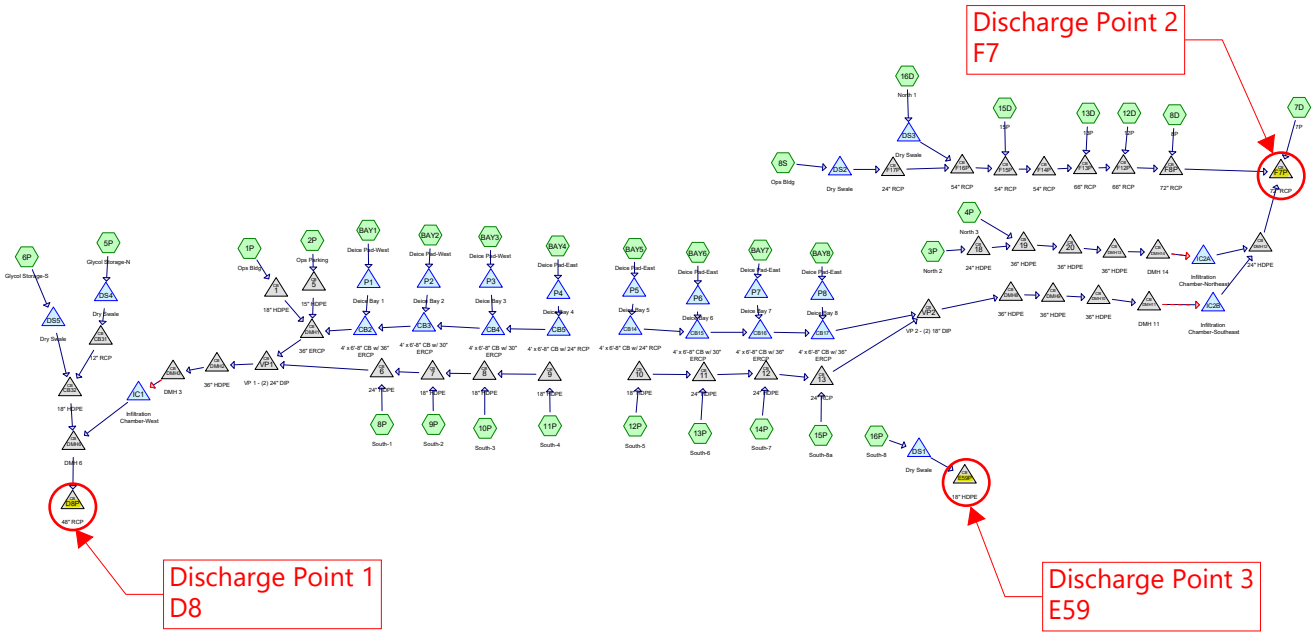
Pond F17E: 24" RCP Peak Elev=411.98' Inflow=0.07 cfs 0.029 af
24.0" Round Culvert n=0.015 L=63.0' S=0.0138 '/' Outflow=0.07 cfs 0.029 af

Pond F7E: 72" RCP Peak Elev=399.79' Inflow=44.62 cfs 2.988 af
72.0" Round Culvert n=0.015 L=333.0' S=0.0017 '/' Outflow=44.62 cfs 2.988 af

Pond F8E: 72" RCP Peak Elev=401.41' Inflow=44.54 cfs 2.913 af
72.0" Round Culvert n=0.015 L=1,062.0' S=0.0013 '/' Outflow=44.54 cfs 2.913 af

Total Runoff Area = 27.941 ac Runoff Volume = 5.108 af Average Runoff Depth = 2.19"
49.41% Pervious = 13.807 ac 50.59% Impervious = 14.134 ac

PROPOSED



Subcat Reach Pond Link

PROPOSED

Routing Diagram for SYR Deice Pad

Prepared by C&S Companies, Printed 4/14/2026

HydroCAD® 10.20-7a s/n 02837 © 2025 HydroCAD Software Solutions LLC

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-Yr, 24-Hr	Type II 24-hr		Default	24.00	1	2.04	2
2	10-Yr, 24-Hr	Type II 24-hr		Default	24.00	1	3.45	2
3	100-Yr, 24-Hr	Type II 24-hr		Default	24.00	1	5.13	2

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1P: Ops Bldg Runoff Area=0.424 ac 100.00% Impervious Runoff Depth=1.81"
Tc=5.0 min CN=98 Runoff=1.24 cfs 0.064 af

Subcatchment 2P: Ops Parking Runoff Area=0.150 ac 100.00% Impervious Runoff Depth=1.81"
Tc=5.0 min CN=98 Runoff=0.44 cfs 0.023 af

Subcatchment 3P: North 2 Runoff Area=1.952 ac 100.00% Impervious Runoff Depth=1.81"
Tc=5.0 min CN=98 Runoff=5.73 cfs 0.295 af

Subcatchment 4P: North 3 Runoff Area=2.370 ac 100.00% Impervious Runoff Depth=1.81"
Tc=5.0 min CN=98 Runoff=6.95 cfs 0.358 af

Subcatchment 5P: Glycol Storage-N Runoff Area=0.500 ac 64.00% Impervious Runoff Depth=0.47"
Tc=5.0 min CN=77 Runoff=0.42 cfs 0.020 af

Subcatchment 6P: Glycol Storage-S Runoff Area=0.691 ac 100.00% Impervious Runoff Depth=1.81"
Tc=5.0 min CN=98 Runoff=2.03 cfs 0.104 af

Subcatchment 7D: 7P Runoff Area=1.540 ac 12.99% Impervious Runoff Depth=0.00"
Tc=20.0 min CN=47 Runoff=0.00 cfs 0.000 af

Subcatchment 8D: 8P Runoff Area=0.240 ac 100.00% Impervious Runoff Depth=1.81"
Tc=5.0 min CN=98 Runoff=0.70 cfs 0.036 af

Subcatchment 8P: South-1 Runoff Area=0.276 ac 100.00% Impervious Runoff Depth=1.81"
Tc=5.0 min CN=98 Runoff=0.81 cfs 0.042 af

Subcatchment 8S: Ops Bldg Runoff Area=1.550 ac 36.13% Impervious Runoff Depth=0.07"
Tc=5.0 min CN=60 Runoff=0.01 cfs 0.009 af

Subcatchment 9P: South-2 Runoff Area=0.476 ac 100.00% Impervious Runoff Depth=1.81"
Tc=5.0 min CN=98 Runoff=1.40 cfs 0.072 af

Subcatchment 10P: South-3 Runoff Area=0.489 ac 100.00% Impervious Runoff Depth=1.81"
Tc=5.0 min CN=98 Runoff=1.43 cfs 0.074 af

Subcatchment 11P: South-4 Runoff Area=0.476 ac 100.00% Impervious Runoff Depth=1.81"
Tc=5.0 min CN=98 Runoff=1.40 cfs 0.072 af

Subcatchment 12D: 12P Runoff Area=0.140 ac 100.00% Impervious Runoff Depth=1.81"
Tc=5.0 min CN=98 Runoff=0.41 cfs 0.021 af

Subcatchment 12P: South-5 Runoff Area=0.489 ac 100.00% Impervious Runoff Depth=1.81"
Tc=5.0 min CN=98 Runoff=1.43 cfs 0.074 af

Subcatchment 13D: 13P Runoff Area=0.240 ac 100.00% Impervious Runoff Depth=1.81"
Tc=5.0 min CN=98 Runoff=0.70 cfs 0.036 af

Subcatchment 13P: South-6 Runoff Area=0.476 ac 100.00% Impervious Runoff Depth=1.81"
Tc=5.0 min CN=98 Runoff=1.40 cfs 0.072 af

Subcatchment 14P: South-7 Runoff Area=0.476 ac 100.00% Impervious Runoff Depth=1.81"
Tc=5.0 min CN=98 Runoff=1.40 cfs 0.072 af

Subcatchment 15D: 15P Runoff Area=1.220 ac 100.00% Impervious Runoff Depth=1.81"
Tc=5.0 min CN=98 Runoff=3.58 cfs 0.184 af

Subcatchment 15P: South-8a Runoff Area=0.341 ac 100.00% Impervious Runoff Depth=1.81"
Tc=5.0 min CN=98 Runoff=1.00 cfs 0.052 af

Subcatchment 16D: North 1 Runoff Area=1.550 ac 100.00% Impervious Runoff Depth=1.81"
Tc=5.0 min CN=98 Runoff=4.55 cfs 0.234 af

Subcatchment 16P: South-8 Runoff Area=1.311 ac 30.51% Impervious Runoff Depth=0.03"
Tc=5.0 min CN=57 Runoff=0.00 cfs 0.004 af

Subcatchment BAY1: Deice Pad-West Runoff Area=1.306 ac 100.00% Impervious Runoff Depth=1.81"
Tc=5.0 min CN=98 Runoff=3.83 cfs 0.197 af

Subcatchment BAY2: Deice Pad-West Runoff Area=1.417 ac 100.00% Impervious Runoff Depth=1.81"
Tc=5.0 min CN=98 Runoff=4.16 cfs 0.214 af

Subcatchment BAY3: Deice Pad-West Runoff Area=1.459 ac 100.00% Impervious Runoff Depth=1.81"
Tc=5.0 min CN=98 Runoff=4.28 cfs 0.221 af

Subcatchment BAY4: Deice Pad-East Runoff Area=1.417 ac 100.00% Impervious Runoff Depth=1.81"
Tc=5.0 min CN=98 Runoff=4.16 cfs 0.214 af

Subcatchment BAY5: Deice Pad-East Runoff Area=1.458 ac 100.00% Impervious Runoff Depth=1.81"
Tc=5.0 min CN=98 Runoff=4.28 cfs 0.220 af

Subcatchment BAY6: Deice Pad-East Runoff Area=1.417 ac 100.00% Impervious Runoff Depth=1.81"
Tc=5.0 min CN=98 Runoff=4.16 cfs 0.214 af

Subcatchment BAY7: Deice Pad-East Runoff Area=1.421 ac 100.00% Impervious Runoff Depth=1.81"
Tc=5.0 min CN=98 Runoff=4.17 cfs 0.215 af

Subcatchment BAY8: Deice Pad-East Runoff Area=0.669 ac 100.00% Impervious Runoff Depth=1.81"
Tc=5.0 min CN=98 Runoff=1.96 cfs 0.101 af

Pond 1: 18" HDPE Peak Elev=411.33' Inflow=1.24 cfs 0.064 af
18.0" Round Culvert n=0.013 L=68.0' S=0.0029 '/' Outflow=1.24 cfs 0.064 af

Pond 5: 15" HDPE Peak Elev=412.09' Inflow=0.44 cfs 0.023 af
15.0" Round Culvert n=0.013 L=298.0' S=0.0041 '/' Outflow=0.44 cfs 0.023 af

Pond 6: 24" HDPE Peak Elev=412.11' Inflow=5.04 cfs 0.260 af
24.0" Round Culvert n=0.013 L=113.0' S=0.0058 '/' Outflow=5.04 cfs 0.260 af

Pond 7: 18" HDPE Peak Elev=412.64' Inflow=4.23 cfs 0.218 af
18.0" Round Culvert n=0.013 L=135.0' S=0.0012 '/' Outflow=4.23 cfs 0.218 af

Pond 8: 18" HDPE Peak Elev=412.57' Inflow=2.83 cfs 0.146 af
18.0" Round Culvert n=0.013 L=173.0' S=0.0015 '/' Outflow=2.83 cfs 0.146 af

Pond 9: 18" HDPE Peak Elev=412.53' Inflow=1.40 cfs 0.072 af
18.0" Round Culvert n=0.013 L=173.0' S=0.0020 '/' Outflow=1.40 cfs 0.072 af

Pond 10: 18" HDPE Peak Elev=411.06' Inflow=1.43 cfs 0.074 af
18.0" Round Culvert n=0.013 L=211.0' S=0.0020 '/' Outflow=1.43 cfs 0.074 af

Pond 11: 24" HDPE Peak Elev=410.84' Inflow=2.83 cfs 0.146 af
24.0" Round Culvert n=0.013 L=160.0' S=0.0019 '/' Outflow=2.83 cfs 0.146 af

Pond 12: 24" HDPE Peak Elev=410.75' Inflow=4.23 cfs 0.218 af
24.0" Round Culvert n=0.013 L=127.0' S=0.0020 '/' Outflow=4.23 cfs 0.218 af

Pond 13: 24" RCP Peak Elev=410.77' Inflow=5.23 cfs 0.269 af
24.0" Round Culvert n=0.015 L=168.0' S=0.0015 '/' Outflow=5.23 cfs 0.269 af

Pond 18: 24" HDPE Peak Elev=411.52' Inflow=5.73 cfs 0.295 af
24.0" Round Culvert n=0.013 L=311.0' S=0.0020 '/' Outflow=5.73 cfs 0.295 af

Pond 19: 36" HDPE Peak Elev=411.33' Inflow=12.68 cfs 0.653 af
36.0" Round Culvert n=0.013 L=156.0' S=0.0015 '/' Outflow=12.68 cfs 0.653 af

Pond 20: 36" HDPE Peak Elev=411.16' Inflow=12.68 cfs 0.653 af
36.0" Round Culvert n=0.013 L=496.0' S=0.0015 '/' Outflow=12.68 cfs 0.653 af

Pond CB14: 4' x 6'-8" CB w/ 24" RCP Peak Elev=411.19' Storage=30 cf Inflow=3.55 cfs 0.220 af
24.0" Round Culvert n=0.015 L=173.0' S=0.0020 '/' Outflow=3.55 cfs 0.220 af

Pond CB15: 4' x 6'-8" CB w/ 30" ERCP Peak Elev=410.91' Storage=32 cf Inflow=7.05 cfs 0.435 af
38.0" x 24.0", R=31.2" Elliptical Culvert n=0.015 L=170.0' S=0.0020 '/' Outflow=7.05 cfs 0.435 af

Pond CB16: 4' x 6'-8" CB w/ 36" ERCP Peak Elev=410.80' Storage=38 cf Inflow=10.56 cfs 0.649 af
45.0" x 29.0", R=39.2" Elliptical Culvert n=0.015 L=163.0' S=0.0015 '/' Outflow=10.56 cfs 0.649 af

Pond CB17: 4' x 6'-8" CB w/ 36" ERCP Peak Elev=410.64' Storage=41 cf Inflow=12.37 cfs 0.751 af
45.0" x 29.0", R=39.2" Elliptical Culvert n=0.015 L=45.0' S=0.0009 '/' Outflow=12.37 cfs 0.751 af

Pond CB2: 4' x 6'-8" CB w/ 36" ERCP Peak Elev=412.19' Storage=43 cf Inflow=13.86 cfs 0.846 af
45.0" x 29.0", R=39.2" Elliptical Culvert n=0.015 L=68.0' S=0.0010 '/' Outflow=13.86 cfs 0.846 af

Pond CB3: 4' x 6'-8" CB w/ 30" ERCP Peak Elev=412.34' Storage=43 cf Inflow=10.52 cfs 0.649 af
38.0" x 24.0", R=31.2" Elliptical Culvert n=0.015 L=171.0' S=0.0010 '/' Outflow=10.52 cfs 0.649 af

Pond CB31: 12" RCP Peak Elev=411.00' Inflow=0.00 cfs 0.000 af
12.0" Round Culvert n=0.015 L=137.0' S=0.0051 '/' Outflow=0.00 cfs 0.000 af

Pond CB32: 18" HDPE Peak Elev=411.03' Inflow=1.83 cfs 0.036 af
18.0" Round Culvert n=0.013 L=40.0' S=0.0050 '/' Outflow=1.83 cfs 0.036 af

Pond CB4: 4' x 6'-8" CB w/ 30" ERCP Peak Elev=412.19' Storage=34 cf Inflow=7.04 cfs 0.435 af
38.0" x 24.0", R=31.2" Elliptical Culvert n=0.015 L=173.0' S=0.0010 '/' Outflow=7.04 cfs 0.435 af

Pond CB5: 4' x 6'-8" CB w/ 24" RCP Peak Elev=412.28' Storage=32 cf Inflow=3.48 cfs 0.214 af
24.0" Round Culvert n=0.015 L=173.0' S=0.0010 '/' Outflow=3.48 cfs 0.214 af

Pond D8P: 48" RCP Peak Elev=402.83' Inflow=1.83 cfs 0.036 af
48.0" Round Culvert n=0.015 L=272.0' S=0.0058 '/' Outflow=1.83 cfs 0.036 af

Pond DMH1: 36" ERCP Peak Elev=412.24' Inflow=15.31 cfs 0.933 af
45.0" x 29.0", R=39.2" Elliptical Culvert n=0.015 L=106.0' S=0.0011 '/' Outflow=15.31 cfs 0.933 af

Pond DMH10: 36" HDPE Peak Elev=410.44' Inflow=17.15 cfs 1.020 af
36.0" Round Culvert n=0.013 L=57.0' S=0.0011 '/' Outflow=17.15 cfs 1.020 af

Pond DMH11: DMH 11 Peak Elev=410.95' Inflow=17.15 cfs 1.020 af
Primary=17.15 cfs 1.020 af Secondary=0.00 cfs 0.000 af Outflow=17.15 cfs 1.020 af

Pond DMH12: 24" HDPE Peak Elev=407.36' Inflow=0.01 cfs 0.000 af
24.0" Round Culvert n=0.013 L=115.0' S=0.0100 '/' Outflow=0.01 cfs 0.000 af

Pond DMH13: 36" HDPE Peak Elev=410.35' Inflow=12.68 cfs 0.653 af
36.0" Round Culvert n=0.013 L=151.0' S=0.0015 '/' Outflow=12.68 cfs 0.653 af

Pond DMH14: DMH 14 Peak Elev=410.33' Inflow=12.68 cfs 0.653 af
Primary=12.68 cfs 0.653 af Secondary=0.00 cfs 0.000 af Outflow=12.68 cfs 0.653 af

Pond DMH2: 36" HDPE Peak Elev=412.63' Inflow=19.98 cfs 1.193 af
36.0" Round Culvert n=0.013 L=55.0' S=0.0020 '/' Outflow=19.98 cfs 1.193 af

Pond DMH3: DMH 3 Peak Elev=413.22' Inflow=19.98 cfs 1.193 af
Primary=19.98 cfs 1.193 af Secondary=0.00 cfs 0.000 af Outflow=19.98 cfs 1.193 af

Pond DMH6: DMH 6 Peak Elev=410.62' Inflow=1.83 cfs 0.036 af
18.0" Round Culvert n=0.013 L=156.0' S=0.0313 '/' Outflow=1.83 cfs 0.036 af

Pond DMH8: 36" HDPE Peak Elev=411.39' Inflow=17.15 cfs 1.020 af
36.0" Round Culvert n=0.013 L=285.0' S=0.0010 '/' Outflow=17.15 cfs 1.020 af

Pond DMH9: 36" HDPE Peak Elev=411.15' Inflow=17.15 cfs 1.020 af
36.0" Round Culvert n=0.013 L=448.0' S=0.0011 '/' Outflow=17.15 cfs 1.020 af

Pond DS1: Dry Swale Peak Elev=412.26' Storage=0 cf Inflow=0.00 cfs 0.004 af
Discarded=0.00 cfs 0.004 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.004 af

Pond DS2: Dry Swale Peak Elev=411.93' Storage=2 cf Inflow=0.01 cfs 0.009 af
Discarded=0.01 cfs 0.009 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.009 af

Pond DS3: Dry Swale Peak Elev=415.39' Storage=257 cf Inflow=4.55 cfs 0.234 af
Discarded=0.33 cfs 0.127 af Primary=4.19 cfs 0.107 af Outflow=4.52 cfs 0.234 af

Pond DS4: Dry Swale Peak Elev=414.96' Storage=175 cf Inflow=0.42 cfs 0.020 af
Discarded=0.15 cfs 0.020 af Primary=0.00 cfs 0.000 af Outflow=0.15 cfs 0.020 af

Pond DS5: Dry Swale Peak Elev=416.11' Storage=254 cf Inflow=2.03 cfs 0.104 af
Discarded=0.19 cfs 0.068 af Primary=1.83 cfs 0.036 af Outflow=2.02 cfs 0.104 af

Pond E59P: 18" HDPE Peak Elev=407.39' Inflow=0.00 cfs 0.000 af
18.0" Round Culvert n=0.013 L=57.0' S=0.0168 '/' Outflow=0.00 cfs 0.000 af

Pond F12P: 66" RCP Peak Elev=400.46' Inflow=8.87 cfs 0.349 af
66.0" Round Culvert n=0.015 L=301.0' S=0.0018 '/' Outflow=8.87 cfs 0.349 af

Pond F13P: 66" RCP Peak Elev=401.68' Inflow=8.46 cfs 0.328 af
66.0" Round Culvert n=0.015 L=215.0' S=0.0066 '/' Outflow=8.46 cfs 0.328 af

Pond F14P: 54" RCP Peak Elev=402.47' Inflow=7.75 cfs 0.292 af
54.0" Round Culvert n=0.015 L=128.0' S=0.0049 '/' Outflow=7.75 cfs 0.292 af

Pond F15P: 54" RCP Peak Elev=403.35' Inflow=7.75 cfs 0.292 af
54.0" Round Culvert n=0.015 L=132.0' S=0.0069 '/' Outflow=7.75 cfs 0.292 af

Pond F16P: 54" RCP Peak Elev=404.62' Inflow=4.19 cfs 0.107 af
54.0" Round Culvert n=0.015 L=291.0' S=0.0052 '/' Outflow=4.19 cfs 0.107 af

Pond F17P: 24" RCP Peak Elev=411.87' Inflow=0.00 cfs 0.000 af
24.0" Round Culvert n=0.015 L=63.0' S=0.0138 '/' Outflow=0.00 cfs 0.000 af

Pond F7P: 72" RCP Peak Elev=398.27' Inflow=9.57 cfs 0.385 af
72.0" Round Culvert n=0.015 L=333.0' S=0.0017 '/' Outflow=9.57 cfs 0.385 af

Pond F8P: 72" RCP Peak Elev=399.08' Inflow=9.57 cfs 0.385 af
72.0" Round Culvert n=0.015 L=1,062.0' S=0.0004 '/' Outflow=9.57 cfs 0.385 af

Pond IC1: Infiltration Chamber-West Peak Elev=410.19' Storage=7,373 cf Inflow=19.98 cfs 1.193 af
Discarded=10.54 cfs 1.193 af Primary=0.00 cfs 0.000 af Outflow=10.54 cfs 1.193 af

Pond IC2A: Infiltration Chamber-Northeast Peak Elev=408.27' Storage=5,457 cf Inflow=12.68 cfs 0.653 af
Discarded=5.11 cfs 0.653 af Primary=0.01 cfs 0.000 af Outflow=5.12 cfs 0.653 af

Pond IC2B: Infiltration Chamber-Southeast Peak Elev=408.10' Storage=6,942 cf Inflow=17.15 cfs 1.020 af
Discarded=8.46 cfs 1.020 af Primary=0.00 cfs 0.000 af Outflow=8.46 cfs 1.020 af

Pond P1: Deice Bay 1 Peak Elev=415.87' Storage=565 cf Inflow=3.83 cfs 0.197 af
Outflow=3.35 cfs 0.197 af

Pond P2: Deice Bay 2 Peak Elev=415.87' Storage=734 cf Inflow=4.16 cfs 0.214 af
Outflow=3.48 cfs 0.214 af

Pond P3: Deice Bay 3 Peak Elev=415.88' Storage=778 cf Inflow=4.28 cfs 0.221 af
Outflow=3.56 cfs 0.221 af

Pond P4: Deice Bay 4 Peak Elev=415.87' Storage=734 cf Inflow=4.16 cfs 0.214 af
Outflow=3.48 cfs 0.214 af

Pond P5: Deice Bay 5 Peak Elev=415.88' Storage=778 cf Inflow=4.28 cfs 0.220 af
Outflow=3.55 cfs 0.220 af

Pond P6: Deice Bay 6 Peak Elev=415.47' Storage=716 cf Inflow=4.16 cfs 0.214 af
Outflow=3.50 cfs 0.214 af

Pond P7: Deice Bay 7 Peak Elev=414.89' Storage=713 cf Inflow=4.17 cfs 0.215 af
Outflow=3.51 cfs 0.215 af

Pond P8: Deice Bay 8 Peak Elev=414.48' Storage=162 cf Inflow=1.96 cfs 0.101 af
Outflow=1.85 cfs 0.101 af

Pond VP1: VP 1 - (2) 24" DIP Peak Elev=412.22' Inflow=19.98 cfs 1.193 af
24.0" Round Culvert x 2.00 n=0.013 L=15.0' S=0.0013 '/' Outflow=19.98 cfs 1.193 af

Pond VP2: VP 2 - (2) 18" DIP Peak Elev=411.27' Inflow=17.15 cfs 1.020 af
18.0" Round Culvert x 2.00 n=0.013 L=19.0' S=0.0005 '/' Outflow=17.15 cfs 1.020 af

Total Runoff Area = 27.941 ac Runoff Volume = 3.515 af Average Runoff Depth = 1.51"
12.24% Pervious = 3.421 ac 87.76% Impervious = 24.520 ac

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1P: Ops Bldg Runoff Area=0.424 ac 100.00% Impervious Runoff Depth=3.22"
Tc=5.0 min CN=98 Runoff=2.14 cfs 0.114 af

Subcatchment 2P: Ops Parking Runoff Area=0.150 ac 100.00% Impervious Runoff Depth=3.22"
Tc=5.0 min CN=98 Runoff=0.76 cfs 0.040 af

Subcatchment 3P: North 2 Runoff Area=1.952 ac 100.00% Impervious Runoff Depth=3.22"
Tc=5.0 min CN=98 Runoff=9.84 cfs 0.523 af

Subcatchment 4P: North 3 Runoff Area=2.370 ac 100.00% Impervious Runoff Depth=3.22"
Tc=5.0 min CN=98 Runoff=11.95 cfs 0.635 af

Subcatchment 5P: Glycol Storage-N Runoff Area=0.500 ac 64.00% Impervious Runoff Depth=1.39"
Tc=5.0 min CN=77 Runoff=1.30 cfs 0.058 af

Subcatchment 6P: Glycol Storage-S Runoff Area=0.691 ac 100.00% Impervious Runoff Depth=3.22"
Tc=5.0 min CN=98 Runoff=3.48 cfs 0.185 af

Subcatchment 7D: 7P Runoff Area=1.540 ac 12.99% Impervious Runoff Depth=0.11"
Tc=20.0 min CN=47 Runoff=0.02 cfs 0.015 af

Subcatchment 8D: 8P Runoff Area=0.240 ac 100.00% Impervious Runoff Depth=3.22"
Tc=5.0 min CN=98 Runoff=1.21 cfs 0.064 af

Subcatchment 8P: South-1 Runoff Area=0.276 ac 100.00% Impervious Runoff Depth=3.22"
Tc=5.0 min CN=98 Runoff=1.39 cfs 0.074 af

Subcatchment 8S: Ops Bldg Runoff Area=1.550 ac 36.13% Impervious Runoff Depth=0.51"
Tc=5.0 min CN=60 Runoff=1.22 cfs 0.066 af

Subcatchment 9P: South-2 Runoff Area=0.476 ac 100.00% Impervious Runoff Depth=3.22"
Tc=5.0 min CN=98 Runoff=2.40 cfs 0.128 af

Subcatchment 10P: South-3 Runoff Area=0.489 ac 100.00% Impervious Runoff Depth=3.22"
Tc=5.0 min CN=98 Runoff=2.47 cfs 0.131 af

Subcatchment 11P: South-4 Runoff Area=0.476 ac 100.00% Impervious Runoff Depth=3.22"
Tc=5.0 min CN=98 Runoff=2.40 cfs 0.128 af

Subcatchment 12D: 12P Runoff Area=0.140 ac 100.00% Impervious Runoff Depth=3.22"
Tc=5.0 min CN=98 Runoff=0.71 cfs 0.038 af

Subcatchment 12P: South-5 Runoff Area=0.489 ac 100.00% Impervious Runoff Depth=3.22"
Tc=5.0 min CN=98 Runoff=2.47 cfs 0.131 af

Subcatchment 13D: 13P Runoff Area=0.240 ac 100.00% Impervious Runoff Depth=3.22"
Tc=5.0 min CN=98 Runoff=1.21 cfs 0.064 af

Subcatchment 13P: South-6 Runoff Area=0.476 ac 100.00% Impervious Runoff Depth=3.22"
Tc=5.0 min CN=98 Runoff=2.40 cfs 0.128 af

Subcatchment 14P: South-7 Runoff Area=0.476 ac 100.00% Impervious Runoff Depth=3.22"
Tc=5.0 min CN=98 Runoff=2.40 cfs 0.128 af

Subcatchment 15D: 15P Runoff Area=1.220 ac 100.00% Impervious Runoff Depth=3.22"
Tc=5.0 min CN=98 Runoff=6.15 cfs 0.327 af

Subcatchment 15P: South-8a Runoff Area=0.341 ac 100.00% Impervious Runoff Depth=3.22"
Tc=5.0 min CN=98 Runoff=1.72 cfs 0.091 af

Subcatchment 16D: North 1 Runoff Area=1.550 ac 100.00% Impervious Runoff Depth=3.22"
Tc=5.0 min CN=98 Runoff=7.82 cfs 0.415 af

Subcatchment 16P: South-8 Runoff Area=1.311 ac 30.51% Impervious Runoff Depth=0.40"
Tc=5.0 min CN=57 Runoff=0.70 cfs 0.043 af

Subcatchment BAY1: Deice Pad-West Runoff Area=1.306 ac 100.00% Impervious Runoff Depth=3.22"
Tc=5.0 min CN=98 Runoff=6.58 cfs 0.350 af

Subcatchment BAY2: Deice Pad-West Runoff Area=1.417 ac 100.00% Impervious Runoff Depth=3.22"
Tc=5.0 min CN=98 Runoff=7.14 cfs 0.380 af

Subcatchment BAY3: Deice Pad-West Runoff Area=1.459 ac 100.00% Impervious Runoff Depth=3.22"
Tc=5.0 min CN=98 Runoff=7.36 cfs 0.391 af

Subcatchment BAY4: Deice Pad-East Runoff Area=1.417 ac 100.00% Impervious Runoff Depth=3.22"
Tc=5.0 min CN=98 Runoff=7.14 cfs 0.380 af

Subcatchment BAY5: Deice Pad-East Runoff Area=1.458 ac 100.00% Impervious Runoff Depth=3.22"
Tc=5.0 min CN=98 Runoff=7.35 cfs 0.391 af

Subcatchment BAY6: Deice Pad-East Runoff Area=1.417 ac 100.00% Impervious Runoff Depth=3.22"
Tc=5.0 min CN=98 Runoff=7.14 cfs 0.380 af

Subcatchment BAY7: Deice Pad-East Runoff Area=1.421 ac 100.00% Impervious Runoff Depth=3.22"
Tc=5.0 min CN=98 Runoff=7.16 cfs 0.381 af

Subcatchment BAY8: Deice Pad-East Runoff Area=0.669 ac 100.00% Impervious Runoff Depth=3.22"
Tc=5.0 min CN=98 Runoff=3.37 cfs 0.179 af

Pond 1: 18" HDPE Peak Elev=411.55' Inflow=2.14 cfs 0.114 af
18.0" Round Culvert n=0.013 L=68.0' S=0.0029 '/' Outflow=2.14 cfs 0.114 af

Pond 5: 15" HDPE Peak Elev=412.21' Inflow=0.76 cfs 0.040 af
15.0" Round Culvert n=0.013 L=298.0' S=0.0041 '/' Outflow=0.76 cfs 0.040 af

Pond 6: 24" HDPE Peak Elev=412.51' Inflow=8.66 cfs 0.460 af
24.0" Round Culvert n=0.013 L=113.0' S=0.0058 '/' Outflow=8.66 cfs 0.460 af

Pond 7: 18" HDPE Peak Elev=413.58' Inflow=7.27 cfs 0.386 af
18.0" Round Culvert n=0.013 L=135.0' S=0.0012 '/' Outflow=7.27 cfs 0.386 af

Pond 8: 18" HDPE Peak Elev=413.03' Inflow=4.87 cfs 0.259 af
18.0" Round Culvert n=0.013 L=173.0' S=0.0015 '/' Outflow=4.87 cfs 0.259 af

Pond 9: 18" HDPE Peak Elev=412.77' Inflow=2.40 cfs 0.128 af
18.0" Round Culvert n=0.013 L=173.0' S=0.0020 '/' Outflow=2.40 cfs 0.128 af

Pond 10: 18" HDPE Peak Elev=411.32' Inflow=2.47 cfs 0.131 af
18.0" Round Culvert n=0.013 L=211.0' S=0.0020 '/' Outflow=2.47 cfs 0.131 af

Pond 11: 24" HDPE Peak Elev=411.16' Inflow=4.87 cfs 0.259 af
24.0" Round Culvert n=0.013 L=160.0' S=0.0019 '/' Outflow=4.87 cfs 0.259 af

Pond 12: 24" HDPE Peak Elev=411.17' Inflow=7.27 cfs 0.386 af
24.0" Round Culvert n=0.013 L=127.0' S=0.0020 '/' Outflow=7.27 cfs 0.386 af

Pond 13: 24" RCP Peak Elev=411.32' Inflow=8.99 cfs 0.478 af
24.0" Round Culvert n=0.015 L=168.0' S=0.0015 '/' Outflow=8.99 cfs 0.478 af

Pond 18: 24" HDPE Peak Elev=412.09' Inflow=9.84 cfs 0.523 af
24.0" Round Culvert n=0.013 L=311.0' S=0.0020 '/' Outflow=9.84 cfs 0.523 af

Pond 19: 36" HDPE Peak Elev=411.99' Inflow=21.79 cfs 1.159 af
36.0" Round Culvert n=0.013 L=156.0' S=0.0015 '/' Outflow=21.79 cfs 1.159 af

Pond 20: 36" HDPE Peak Elev=411.87' Inflow=21.79 cfs 1.159 af
36.0" Round Culvert n=0.013 L=496.0' S=0.0015 '/' Outflow=21.79 cfs 1.159 af

Pond CB14: 4' x 6'-8" CB w/ 24" RCP Peak Elev=411.53' Storage=39 cf Inflow=5.78 cfs 0.391 af
24.0" Round Culvert n=0.015 L=173.0' S=0.0020 '/' Outflow=5.78 cfs 0.391 af

Pond CB15: 4' x 6'-8" CB w/ 30" ERCP Peak Elev=411.29' Storage=42 cf Inflow=11.50 cfs 0.771 af
38.0" x 24.0", R=31.2" Elliptical Culvert n=0.015 L=170.0' S=0.0020 '/' Outflow=11.50 cfs 0.771 af

Pond CB16: 4' x 6'-8" CB w/ 36" ERCP Peak Elev=411.24' Storage=49 cf Inflow=17.25 cfs 1.152 af
45.0" x 29.0", R=39.2" Elliptical Culvert n=0.015 L=163.0' S=0.0015 '/' Outflow=17.25 cfs 1.152 af

Pond CB17: 4' x 6'-8" CB w/ 36" ERCP Peak Elev=411.12' Storage=54 cf Inflow=20.29 cfs 1.331 af
45.0" x 29.0", R=39.2" Elliptical Culvert n=0.015 L=45.0' S=0.0009 '/' Outflow=20.29 cfs 1.331 af

Pond CB2: 4' x 6'-8" CB w/ 36" ERCP Peak Elev=412.71' Storage=57 cf Inflow=22.66 cfs 1.501 af
45.0" x 29.0", R=39.2" Elliptical Culvert n=0.015 L=68.0' S=0.0010 '/' Outflow=22.66 cfs 1.501 af

Pond CB3: 4' x 6'-8" CB w/ 30" ERCP Peak Elev=412.90' Storage=58 cf Inflow=17.13 cfs 1.151 af
38.0" x 24.0", R=31.2" Elliptical Culvert n=0.015 L=171.0' S=0.0010 '/' Outflow=17.13 cfs 1.151 af

Pond CB31: 12" RCP Peak Elev=411.67' Inflow=1.11 cfs 0.015 af
12.0" Round Culvert n=0.015 L=137.0' S=0.0051 '/' Outflow=1.11 cfs 0.015 af

Pond CB32: 18" HDPE Peak Elev=411.51' Inflow=4.36 cfs 0.092 af
18.0" Round Culvert n=0.013 L=40.0' S=0.0050 '/' Outflow=4.36 cfs 0.092 af

Pond CB4: 4' x 6'-8" CB w/ 30" ERCP Peak Elev=412.59' Storage=45 cf Inflow=11.46 cfs 0.771 af
38.0" x 24.0", R=31.2" Elliptical Culvert n=0.015 L=173.0' S=0.0010 '/' Outflow=11.46 cfs 0.771 af

Pond CB5: 4' x 6'-8" CB w/ 24" RCP Peak Elev=412.64' Storage=41 cf Inflow=5.67 cfs 0.380 af
24.0" Round Culvert n=0.015 L=173.0' S=0.0010 '/' Outflow=5.67 cfs 0.380 af

Pond D8P: 48" RCP Peak Elev=403.12' Inflow=4.53 cfs 0.117 af
48.0" Round Culvert n=0.015 L=272.0' S=0.0058 '/' Outflow=4.53 cfs 0.117 af

Pond DMH1: 36" ERCP Peak Elev=412.82' Inflow=25.07 cfs 1.655 af
45.0" x 29.0", R=39.2" Elliptical Culvert n=0.015 L=106.0' S=0.0011 '/' Outflow=25.07 cfs 1.655 af

Pond DMH10: 36" HDPE Peak Elev=411.18' Inflow=28.36 cfs 1.809 af
36.0" Round Culvert n=0.013 L=57.0' S=0.0011 '/' Outflow=28.36 cfs 1.809 af

Pond DMH11: DMH 11 Peak Elev=411.82' Inflow=28.36 cfs 1.809 af
Primary=24.23 cfs 1.773 af Secondary=4.13 cfs 0.035 af Outflow=28.36 cfs 1.809 af

Pond DMH12: 24" HDPE Peak Elev=407.93' Inflow=2.08 cfs 0.046 af
24.0" Round Culvert n=0.013 L=115.0' S=0.0100 '/' Outflow=2.08 cfs 0.046 af

Pond DMH13: 36" HDPE Peak Elev=411.01' Inflow=21.79 cfs 1.159 af
36.0" Round Culvert n=0.013 L=151.0' S=0.0015 '/' Outflow=21.79 cfs 1.159 af

Pond DMH14: DMH 14 Peak Elev=411.08' Inflow=21.79 cfs 1.159 af
Primary=18.59 cfs 1.134 af Secondary=3.20 cfs 0.024 af Outflow=21.79 cfs 1.159 af

Pond DMH2: 36" HDPE Peak Elev=413.46' Inflow=33.00 cfs 2.115 af
36.0" Round Culvert n=0.013 L=55.0' S=0.0020 '/' Outflow=33.00 cfs 2.115 af

Pond DMH3: DMH 3 Peak Elev=414.90' Inflow=33.00 cfs 2.115 af
Primary=28.89 cfs 2.074 af Secondary=4.11 cfs 0.041 af Outflow=33.00 cfs 2.115 af

Pond DMH6: DMH 6 Peak Elev=411.04' Inflow=4.53 cfs 0.117 af
18.0" Round Culvert n=0.013 L=156.0' S=0.0313 '/' Outflow=4.53 cfs 0.117 af

Pond DMH8: 36" HDPE Peak Elev=412.25' Inflow=28.36 cfs 1.809 af
36.0" Round Culvert n=0.013 L=285.0' S=0.0010 '/' Outflow=28.36 cfs 1.809 af

Pond DMH9: 36" HDPE Peak Elev=412.07' Inflow=28.36 cfs 1.809 af
36.0" Round Culvert n=0.013 L=448.0' S=0.0011 '/' Outflow=28.36 cfs 1.809 af

Pond DS1: Dry Swale Peak Elev=412.65' Storage=227 cf Inflow=0.70 cfs 0.043 af
Discarded=0.25 cfs 0.043 af Primary=0.00 cfs 0.000 af Outflow=0.25 cfs 0.043 af

Pond DS2: Dry Swale Peak Elev=412.94' Storage=284 cf Inflow=1.22 cfs 0.066 af
Discarded=0.17 cfs 0.057 af Primary=1.01 cfs 0.009 af Outflow=1.18 cfs 0.066 af

Pond DS3: Dry Swale Peak Elev=415.47' Storage=359 cf Inflow=7.82 cfs 0.415 af
Discarded=0.43 cfs 0.193 af Primary=7.32 cfs 0.222 af Outflow=7.76 cfs 0.415 af

Pond DS4: Dry Swale Peak Elev=415.08' Storage=236 cf Inflow=1.30 cfs 0.058 af
Discarded=0.18 cfs 0.043 af Primary=1.11 cfs 0.015 af Outflow=1.29 cfs 0.058 af

Pond DS5: Dry Swale Peak Elev=416.16' Storage=286 cf Inflow=3.48 cfs 0.185 af
Discarded=0.21 cfs 0.109 af Primary=3.27 cfs 0.077 af Outflow=3.47 cfs 0.185 af

Pond E59P: 18" HDPE Peak Elev=407.39' Inflow=0.00 cfs 0.000 af
18.0" Round Culvert n=0.013 L=57.0' S=0.0168 '/' Outflow=0.00 cfs 0.000 af

Pond F12P: 66" RCP Peak Elev=400.87' Inflow=15.47 cfs 0.660 af
66.0" Round Culvert n=0.015 L=301.0' S=0.0018 '/' Outflow=15.47 cfs 0.660 af

Pond F13P: 66" RCP Peak Elev=402.01' Inflow=14.79 cfs 0.622 af
66.0" Round Culvert n=0.015 L=215.0' S=0.0066 '/' Outflow=14.79 cfs 0.622 af

Pond F14P: 54" RCP Peak Elev=402.84' Inflow=13.65 cfs 0.558 af
54.0" Round Culvert n=0.015 L=128.0' S=0.0049 '/' Outflow=13.65 cfs 0.558 af

Pond F15P: 54" RCP Peak Elev=403.70' Inflow=13.65 cfs 0.558 af
54.0" Round Culvert n=0.015 L=132.0' S=0.0069 '/' Outflow=13.65 cfs 0.558 af

Pond F16P: 54" RCP Peak Elev=404.91' Inflow=7.90 cfs 0.231 af
54.0" Round Culvert n=0.015 L=291.0' S=0.0052 '/' Outflow=7.90 cfs 0.231 af

Pond F17P: 24" RCP Peak Elev=412.28' Inflow=1.01 cfs 0.009 af
24.0" Round Culvert n=0.015 L=63.0' S=0.0138 '/' Outflow=1.01 cfs 0.009 af

Pond F7P: 72" RCP Peak Elev=398.72' Inflow=17.51 cfs 0.785 af
72.0" Round Culvert n=0.015 L=333.0' S=0.0017 '/' Outflow=17.51 cfs 0.785 af

Pond F8P: 72" RCP Peak Elev=399.57' Inflow=16.60 cfs 0.724 af
72.0" Round Culvert n=0.015 L=1,062.0' S=0.0004 '/' Outflow=16.60 cfs 0.724 af

Pond IC1: Infiltration Chamber-West Peak Elev=410.76' Storage=16,953 cf Inflow=33.00 cfs 2.115 af
Discarded=14.30 cfs 2.089 af Primary=1.20 cfs 0.025 af Outflow=15.49 cfs 2.115 af

Pond IC2A: Infiltration Chamber-Northeast Peak Elev=408.85' Storage=11,486 cf Inflow=21.79 cfs 1.159 af
Discarded=6.96 cfs 1.128 af Primary=1.51 cfs 0.031 af Outflow=8.47 cfs 1.158 af

Pond IC2B: Infiltration Chamber-Southeast Peak Elev=408.55' Storage=15,959 cf Inflow=28.36 cfs 1.809 af
Discarded=10.96 cfs 1.793 af Primary=0.71 cfs 0.016 af Outflow=11.66 cfs 1.808 af

Pond P1: Deice Bay 1 Peak Elev=415.96' Storage=1,147 cf Inflow=6.58 cfs 0.350 af
Outflow=5.54 cfs 0.350 af

Pond P2: Deice Bay 2 Peak Elev=415.96' Storage=1,502 cf Inflow=7.14 cfs 0.380 af
Outflow=5.67 cfs 0.380 af

Pond P3: Deice Bay 3 Peak Elev=415.97' Storage=1,592 cf Inflow=7.36 cfs 0.391 af
Outflow=5.79 cfs 0.391 af

Pond P4: Deice Bay 4 Peak Elev=415.96' Storage=1,502 cf Inflow=7.14 cfs 0.380 af
Outflow=5.67 cfs 0.380 af

Pond P5: Deice Bay 5 Peak Elev=415.97' Storage=1,591 cf Inflow=7.35 cfs 0.391 af
Outflow=5.78 cfs 0.391 af

Pond P6: Deice Bay 6 Peak Elev=415.57' Storage=1,467 cf Inflow=7.14 cfs 0.380 af
Outflow=5.72 cfs 0.380 af

Pond P7: Deice Bay 7 Peak Elev=414.99' Storage=1,463 cf Inflow=7.16 cfs 0.381 af
Outflow=5.75 cfs 0.381 af

Pond P8: Deice Bay 8 Peak Elev=414.55' Storage=340 cf Inflow=3.37 cfs 0.179 af
Outflow=3.11 cfs 0.179 af

Pond VP1: VP 1 - (2) 24" DIP Peak Elev=413.08' Inflow=33.00 cfs 2.115 af
24.0" Round Culvert x 2.00 n=0.013 L=15.0' S=0.0013 '/' Outflow=33.00 cfs 2.115 af

Pond VP2: VP 2 - (2) 18" DIP Peak Elev=412.63' Inflow=28.36 cfs 1.809 af
18.0" Round Culvert x 2.00 n=0.013 L=19.0' S=0.0005 '/' Outflow=28.36 cfs 1.809 af

Total Runoff Area = 27.941 ac Runoff Volume = 6.358 af Average Runoff Depth = 2.73"
12.24% Pervious = 3.421 ac 87.76% Impervious = 24.520 ac

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1P: Ops Bldg Runoff Area=0.424 ac 100.00% Impervious Runoff Depth=4.89"
Tc=5.0 min CN=98 Runoff=3.20 cfs 0.173 af

Subcatchment 2P: Ops Parking Runoff Area=0.150 ac 100.00% Impervious Runoff Depth=4.89"
Tc=5.0 min CN=98 Runoff=1.13 cfs 0.061 af

Subcatchment 3P: North 2 Runoff Area=1.952 ac 100.00% Impervious Runoff Depth=4.89"
Tc=5.0 min CN=98 Runoff=14.71 cfs 0.796 af

Subcatchment 4P: North 3 Runoff Area=2.370 ac 100.00% Impervious Runoff Depth=4.89"
Tc=5.0 min CN=98 Runoff=17.87 cfs 0.966 af

Subcatchment 5P: Glycol Storage-N Runoff Area=0.500 ac 64.00% Impervious Runoff Depth=2.73"
Tc=5.0 min CN=77 Runoff=2.52 cfs 0.114 af

Subcatchment 6P: Glycol Storage-S Runoff Area=0.691 ac 100.00% Impervious Runoff Depth=4.89"
Tc=5.0 min CN=98 Runoff=5.21 cfs 0.282 af

Subcatchment 7D: 7P Runoff Area=1.540 ac 12.99% Impervious Runoff Depth=0.58"
Tc=20.0 min CN=47 Runoff=0.56 cfs 0.075 af

Subcatchment 8D: 8P Runoff Area=0.240 ac 100.00% Impervious Runoff Depth=4.89"
Tc=5.0 min CN=98 Runoff=1.81 cfs 0.098 af

Subcatchment 8P: South-1 Runoff Area=0.276 ac 100.00% Impervious Runoff Depth=4.89"
Tc=5.0 min CN=98 Runoff=2.08 cfs 0.113 af

Subcatchment 8S: Ops Bldg Runoff Area=1.550 ac 36.13% Impervious Runoff Depth=1.38"
Tc=5.0 min CN=60 Runoff=3.87 cfs 0.178 af

Subcatchment 9P: South-2 Runoff Area=0.476 ac 100.00% Impervious Runoff Depth=4.89"
Tc=5.0 min CN=98 Runoff=3.59 cfs 0.194 af

Subcatchment 10P: South-3 Runoff Area=0.489 ac 100.00% Impervious Runoff Depth=4.89"
Tc=5.0 min CN=98 Runoff=3.69 cfs 0.199 af

Subcatchment 11P: South-4 Runoff Area=0.476 ac 100.00% Impervious Runoff Depth=4.89"
Tc=5.0 min CN=98 Runoff=3.59 cfs 0.194 af

Subcatchment 12D: 12P Runoff Area=0.140 ac 100.00% Impervious Runoff Depth=4.89"
Tc=5.0 min CN=98 Runoff=1.06 cfs 0.057 af

Subcatchment 12P: South-5 Runoff Area=0.489 ac 100.00% Impervious Runoff Depth=4.89"
Tc=5.0 min CN=98 Runoff=3.69 cfs 0.199 af

Subcatchment 13D: 13P Runoff Area=0.240 ac 100.00% Impervious Runoff Depth=4.89"
Tc=5.0 min CN=98 Runoff=1.81 cfs 0.098 af

Subcatchment 13P: South-6 Runoff Area=0.476 ac 100.00% Impervious Runoff Depth=4.89"
Tc=5.0 min CN=98 Runoff=3.59 cfs 0.194 af

Subcatchment 14P: South-7 Runoff Area=0.476 ac 100.00% Impervious Runoff Depth=4.89"
Tc=5.0 min CN=98 Runoff=3.59 cfs 0.194 af

Subcatchment 15D: 15P Runoff Area=1.220 ac 100.00% Impervious Runoff Depth=4.89"
Tc=5.0 min CN=98 Runoff=9.20 cfs 0.497 af

Subcatchment 15P: South-8a Runoff Area=0.341 ac 100.00% Impervious Runoff Depth=4.89"
Tc=5.0 min CN=98 Runoff=2.57 cfs 0.139 af

Subcatchment 16D: North 1 Runoff Area=1.550 ac 100.00% Impervious Runoff Depth=4.89"
Tc=5.0 min CN=98 Runoff=11.68 cfs 0.632 af

Subcatchment 16P: South-8 Runoff Area=1.311 ac 30.51% Impervious Runoff Depth=1.17"
Tc=5.0 min CN=57 Runoff=2.72 cfs 0.128 af

Subcatchment BAY1: Deice Pad-West Runoff Area=1.306 ac 100.00% Impervious Runoff Depth=4.89"
Tc=5.0 min CN=98 Runoff=9.84 cfs 0.533 af

Subcatchment BAY2: Deice Pad-West Runoff Area=1.417 ac 100.00% Impervious Runoff Depth=4.89"
Tc=5.0 min CN=98 Runoff=10.68 cfs 0.578 af

Subcatchment BAY3: Deice Pad-West Runoff Area=1.459 ac 100.00% Impervious Runoff Depth=4.89"
Tc=5.0 min CN=98 Runoff=11.00 cfs 0.595 af

Subcatchment BAY4: Deice Pad-East Runoff Area=1.417 ac 100.00% Impervious Runoff Depth=4.89"
Tc=5.0 min CN=98 Runoff=10.68 cfs 0.578 af

Subcatchment BAY5: Deice Pad-East Runoff Area=1.458 ac 100.00% Impervious Runoff Depth=4.89"
Tc=5.0 min CN=98 Runoff=10.99 cfs 0.594 af

Subcatchment BAY6: Deice Pad-East Runoff Area=1.417 ac 100.00% Impervious Runoff Depth=4.89"
Tc=5.0 min CN=98 Runoff=10.68 cfs 0.578 af

Subcatchment BAY7: Deice Pad-East Runoff Area=1.421 ac 100.00% Impervious Runoff Depth=4.89"
Tc=5.0 min CN=98 Runoff=10.71 cfs 0.579 af

Subcatchment BAY8: Deice Pad-East Runoff Area=0.669 ac 100.00% Impervious Runoff Depth=4.89"
Tc=5.0 min CN=98 Runoff=5.04 cfs 0.273 af

Pond 1: 18" HDPE Peak Elev=411.76' Inflow=3.20 cfs 0.173 af
18.0" Round Culvert n=0.013 L=68.0' S=0.0029 '/' Outflow=3.20 cfs 0.173 af

Pond 5: 15" HDPE Peak Elev=412.32' Inflow=1.13 cfs 0.061 af
15.0" Round Culvert n=0.013 L=298.0' S=0.0041 '/' Outflow=1.13 cfs 0.061 af

Pond 6: 24" HDPE Peak Elev=412.97' Inflow=12.94 cfs 0.700 af
24.0" Round Culvert n=0.013 L=113.0' S=0.0058 '/' Outflow=12.94 cfs 0.700 af

Pond 7: 18" HDPE Peak Elev=414.87' Inflow=10.86 cfs 0.588 af
18.0" Round Culvert n=0.013 L=135.0' S=0.0012 '/' Outflow=10.86 cfs 0.588 af

Pond 8: 18" HDPE Peak Elev=413.93' Inflow=7.27 cfs 0.393 af
18.0" Round Culvert n=0.013 L=173.0' S=0.0015 '/' Outflow=7.27 cfs 0.393 af

Pond 9: 18" HDPE Peak Elev=413.03' Inflow=3.59 cfs 0.194 af
18.0" Round Culvert n=0.013 L=173.0' S=0.0020 '/' Outflow=3.59 cfs 0.194 af

Pond 10: 18" HDPE Peak Elev=411.58' Inflow=3.69 cfs 0.199 af
18.0" Round Culvert n=0.013 L=211.0' S=0.0020 '/' Outflow=3.69 cfs 0.199 af

Pond 11: 24" HDPE Peak Elev=411.49' Inflow=7.27 cfs 0.393 af
24.0" Round Culvert n=0.013 L=160.0' S=0.0019 '/' Outflow=7.27 cfs 0.393 af

Pond 12: 24" HDPE Peak Elev=411.63' Inflow=10.86 cfs 0.588 af
24.0" Round Culvert n=0.013 L=127.0' S=0.0020 '/' Outflow=10.86 cfs 0.588 af

Pond 13: 24" RCP Peak Elev=412.32' Inflow=13.43 cfs 0.727 af
24.0" Round Culvert n=0.015 L=168.0' S=0.0015 '/' Outflow=13.43 cfs 0.727 af

Pond 18: 24" HDPE Peak Elev=413.34' Inflow=14.71 cfs 0.796 af
24.0" Round Culvert n=0.013 L=311.0' S=0.0020 '/' Outflow=14.71 cfs 0.796 af

Pond 19: 36" HDPE Peak Elev=412.74' Inflow=32.58 cfs 1.762 af
36.0" Round Culvert n=0.013 L=156.0' S=0.0015 '/' Outflow=32.58 cfs 1.762 af

Pond 20: 36" HDPE Peak Elev=412.81' Inflow=32.58 cfs 1.762 af
36.0" Round Culvert n=0.013 L=496.0' S=0.0015 '/' Outflow=32.58 cfs 1.762 af

Pond CB14: 4' x 6'-8" CB w/ 24" RCP Peak Elev=411.88' Storage=48 cf Inflow=8.25 cfs 0.594 af
24.0" Round Culvert n=0.015 L=173.0' S=0.0020 '/' Outflow=8.25 cfs 0.594 af

Pond CB15: 4' x 6'-8" CB w/ 30" ERCP Peak Elev=411.67' Storage=52 cf Inflow=16.41 cfs 1.172 af
38.0" x 24.0", R=31.2" Elliptical Culvert n=0.015 L=170.0' S=0.0020 '/' Outflow=16.41 cfs 1.172 af

Pond CB16: 4' x 6'-8" CB w/ 36" ERCP Peak Elev=411.68' Storage=61 cf Inflow=24.62 cfs 1.752 af
45.0" x 29.0", R=39.2" Elliptical Culvert n=0.015 L=163.0' S=0.0015 '/' Outflow=24.62 cfs 1.752 af

Pond CB17: 4' x 6'-8" CB w/ 36" ERCP Peak Elev=411.62' Storage=67 cf Inflow=29.07 cfs 2.024 af
45.0" x 29.0", R=39.2" Elliptical Culvert n=0.015 L=45.0' S=0.0009 '/' Outflow=29.07 cfs 2.024 af

Pond CB2: 4' x 6'-8" CB w/ 36" ERCP Peak Elev=413.28' Storage=72 cf Inflow=32.46 cfs 2.283 af
45.0" x 29.0", R=39.2" Elliptical Culvert n=0.015 L=68.0' S=0.0010 '/' Outflow=32.40 cfs 2.283 af

Pond CB3: 4' x 6'-8" CB w/ 30" ERCP Peak Elev=413.88' Storage=84 cf Inflow=24.45 cfs 1.750 af
38.0" x 24.0", R=31.2" Elliptical Culvert n=0.015 L=171.0' S=0.0010 '/' Outflow=24.48 cfs 1.750 af

Pond CB31: 12" RCP Peak Elev=412.13' Inflow=2.31 cfs 0.044 af
12.0" Round Culvert n=0.015 L=137.0' S=0.0051 '/' Outflow=2.31 cfs 0.044 af

Pond CB32: 18" HDPE Peak Elev=412.04' Inflow=7.28 cfs 0.176 af
18.0" Round Culvert n=0.013 L=40.0' S=0.0050 '/' Outflow=7.28 cfs 0.176 af

Pond CB4: 4' x 6'-8" CB w/ 30" ERCP Peak Elev=413.01' Storage=56 cf Inflow=16.35 cfs 1.173 af
38.0" x 24.0", R=31.2" Elliptical Culvert n=0.015 L=173.0' S=0.0010 '/' Outflow=16.35 cfs 1.173 af

Pond CB5: 4' x 6'-8" CB w/ 24" RCP Peak Elev=413.00' Storage=51 cf Inflow=8.10 cfs 0.578 af
24.0" Round Culvert n=0.015 L=173.0' S=0.0010 '/' Outflow=8.10 cfs 0.578 af

Pond D8P: 48" RCP Peak Elev=403.45' Inflow=8.93 cfs 0.313 af
48.0" Round Culvert n=0.015 L=272.0' S=0.0058 '/' Outflow=8.93 cfs 0.313 af

Pond DMH1: 36" ERCP Peak Elev=413.60' Inflow=35.95 cfs 2.517 af
45.0" x 29.0", R=39.2" Elliptical Culvert n=0.015 L=106.0' S=0.0011 '/' Outflow=35.95 cfs 2.517 af

Pond DMH10: 36" HDPE Peak Elev=412.09' Inflow=41.01 cfs 2.751 af
36.0" Round Culvert n=0.013 L=57.0' S=0.0011 '/' Outflow=41.01 cfs 2.751 af

Pond DMH11: DMH 11 Peak Elev=412.68' Inflow=41.01 cfs 2.751 af
Primary=28.03 cfs 2.586 af Secondary=12.98 cfs 0.165 af Outflow=41.01 cfs 2.751 af

Pond DMH12: 24" HDPE Peak Elev=408.57' Inflow=7.74 cfs 0.239 af
24.0" Round Culvert n=0.013 L=115.0' S=0.0100 '/' Outflow=7.74 cfs 0.239 af

Pond DMH13: 36" HDPE Peak Elev=411.75' Inflow=32.58 cfs 1.762 af
36.0" Round Culvert n=0.013 L=151.0' S=0.0015 '/' Outflow=32.58 cfs 1.762 af

Pond DMH14: DMH 14 Peak Elev=411.70' Inflow=32.58 cfs 1.762 af
Primary=23.44 cfs 1.668 af Secondary=9.14 cfs 0.095 af Outflow=32.58 cfs 1.762 af

Pond DMH2: 36" HDPE Peak Elev=414.59' Inflow=47.72 cfs 3.217 af
36.0" Round Culvert n=0.013 L=55.0' S=0.0020 '/' Outflow=47.72 cfs 3.217 af

Pond DMH3: DMH 3 Peak Elev=418.21' Inflow=47.72 cfs 3.217 af
Primary=39.90 cfs 3.093 af Secondary=7.82 cfs 0.124 af Outflow=47.72 cfs 3.217 af

Pond DMH6: DMH 6 Peak Elev=411.85' Inflow=8.93 cfs 0.313 af
18.0" Round Culvert n=0.013 L=156.0' S=0.0313 '/' Outflow=8.93 cfs 0.313 af

Pond DMH8: 36" HDPE Peak Elev=413.67' Inflow=41.01 cfs 2.751 af
36.0" Round Culvert n=0.013 L=285.0' S=0.0010 '/' Outflow=41.01 cfs 2.751 af

Pond DMH9: 36" HDPE Peak Elev=413.79' Inflow=41.01 cfs 2.751 af
36.0" Round Culvert n=0.013 L=448.0' S=0.0011 '/' Outflow=41.01 cfs 2.751 af

Pond DS1: Dry Swale Peak Elev=413.06' Storage=1,269 cf Inflow=2.72 cfs 0.128 af
Discarded=0.80 cfs 0.128 af Primary=0.00 cfs 0.000 af Outflow=0.80 cfs 0.128 af

Pond DS2: Dry Swale Peak Elev=413.04' Storage=337 cf Inflow=3.87 cfs 0.178 af
Discarded=0.20 cfs 0.104 af Primary=3.66 cfs 0.074 af Outflow=3.86 cfs 0.178 af

Pond DS3: Dry Swale Peak Elev=415.56' Storage=490 cf Inflow=11.68 cfs 0.632 af
Discarded=0.55 cfs 0.251 af Primary=11.03 cfs 0.381 af Outflow=11.59 cfs 0.632 af

Pond DS4: Dry Swale Peak Elev=415.13' Storage=265 cf Inflow=2.52 cfs 0.114 af
Discarded=0.20 cfs 0.070 af Primary=2.31 cfs 0.044 af Outflow=2.51 cfs 0.114 af

Pond DS5: Dry Swale Peak Elev=416.21' Storage=321 cf Inflow=5.21 cfs 0.282 af
Discarded=0.22 cfs 0.150 af Primary=4.97 cfs 0.132 af Outflow=5.19 cfs 0.282 af

Pond E59P: 18" HDPE Peak Elev=407.39' Inflow=0.00 cfs 0.000 af
18.0" Round Culvert n=0.013 L=57.0' S=0.0168 '/' Outflow=0.00 cfs 0.000 af

Pond F12P: 66" RCP Peak Elev=401.39' Inflow=26.62 cfs 1.107 af
66.0" Round Culvert n=0.015 L=301.0' S=0.0018 '/' Outflow=26.62 cfs 1.107 af

Pond F13P: 66" RCP Peak Elev=402.45' Inflow=25.57 cfs 1.050 af
66.0" Round Culvert n=0.015 L=215.0' S=0.0066 '/' Outflow=25.57 cfs 1.050 af

Pond F14P: 54" RCP Peak Elev=403.35' Inflow=23.77 cfs 0.952 af
54.0" Round Culvert n=0.015 L=128.0' S=0.0049 '/' Outflow=23.77 cfs 0.952 af

Pond F15P: 54" RCP Peak Elev=404.19' Inflow=23.77 cfs 0.952 af
54.0" Round Culvert n=0.015 L=132.0' S=0.0069 '/' Outflow=23.77 cfs 0.952 af

Pond F16P: 54" RCP Peak Elev=405.30' Inflow=14.66 cfs 0.455 af
54.0" Round Culvert n=0.015 L=291.0' S=0.0052 '/' Outflow=14.66 cfs 0.455 af

Pond F17P: 24" RCP Peak Elev=412.68' Inflow=3.66 cfs 0.074 af
24.0" Round Culvert n=0.015 L=63.0' S=0.0138 '/' Outflow=3.66 cfs 0.074 af

Pond F7P: 72" RCP Peak Elev=399.36' Inflow=32.43 cfs 1.519 af
72.0" Round Culvert n=0.015 L=333.0' S=0.0017 '/' Outflow=32.43 cfs 1.519 af

Pond F8P: 72" RCP Peak Elev=400.21' Inflow=28.43 cfs 1.205 af
72.0" Round Culvert n=0.015 L=1,062.0' S=0.0004 '/' Outflow=28.43 cfs 1.205 af

Pond IC1: Infiltration Chamber-West Peak Elev=411.44' Storage=27,483 cf Inflow=47.72 cfs 3.217 af
Discarded=18.79 cfs 3.081 af Primary=4.60 cfs 0.137 af Outflow=23.39 cfs 3.217 af

Pond IC2A: Infiltration Chamber-Northeast Peak Elev=409.52' Storage=17,958 cf Inflow=32.58 cfs 1.762 af
Discarded=9.15 cfs 1.627 af Primary=5.18 cfs 0.136 af Outflow=14.33 cfs 1.762 af

Pond IC2B: Infiltration Chamber-Southeast Peak Elev=409.08' Storage=26,232 cf Inflow=41.01 cfs 2.751 af
Discarded=13.97 cfs 2.648 af Primary=3.10 cfs 0.104 af Outflow=17.08 cfs 2.751 af

Pond P1: Deice Bay 1 Peak Elev=416.05' Storage=1,940 cf Inflow=9.84 cfs 0.533 af
Outflow=8.00 cfs 0.533 af

Pond P2: Deice Bay 2 Peak Elev=416.05' Storage=2,553 cf Inflow=10.68 cfs 0.578 af
Outflow=8.10 cfs 0.578 af

Pond P3: Deice Bay 3 Peak Elev=416.06' Storage=2,703 cf Inflow=11.00 cfs 0.595 af
Outflow=8.25 cfs 0.595 af

Pond P4: Deice Bay 4 Peak Elev=416.05' Storage=2,553 cf Inflow=10.68 cfs 0.578 af
Outflow=8.10 cfs 0.578 af

Pond P5: Deice Bay 5 Peak Elev=416.06' Storage=2,701 cf Inflow=10.99 cfs 0.594 af
Outflow=8.25 cfs 0.594 af

Pond P6: Deice Bay 6 Peak Elev=415.65' Storage=2,495 cf Inflow=10.68 cfs 0.578 af
Outflow=8.17 cfs 0.578 af

Pond P7: Deice Bay 7 Peak Elev=415.07' Storage=2,489 cf Inflow=10.71 cfs 0.579 af
Outflow=8.20 cfs 0.579 af

Pond P8: Deice Bay 8 Peak Elev=414.61' Storage=587 cf Inflow=5.04 cfs 0.273 af
Outflow=4.57 cfs 0.273 af

Pond VP1: VP 1 - (2) 24" DIP Peak Elev=413.87' Inflow=47.72 cfs 3.217 af
24.0" Round Culvert x 2.00 n=0.013 L=15.0' S=0.0013 '/' Outflow=47.72 cfs 3.217 af

Pond VP2: VP 2 - (2) 18" DIP Peak Elev=415.66' Inflow=41.01 cfs 2.751 af
18.0" Round Culvert x 2.00 n=0.013 L=19.0' S=0.0005 '/' Outflow=41.01 cfs 2.751 af

Total Runoff Area = 27.941 ac Runoff Volume = 9.890 af Average Runoff Depth = 4.25"
12.24% Pervious = 3.421 ac 87.76% Impervious = 24.520 ac

APPENDIX E

WEEKLY SOIL EROSION AND SEDIMENT CONTROL INSPECTION CHECKLIST

II. CONSTRUCTION DURATION INSPECTIONS

A. DIRECTIONS:

Inspection Forms will be filled out during the entire construction phase of the project.

Required Elements:

(1) On a site map, indicate the extent of all disturbed site areas and drainage pathways. Indicate site areas that are expected to undergo initial disturbance or significant site work within the next 14-day period;

(2) Indicate on a site map all areas of the site that have undergone temporary or permanent stabilization;

(3) Indicate all disturbed site areas that have not undergone active site work during the previous 14-day period;

(4) Inspect all sediment control practices and record the approximate degree of sediment accumulation as a percentage of sediment storage volume (for example, 10 percent, 20 percent, 50 percent);

(5) Inspect all erosion and sediment control practices and record all maintenance requirements such as verifying the integrity of barrier of diversion systems (earthen berms or silt fencing) and containment systems (sediment basins and sediment traps). Identify any evidence of rill or gully erosion occurring on slopes and any loss of stabilizing vegetation or seeding/mulching. Document any excessive deposition of sediment or ponding water along barrier or diversion systems. Record the depth of sediment with containment structures, any erosion near outlet and overflow structures, and verify the ability of rock filters around perforated riser pipes to pass water; and

(6) Immediately report to the Operator any deficiencies that are identified with the implementation of the SWPPP.

SITE PLAN/SKETCH (Attached)

Inspector (print name)	**Date of Inspection**
Qualified Professional (print name)	**Qualified Professional Signature**

The above signed acknowledges that, to the best of his/her knowledge, all information provided on the forms is accurate and complete.

Permit Identification Number: _____

Approximate Area of Disturbance: _____ Temperature: _____

Maintaining Water Quality

Yes	No	NA	
[ ]	[ ]	[ ]	Is there an increase in turbidity causing a substantial visible contrast to natural conditions?
[ ]	[ ]	[ ]	Is there residue from oil and floating substances, visible oil film, or globules or grease?
[ ]	[ ]	[ ]	All disturbance is within the limits of the approved plans.
[ ]	[ ]	[ ]	Have receiving lake/bay, stream, and/or wetland been impacted by silt from project?

Housekeeping

1. General Site Conditions

Yes	No	NA	
[ ]	[ ]	[ ]	Is construction site litter and debris appropriately managed?
[ ]	[ ]	[ ]	Are facilities and equipment necessary for implementation of erosion and sediment control in working order and/or properly maintained?
[ ]	[ ]	[ ]	Is construction impacting the adjacent property?
[ ]	[ ]	[ ]	Is dust adequately controlled?

Runoff Control Practices

1. Excavation Dewatering

Yes	No	NA	
[ ]	[ ]	[ ]	Upstream and downstream berms (sandbags, inflatable dams, etc.) are installed per plan.
[ ]	[ ]	[ ]	Clean water from upstream pool is being pumped to the downstream pool.
[ ]	[ ]	[ ]	Sediment laden water from work area is being discharged to a silt-trapping device.
[ ]	[ ]	[ ]	Constructed upstream berm with one-foot minimum freeboard.

Soil Stabilization

1. Topsoil and Spoil Stockpiles

Yes	No	NA	
[ ]	[ ]	[ ]	Stockpiles are stabilized with vegetation and/or mulch.
[ ]	[ ]	[ ]	Sediment control is installed at the toe of the slope.

2. Revegetation

Yes	No	NA	
[ ]	[ ]	[ ]	Temporary seedings and mulch have been applied to idle areas.
[ ]	[ ]	[ ]	4 inches minimum of topsoil has been applied under permanent seedings

Sediment Control Practices

1. Dust Control

Yes	No	NA	
[ ]	[ ]	[ ]	Dust resulting from land-disturbing activities is being controlled.
[ ]	[ ]	[ ]	On driving areas, water is being applied by sprinkling until the surface is wet.
[ ]	[ ]	[ ]	On paved access routes, a street sweeper is being used to remove dust and debris.
[ ]	[ ]	[ ]	On non-driving areas, measures such as vegetative cover, mulch or sprayed adhesives are being employed.

2. Compost Filter Sock

Yes	No	NA	
[ ]	[ ]	[ ]	Installed on Contour, 10 feet from toe of slope (not across conveyance channels).
[ ]	[ ]	[ ]	Joints constructed by wrapping the two ends together for continuous support.
[ ]	[ ]	[ ]	Secured tight to the ground.
[ ]	[ ]	[ ]	Stable, sock is tight and without rips or frayed areas.

Sediment accumulation is ___% of design capacity.

3. Storm Drain Inlet Protection (Use for Dandy Sack or Ultra-Drain Guard; Stone & Block; Filter Fabric; Curb; or, Excavated practices)

Yes	No	NA	
[ ]	[ ]	[ ]	Dandy Sack or Ultra-Drain Guard installed per plans & details.
[ ]	[ ]	[ ]	Installed concrete blocks lengthwise so open ends face outward, not upward.
[ ]	[ ]	[ ]	Placed wire screen between No. 3 crushed stone and concrete blocks.
[ ]	[ ]	[ ]	Drainage area is 1acre or less.
[ ]	[ ]	[ ]	Excavated area is 900 cubic feet.
[ ]	[ ]	[ ]	Excavated side slopes should be 2:1.
[ ]	[ ]	[ ]	2” x 4” frame is constructed and structurally sound.
[ ]	[ ]	[ ]	Posts 3-foot maximum spacing between posts.
[ ]	[ ]	[ ]	Fabric is embedded 1 to 1.5 feet below ground and secured to frame/posts with staples at max 8-inch spacing.
[ ]	[ ]	[ ]	Posts are stable, fabric is tight and without rips or frayed areas.

Sediment accumulation ___% of design capacity.

Notes: Not all erosion and sediment control practices are included in this listing. Add additional pages to this list as required by site specific design.
Construction inspection checklists for post-development storm water management practices can be found in Appendix F of the New York Stormwater Management Design Manual.

CONSTRUCTION DURATION INSPECTIONS

b. Modifications to the SWPPP (To be completed as described below)

The Operator shall amend the SWPPP whenever:

1. There is a significant change in design, construction, operation, or maintenance which may have a significant effect on the potential for the discharge of pollutants to the waters of the United States and which has not otherwise been addressed in the SWPPP; or
2. The SWPPP proves to be ineffective in:
   a. Eliminating or significantly minimizing pollutants from sources identified in the SWPPP and as required by this permit; or
   b. Achieving the general objectives of controlling pollutants in stormwater discharges from permitted construction activity; and
3. Additionally, the SWPPP shall be amended to identify any new contractor or subcontractor that will implement any measure of the SWPPP.

Modification & Reason:

III. MONTHLY SUMMARY OF SITE INSPECTION ACTIVITIES

Name of Permitted Facility: _____

Today's Date: _____ **Reporting Month:** _____

Location: _____

Permit Identification #: _____

Name and Telephone Number of Site Inspector: _____

Date of Inspection	Regular Inspection/ Rainfall based Inspection	Name of Inspector	Items of Concern

Owner/Operator Certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that false statements made herein are punishable as a class A misdemeanor pursuant to Section 210.45 of the Penal Law."

_____ _____

Signature of Permittee or Duly Authorized Representative Name of Permittee or Duly Authorized Representative

Date: _____

Duly authorized representatives must have written authorization, submitted to DEC, to sign any permit documents.

APPENDIX F

CONTRACTOR'S CERTIFICATION FORM

CONTRACTOR'S STORM WATER POLLUTION PREVENTION PLAN CERTIFICATION

Airport Name/Location: _____

Project Name: _____

Contractor's Official Name: _____

Address: _____

Telephone Number: _____

Certification Statement:

"I certify under penalty of law that I understand and agree to comply with the terms and conditions of the Storm Water Pollution Prevention Plan for this project presented in the technical specifications of these Contract Documents in Item C-102, "Temporary Air and Water Pollution, Soil Erosion, and Siltation Control". I understand and agree to comply with the terms and conditions of the New York State Pollutant Discharge Elimination System (SPDES) general permit for storm water discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. I understand that the Owner must file a "Notice of Intent for Stormwater Discharges Associated with Construction Activity Under SPDES General Permit #GP-0-25-001 (Permit)". I agree that I will not engage in activity that will cause stormwater to discharge from the construction site until such time that the Owner has received acknowledgment from the New York State Department of Environmental Conservation that construction activity associated with this project is covered under the Permit."

_____	_____
Printed Name of Bidder	Signature
_____	_____
Title	Date

APPENDIX G

ELECTRONIC NOTICE OF INTENT (eNOI)

FOR STORM WATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITY UNDER THE SPDES GENERAL PERMIT

Construction General Permit (CGP) Electronic Notice of Intent (eNOI) GP-0-25-001

version 1.17

(Submission #: HQG-ACDT-39FTA, version 1)

Details

Originally Started By	John Frazee
Alternate Identifier	Syracuse Hancock International Airport Centralized Aircraft Deicing Pad—Region 7
Submission ID	HQG-ACDT-39FTA
Status	Draft
Active Steps	Form Submitted

Form Input

Eligibility

Disturbance Threshold

1. Will the construction activity involve soil disturbances listed in Part I.A.1 of GP-0-25-001?
Yes

1.a. Will any runoff from the site enter a sewer system classified as a combined sewer?
No

1.b. Is this a remediation project being done under a Department approved work plan (i.e. CERCLA, RCRA, Voluntary Cleanup Agreement, etc.) with a SWPPP which meets the substantive requirements of GP-0-25-001?
No

1.c. Is the construction activity related to a stormwater discharge that does not require a permit as described in 40 CFR 122.3(e), e.g. non-point source agriculture or silviculture activities?
No

Other SPDES Permits

2. Will the discharge from the construction activity meet all conditions listed in Part I.A.2 of GP-0-25-001?
Yes

Threatened and Endangered Species

3. Will the construction activity potentially adversely affect a species that is endangered or threatened per Part I.A.3.?
No

State Historic Preservation Act (SHPA)

4. Is the construction activity designated by the Commissioner of the Office of Parks, Recreation and Historic Preservation (OPRHP), pursuant to 9 NYCRR §§428.12 or 428.13 as exempt from the SHPA review (see Attachment 2 of the Letter of Resolution between NYSDEC and OPRHP, dated January 9, 2015)?
No

4.a. Will the construction activity:

a) occur within an archeologically sensitive area indicated on the sensitivity map, or

b) have the potential to affect a property that is listed or determined to be eligible for listing on the National or State Registers of Historic Places, or

c) include a new permanent building on the construction site within the following distances from a building, structure, or object that is more than 50 yea and OPRHP, a Historic Preservation Commission of a Certified Local Government, or a qualified preservation professional has determined is a historically/archeologically significant building, structure, or object:

- 1-5 acres of disturbance—20 feet
- 5-20 acres of disturbance—50 feet
- 20+ acres of disturbance—100 feet?

No

4.b. Is there documentation at the construction site demonstrating:

a) that the construction activity is not within an archeologically sensitive area indicated on the sensitivity map, and that the construction activity is not immediately adjacent to a property listed or determined to be eligible for listing on the National or State Registers of Historic Places, and

b) that there is no new permanent building to be built on the construction site within the following distances from a building, structure, or object that is n than 50 years old, or if there is such a new permanent building on the construction site within those parameters that OPRHP, a Historic Preservation Commission of a Certified Local Government, or a qualified preservation professional has determined that the building, structure, or object more than 5(years old is not historically/archeologically significant:

- 1-5 acres of disturbance – 20 feet
- 5-20 acres of disturbance – 50 feet
- 20+ acres of disturbance – 100 feet?

Yes

State Environmental Quality Review (SEQR)

5. Is the construction activity subject to SEQR (Part I.A.5.), or the equivalent environmental review from another NYS or federal agency (Part I.A.6.)?
Yes

5.a. Has the owner/operator obtained documentation that the project review pursuant to SEQR, or the equivalent, has been satisfied per Part I.A.5. or I.A.6. of GP-0-25-001?
Yes

Uniform Procedures Act (UPA) Permits

6. Has the owner/operator obtained all necessary UPA permits from NYSDEC, or the equivalent from another NYS or federal agency per Part I.A.7.a. of GP-0-25-001? Select "Yes" if no UPA permits, or the equivalent, are required for this construction activity.
Yes

Steep Slope

7. Is the construction activity within the watershed of surface waters of the State classified as AA or AA-S identified utilizing the Stormwater Interactive Map on NYSDEC's website?
No

Owner/Operator Information

8. Owner/Operator Name
Syracuse Regional Airport Authority

9. Owner/Operator Contact Person Information

First and Last Name	Phone	E-mail
Arjun Nair	315-455-3652	naira@syrairport.org

10. Owner/Operator Mailing Address
1000 COL EILEEN COLLINS BLVD
SYRACUSE, NY 13212-3903
USA

11. Is the billing contact different from the Owner/Operator Contact?
No

12. What type of organization is the owner/operator?
Municipality (City, Town, Village)

Site Information

13. Project/Site Name
Syracuse Hancock International Airport Centralized Aircraft Deicing Pad

14. Site Address
1000 COL EILEEN COLLINS BLVD
SYRACUSE, NY 13212-3903
Onondaga

DEC Region
7

15. Site Latitude & Longitude
43.1108066618431,-76.11122844766098

Project Details

16. This eNOI submission is for:
A construction activity not part of a common plan of development or sale in accordance with Part I.D.1.a.

17. Does the project type fall under Table 1 or Table 2 of Appendix B of GP-0-25-001? If any portion of the construction activity falls under Table 2, regardless of the size of the disturbance, select "Table 2".
Table 2

18. Consistent with Part III.B.1.c.i. of GP-0-25-001, provide a concise overview of the project. Describe existing and proposed conditions, and include any other relevant information.
This project aims to centralize aircraft deicing efforts into the existing south deicing pad through the expansion and reconstruction of the south deicing pad. This consists of full depth asphalt pavement reconstruction, asphalt pavement mill and overlay, and new asphalt pavement. The total project area is approximately 26.3 acres of which approximately 1.5 acres will undergo an asphalt mill and overlay (not considered disturbance), 11.8 acres will include new asphalt pavement, 8.0 acres will undergo full depth reconstruction of existing asphalt pavement, and the remaining 5.0 acres of turf area is expected to be disturbed from excavation and grading operations during construction. Post-construction stormwater controls will be provided in the form of dry swales and underground infiltration chambers for the redevelopment area. The dry swales will discharge to catch basins (check dams provided to provide storage/infiltration). Grass filter strips will provide pretreatment for the dry swales. The underground infiltration chambers will include a series of separator rows wrapped in geotextile fabric, providing pretreatment. Preconstruction hydrology (peak flow rates) will be maintained.

Enter the total project site acreage, the acreage to be disturbed, and the future impervious area (acreage) within the disturbed area, rounded to the nearest tenth of an acre.

19. Total Site Area (acres)
26.3

20. Total Area to be Disturbed (acres)
24.8

21. Existing Impervious Area to be Disturbed (acres)
10.8

22. Future Impervious Area Within Disturbed Area (acres)
21.8

Nature of the project:
Redevelopment with increase in impervious area

23. Do you plan to disturb more than 5 acres of soil at any one time?
No

---

24. Indicate the percentage (%) of each Hydrologic Soil Group(HSG) at the site.

A (%)
100

B (%)
0

C (%)
0

D (%)
0

25. Enter the planned start and end dates of the disturbance activities.

Start Date
10/05/2026

End Date
10/01/2027

26. Identify the nearest surface waterbody(ies) to which construction site runoff will discharge.
Ley Creek

27. Type of waterbody identified in question 26?
Stream/Creek Off Site

28. Has the surface waterbody in question 26 been identified as a 303(d) segment in Appendix D of GP-0-25-001?
Yes

29. Is this project located in one of the Watersheds identified in Appendix C of GP-0-25-001?
Yes

30. Will the project disturb soils within a State regulated wetland or the protected 100 foot adjacent area?
No

31. Does the site runoff enter a separate storm sewer system (including roadside drains, swales, ditches, culverts, etc)?
Yes

31.a. What is the name of the municipality/entity that owns the separate storm sewer system? If the separate sewer system is owned by an MS4 Operator, enter the MS4 Operator name.
Syracuse Regional Airport Authority

32. Will future use of this site be an agricultural property as defined by the NYS Agriculture and Markets Law?
No

33. Is this property owned by a state authority, state agency, federal government or local government?
Yes

Required SWPPP Components

General SWPPP Requirements

34. Has a SWPPP been developed in conformance with the requirements in Part III. of GP-0-25-001?
Yes

35. Does the SWPPP demonstrate consideration of the future physical risks due to climate change pursuant to the CRRA, 6 NYCRR Part 490, and associated guidance per Part III.A.2. of GP-0-25-001?
Yes

36. Has the required Erosion and Sediment Control component of the SWPPP been developed in conformance with the current NYS Standards and Specifications for Erosion and Sediment Control (aka Blue Book)?
Yes

37. Has the post-construction stormwater management practice component of the SWPPP been developed in conformance with the NYS Stormwater Management Design Manual?
Yes

37.a. Which version of the NYS Stormwater Management Design Manual was used to develop the SWPPP?
2024

SWPPP Preparer

39. The Stormwater Pollution Prevention Plan (SWPPP) was prepared by:
Professional Engineer (P.E.)

40. Name of the person who prepared the SWPPP
John Frazee

41. SWPPP Preparer Organization Name
C&S Engineers, Inc.

42. SWPPP Preparer Contact Information

First and Last Name	Phone	E-mail
John Frazee	315-455-2000	jfrazee@cscos.com

43. SWPPP Preparer Address
499 COL EILEEN COLLINS BLVD
SYRACUSE, NY 13212-3930

Download SWPPP Preparer Certification Form

Please take the following steps to prepare and upload your preparer certification form:

1) Click on the link below to download a blank certification form
2) The certified SWPPP preparer should sign this form
3) Upload the completed form
Download SWPPP Preparer Certification Form

44. Please upload the SWPPP Preparer Certification
NONE PROVIDED
Comment
NONE PROVIDED

44.a. Has the SWPPP Preparer Certification Form been signed by the SWPPP preparer in accordance with Part VII.J of GP-0-25-001?
Yes

Erosion & Sediment Control Criteria

45. Has a construction sequence schedule for the planned management practices been prepared?
Yes

Post-Construction Criteria

Site Planning and Soil Restoration

46. Identify all site planning practices that were used to prepare the final site plan/layout for the project.
Preservation of Undisturbed Area
Reduction of Clearing and Grading

47. Indicate which of the following soil restoration criteria was used to address the requirements in Section 5.1.6 ("Soil Restoration") of the Design Manual.
All disturbed areas will be restored in accordance with the Soil Restoration requirements in Table 5.3 of the Design Manual (see page 5-22).

Water Quality Criteria

49. Water Quality Sizing Criteria

Total WQv required (acre-feet)	Total RRv provided (acre-feet)	Minimum RRv (acre-feet)	Total WQv provided (acre-feet)	Sum of RRv and WQv provided
2.248	1.978	1.192	0.271	2.249

Water Quantity Criteria

50. Per Section 9.2.1.C.VI and VII of the 2024 Design Manual, is there 0% change to hydrology that increases the discharge rate and volume from the project site?
Yes

Operation and Maintenance

53. Has a long-term Operation and Maintenance Plan for the post-construction stormwater management practice(s) been developed?
Yes

53.a. Identify the entity responsible for the long-term Operation and Maintenance.
Syracuse Regional Airport Authority

Post-Construction SMP Identification

54. Post-Construction RR Techniques and Standard SMPs

RR Techniques and SMPs	Contributing Impervious Area (acres)	Total Contributing Area (acres)
Underground Infiltration System (I-4)	11.060	
Dry Swale (O-1)	1.240	

55. Alternative SMPs

Type of Alternative SMP	Manufacturer of the Alternative SMP	Name of the Alternative SMP	Contributing Impervious Area (acres)
NONE PROVIDED	*NONE PROVIDED*	*NONE PROVIDED*	*NONE PROVIDED*

Other Permits

56. Identify other permits, existing and new, that are required for this project/facility.
None

57. Is this NOI for a change in owner/operator per Part I.G.?
No

MS4 SWPPP Acceptance

59. Will the construction activities be within the municipal boundary(ies) of Traditional Land Use Control MS4 Operator(s) and discharge to the MS4(s)?
Yes

59.a. Which form is required per Part I.D.2.b.ii.?
MS4 SWPPP Acceptance Form

MS4 SWPPP Acceptance Form Download

Download the MS4 SWPPP Acceptance Form from the link below.
MS4 SWPPP Acceptance Form

60. MS4 Acceptance or No Jurisdiction Form Upload
NONE PROVIDED
Comment
NONE PROVIDED

60.a. Has the form been signed by the principal executive officer or ranking elected official—or duly authorized representative of that person—in accordance with Part VII.J. and submitted along with this NOI?
Yes

Owner/Operator Certification

Owner/Operator Certification Form Download

Download the Owner/Operator Certification Form by clicking the link below.
Owner/Operator Certification Form

61. Upload Owner/Operator Certification Form
NONE PROVIDED
Comment
NONE PROVIDED

61.a. Has the Owner/Operator Certification Form from Appendix J been signed by the owner/operator, or a representative of the owner/operator in accordance with Part VII.J of GP-0-25-001 and uploaded to the eNOI?
Yes

Additional Project Information

62. Enter any additional pertinent project information in the text box below.
NONE PROVIDED

Status History

	User	Processing Status
10/13/2025 10:19:00 AM	John Frazee	Draft

Processing Steps

Step Name	Assigned To/Completed By	Date Completed
Form Submitted		
Issue SPDES Permit ID	Daniel von Schilgen	

SWPPP Preparer Certification Form

SPDES General Permit for Stormwater Discharges from Construction Activity, GP-0-25-001 (CGP)

(In accordance with CGP Part I.D.2.b., the completed form must be attached to the eNOI and submitted to NYSDEC electronically.)

Project/Site Name:	Syracuse Hancock International Airport Centralized Aircraft Deicing Pad
eNOI Submission ID:	HQG-ACDT-39FTA
Owner/Operator Name:	Syracuse Regional Airport Authority

Certification Statement – SWPPP Preparer

I hereby certify that the Stormwater Pollution Prevention Plan (SWPPP) has been prepared in accordance with the requirements of GP-0-25-001. I certify under penalty of law that the SWPPP and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

John	F	Frazee
SWPPP Preparer First Name	MI	SWPPP Preparer Last Name

Signature

Date

Revised: January 2025

Owner/Operator Certification Form

SPDES General Permit for Stormwater Discharges from Construction Activity, GP-0-25-001 (CGP)

(In accordance with CGP Part I.D.2.b. or Part I.F.2. and 3., the completed form must be attached to the eNOI or the Request to Continue Coverage, and submitted to NYSDEC electronically.

Project/Site Name: Syracuse Hancock International Airport Centralized Aircraft Deicing Pad

eNOI Submission ID: HQG-ACDT-39FTA

eNOI Submitted by: ☐ **Owner/Operator** ☑ **SWPPP Preparer** ☐ **Other**

Certification Statement - Owner/Operator

I hereby certify that I read, and will comply with, the GP-0-25-001 permit requirements. I understand that authorization to discharge under the permit for the project/site named above is dependent on receipt of a Letter of Authorization (LOA) or a Letter of Continued Coverage (LOCC) from the New York State Department of Environmental Conservation (NYSDEC) in accordance with CGP Part I.D.3.b. or Part I.F.4. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Owner/Operator First Name MI Owner/Operator Last Name

_____

Signature

_____

Date

Revised: January 2025

MS4 SWPPP Acceptance Form

for construction activities seeking authorization under the

SPDES General Permit for Stormwater Discharges from Construction Activity, GP-0-25-001 (CGP)

(In accordance with CGP Part I.D.2.b., the completed form must be attached to the eNOI and submitted to NYSDEC electronically.)

I. Project Owner/Operator Information	
1. Owner/Operator Name:	Syracuse Regional Airport Authority
2. Contact Person:	Arjun Nair
3. Street Address:	1000 Col Eileen Collins Blvd.
4. City/State/Zip:	Syracuse, NY 13212
II. Project Site Information	
5. Project/Site Name:	Syracuse Hancock International Airport Centralized Aircraft Deicing Pad
6. Street Address:	1000 Col Eileen Collins Blvd.
7. City/State/Zip:	Syracuse, NY 13212
III. Stormwater Pollution Prevention Plan (SWPPP) Review and Acceptance Information	
8. SWPPP Reviewed by:	Douglas A Miller, P.E.
9. Title/Position:	Engineer for the Town of DeWitt
10. Date Final SWPPP Reviewed and Accepted:	
IV. Regulated MS4 Information	
11. Name of MS4 Operator:	Town of Dewitt
12. MS4 SPDES Permit Identification Number: NYR20A	156
13. Street Address:	5400 Butternut Drive
14. City/State/Zip:	East Syracuse, NY 13057
15. Telephone Number:	315-446-3910

MS4 SWPPP Acceptance Form - continued

V. Certification Statement - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative

I hereby certify that the final Stormwater Pollution Prevention Plan (SWPPP) for the construction project identified in section II. of this form has been reviewed and meets the substantive requirements in the SPDES General Permit for Stormwater Discharges from Construction Activity, GP-0-25-001 (CGP). Note: The MS4 Operator, through the acceptance of the SWPPP, assumes no responsibility for the accuracy and adequacy of the design included in the SWPPP. In addition, review and acceptance of the SWPPP by the MS4 Operator does not relieve the owner/operator or their SWPPP preparer of responsibility or liability for errors or omissions in the plan.

Printed Name[1]: Douglas A Miller, P.E.

Title/Position: Engineer for the Town of DeWitt

Signature:

Date:

VI. Additional Information

[1] Printed name of the principal executive officer or ranking elected official for the MS4 Operator or their duly authorized representative in accordance with CGP Part VII.J.2.

APPENDIX H

SAMPLE NOTICE OF TERMINATION (eNOT)

FOR STORM WATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITY UNDER THE SPDES GENERAL PERMIT

New York State Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505
***(NOTE:** Submit completed form to address above)*

NOTICE OF TERMINATION for Storm Water Discharges Authorized under the SPDES General Permit for Construction Activity

Please indicate your permit identification number: NYR _____ _____ _____ _____ _____ _____

I. Owner or Operator Information

1. Owner/Operator Name: Syracuse Regional Airport Authority

2. Street Address: 1000 Col. Eileen Collins Blvd.

3. City/State/Zip: Syracuse, New York 13212

4. Contact Person: Arjun Nair | 4a. Telephone: 315-455-3652

5. Contact Person E-Mail: naira@syrairport.org

II. Project Site Information

5. Project Site Name: Syracuse Hancock International Airport – Centralized Deicing Facility (CDF) Project

6. Street Address: 1000 Col. Eileen Collins Blvd.

7. City/Zip: Syracuse, New York 13212

8. County: Onondaga

III. Reason for Termination

9a. ☐ All disturbed areas have achieved final stabilization in accordance with the general permit and SWPPP.

***Date final stabilization completed** (month/year): _____

9b. ☐ Permit coverage has been transferred to new owner/operator. Indicate new owner/operator's permit identification number: NYR _____ _____ _____ _____ _____ _____
(Note: Permit coverage cannot be terminated by owner identified in I.1 above until new owner/operator obtains coverage under the general permit)

9c. ☐ Other (Explain on Page 2)

IV. Final Site Information

10a. Did this construction activity require the development of a SWPPP that includes post-construction stormwater management practices? ☐ yes ☐ no (If no, go to question 10f.)

10b. Have all post-construction stormwater management practices included in the final SWPPP been constructed?
☐ yes ☐ no (If no, explain on Page 2)

10c. Identify the entity responsible for long-term operation and maintenance of practice(s)?

_____

NOTICE OF TERMINATION for Storm Water Discharges Authorized under the SPDES General Permit for Construction Activity – continued

10d. Has the entity responsible for long-term operation and maintenance been given a copy of the operation and maintenance plan required by the general permit? ☐ yes ☐ no

10e. Indicate the method used to ensure long-term operation and maintenance of the post-construction stormwater management practice(s):

- ☐ Post-construction storm water management practice(s) and any right-of-way(s) needed to maintain practice(s) have been deeded to the municipality.
- ☐ Executed maintenance agreement is in place with the municipality that will maintain the post-construction stormwater management practice(s).
- ☐ For post-construction stormwater management practice(s) that are privately owned, a mechanism is in place that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan, such as a deed covenant in the owner or operator's deed of record.
- ☐ For post-construction stormwater management practices that are owned by a public or private institution (e.g. school, university, hospital), government agency or authority, or public utility; policy and procedures are in place that ensures operation and maintenance of the practice(s) in accordance with the operation and maintenance plan.

10f. Provide the total area of impervious surface (i.e. roof, pavement, concrete, gravel, etc.) constructed within the disturbance area? _____ (acres)

11. Is this project subject to the requirements of a regulated, traditional land use control MS4? ☐ yes ☐ no
(If Yes, complete section VI – "MS4 Acceptance" statement

V. Additional Information/Explanation:
(Use this section to answer questions 9c. and 10b., if applicable)

VI. MS4 Acceptance – MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative (Note: Not required when 9b. is checked-transfer of coverage)

I have determined that it is acceptable for the owner or operator of the construction project identified in question 5
to submit the Notice of Termination at this time.

Printed Name:

Title/Position:

Signature:	Date:

NOTICE OF TERMINATION for Storm Water Discharges Authorized under the SPDES General Permit for Construction Activity – continued	
VII. Qualified Inspector Certification – Final Stabilization	
I hereby certify that all disturbed areas have achieved final stabilization as defined in the current version of the general permit, and that all temporary, structural erosion and sediment control measures have been removed. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.	
Printed Name:	
Title/Position:	
Signature:	Date:
VIII. Qualified Inspector Certification – Post-construction Stormwater Management Practice(s)	
I hereby certify that all post-construction stormwater management practices have been constructed in conformance with the SWPPP. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.	
Printed Name:	
Title/Position:	
Signature:	Date:
IX. Owner or Operator Certification	
I hereby certify that this document was prepared by me or under my direction or supervision. My determination, based upon my inquiry of the person(s) who managed the construction activity, or those persons directly responsible for gathering the information, is that the information provided in this document is true, accurate and complete. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.	
Printed Name:	
Title/Position:	
Signature:	Date:

(NYS DEC Notice of Termination – January 2015)

Item C-105 Mobilization

105-1 Description. This item of work shall consist of, but is not limited to, work and operations necessary for the movement of personnel, equipment, material and supplies to and from the project site for work on the project except as provided in the contract as separate pay items.

105-2 Mobilization limit. Mobilization shall be limited to 4 percent of the total project cost.

105-3 Posted notices. Prior to commencement of construction activities, the Contractor must post the following documents in a prominent and accessible place where they may be easily viewed by all employees of the prime Contractor and by all employees of subcontractors engaged by the prime Contractor: Equal Employment Opportunity (EEO) Poster "Equal Employment Opportunity is the Law" in accordance with the Office of Federal Contract Compliance Programs Executive Order 11246, as amended; Davis Bacon Wage Poster (WH 1321) - DOL "Notice to All Employees" Poster; and Applicable Davis-Bacon Wage Rate Determination. These notices must remain posted until final acceptance of the work by the Owner.

105-4 Engineer/RPR field office and equipment. The Contractor shall provide dedicated space for the use of the field RPR and inspectors, as a field office for the duration of the project. This space shall be located conveniently near the construction and shall be separate from any space used by the Contractor. The Contractor shall furnish water, sanitary facilities, heat, air conditioning, and electricity in accordance with local building codes.

105-4.1 Field Office. The Contractor shall supply for the RPR's use, a building or mobile trailer which shall be erected at the location shown on the Contract Drawings and shall be separate from any building used by the Contractor. The field office, equipment and all appurtenances shall be onsite, installed and operational at least 3 days prior to commencement of construction, and shall remain in place for a period of 7 days after the date of final acceptance of the project. The Contractor shall maintain all facilities and furnished equipment in good working condition.

The field office shall have a minimum ceiling height of 7 feet and shall be provided with four weather proof windows and two weatherproof doors, each equipped with adequate locking devices. Each window shall have a minimum area of 8 square feet, shall be screened and of a type that will open and close to provide adequate ventilation.

The field office shall have a minimum of 320 square feet of floor space. The field office shall be partitioned to provide two rooms with adjoining doors. The smaller rooms shall be not less than 95 square feet in floor area and each shall contain two windows.

Lighting shall consist of electric non-glare type luminaries that provide a minimum level of 93 foot-candles at desk height level. Heating and cooling units shall be capable of maintaining an ambient air temperature of 70 degrees F, +/- 5 degrees. Hot and cold running water shall be provided. The water may be provided from a municipal water line, or from potable bottled water. Potable bottled water shall utilize a dispensing unit capable of providing hot and cold water.

The field office shall have a separately enclosed room, properly ventilated and complying with applicable sanitary codes with a flush-type toilet. The Contractor shall provide all lavatory amenities, necessary paper and soap products, and hot and cold running water. Sanitary and water supply for the restroom may be via portable tanks if utility service is not available.

The Contractor shall provide a parking area for 5 vehicles. The area shall be 45 feet wide by 18 feet long, and shall be paved, crushed stone, gravel or bank-run material. A sidewalk shall be constructed of the same material connecting the parking area to the door of the field office. Steps shall be installed at each door to the field office and shall include a hand rail. Steps shall meet the requirements of all applicable building, safety, and health regulations and laws. Portable steps, when used, shall be set level and shall be suitably anchored to the ground to prevent movement.

The office shall be cleaned at least once weekly, and at other times as directed by the RPR.

The Contractor may furnish equivalent facilities in an existing building provided such facilities and buildings are located conveniently near to the construction, and provided the building and location is acceptable to the RPR.

The field office and site shall be maintained in good condition and appearance by the Contractor for the designated period, after which the field office, utilities and appurtenances shall be removed and the site restored to a condition equal to or better than original condition. The Contractor shall be responsible, until use and occupancy of the field office is relinquished by the RPR, for any and all damage, direct or indirect, of whatever nature, occurring to the property of the Owner and RPR, including the property of other employees of the RPR assigned to the field office, which is kept in the field office. The responsibility of property shall include only those items used by appropriate personnel in the performance of project related work activities. Such property shall be replaced within 30 days of the reported damages and shall include any loss caused by, but not limited to, fire, theft, vandalism, and malicious mischief.

The RPR shall provide the Contractor with a detailed list of items, with corresponding dollar values, belonging to the RPR, and the RPR's personnel. The list shall be updated at least every three months, but not more than once a month. The Contractor shall not be responsible for items kept in the RPR's field office that are not on this list.

105-4.2 Field Office Equipment:

A. Desks and chairs. The Contractor shall provide 1 office desk that is at least 2-1/2 feet by 5 feet each and 2 office chairs.

B. Drafting table and stools. The Contractor shall provide 1 drafting table which is approximately 3 feet by 6 feet and 2 stools.

C. Office table. The Contractor shall provide an office table which is at least 3 feet by 6 feet.

D. Network access, additional equipment and appurtenances. The Contractor shall provide following items in the field office:

a. A secured wired or wireless network with ability for printing and scanning documents and access to high speed internet for multiple computers and/or devices available from the start of the project for the project duration. Internet Access shall be obtained through one of the following methods* (in order of preference):

1. Cable Modem
2. Wireless Broadband Access Card
3. Satellite Modem

ii. *A minimum download speed of 40 Mbps is required for the accepted internet connection. Connection type shall be approved by the RPR.

NOTE: CONSTRUCTION CAN NOT COMMENCE WITHOUT A VERIFIED AND APPROVED HIGH SPEED NETWORK CONNECTION. THE SERVICE IS REQUIRED AS THE RPR CONSTRUCTION MANAGEMENT SOFTWARE IS CLOUD BASED.

E. Printer paper and ink cartridges. The Contractor shall provide a printer capable of printing 8-1/2 x 11 and 11 x 17 along with a supply of 8-1/2 x 11 inch and 11 x 17 inch printer paper and

spare printer ink cartridges in the field office. The supply shall be replenished as needed throughout the duration of the project.

F. Refrigerator. The Contractor shall provide a standard electric cold storage type refrigerator providing a minimum storage space of 3 cubic feet.

G. Fire resistant cabinet. The Contractor shall provide one fire resistant cabinet. Each cabinet shall be 2 drawer, legal size with lock and 2 keys, meeting the requirements for "Insulating Filing Devised, Class 350-1 Hour (D)" of ANSI/UL 72 or the Class D rating of Underwriters Laboratories specification for insulated filing devices.

H. Bookcases. The Contractor shall provide one self-standing 3 shelf metal bookcase. The bookcase shall be approximately 4 feet high by 4 feet wide by 1 foot deep.

I. First aid kit. The Contractor shall provide a first aid kit properly stocked with appropriate first aid supplies.

J. Fire extinguishers. The Contractor shall provide one fire extinguisher per room. The fire extinguisher shall be a non-toxic dry chemical, fire extinguisher meeting Underwriters Laboratories, Inc., approval for Class A, Class B and Class C fires with a minimum rating of 2A:10B:10C.

K. Tack boards. The Contractor shall provide one cork tack board mounted on a wall. The tack board shall be a minimum of 2 feet high by 4 feet wide.

L. Waste paper baskets. The Contractor shall provide a metal waste basket in each room.

M. SWPPP Mailbox. The Contractor shall provide and install a standard mailbox. The mailbox shall be installed at a location to be determined during construction. The mailbox shall be labeled "SWPPP"

METHOD OF MEASUREMENT

105-5 .1 Measurement for payment of mobilization will be made on a lump sum basis. Measurement for partial payment of mobilization will be made based percentage of work completed in accordance with the schedule shown in Section 6.1.

105-5.2 Measurement for payment for the field office, and for field office equipment will be made on lump sum bases. Measurements for partial payment of each item may be made at the discretion of the RPR as the work progresses based on contract time or percent of work completed.

BASIS OF PAYMENT

105-6.1 Payment for mobilization will be made on a lump sum basis. Based upon the contract lump sum price for "Mobilization" partial payments will be allowed as follows:

a. With first pay request, 25%.

b. When 25% or more of the original contract is earned, an additional 25%.

c. When 50% or more of the original contract is earned, an additional 40%.

d. After Final Inspection, Staging area clean-up and delivery of all Project Closeout materials as required by Section 90, paragraph 90-11, *Contractor Final Project Documentation,* the final 10%.

105-6.2 The lump sum prices bid for the field office, and for field office equipment shall include all utility charges, equipment, materials, labor and incidentals necessary to complete this item. Partial payments of the lump sum price bid may be made at the discretion of the RPR as the work progresses based on contract time or percent of work completed. No payment shall be made for items omitted by the Owner or not properly maintained by the Contractor throughout the duration of the project.

Payment will be made under:

Item C-105-1	Mobilization (4% max.) – per lump sum
Item C-105-2	Field Office – per lump sum
Item C-105-3	Field Office Equipment – per lump sum

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Office of Federal Contract Compliance Programs (OFCCP)

Executive Order 11246, as amended

EEOC-P/E-1 – Equal Employment Opportunity is the Law Poster

United States Department of Labor, Wage and Hour Division (WHD)

WH 1321 – Employee Rights under the Davis-Bacon Act Poster

END OF ITEM C-105

Item C-106 Safety, Security and Maintenance of Traffic

DESCRIPTION

106-1.1 General. This work shall consist of maintaining aircraft and vehicular traffic and protecting the public from damage to person and property within the limits of and for the duration of the Contract, and as specified in the Construction Safety and Phasing Plan, Appendix A to Section 70. Contractor is responsible for maintenance and repair of these items, regardless of cause of damage, until the project is accepted.

The following items are specifically included without limiting the generality implied by these Specifications and the Contract Drawings. Contractor is responsible for maintenance and repair of these items, regardless of cause of damage, until the project is accepted.

- Restoration of all surfaces disturbed as a result of the Contractor's Operations which are not otherwise paid for.
- Utility investigation, including private utility locating service and hydro excavation and soft digs.
- Installation, maintenance, repair and removal of temporary access roads and maintenance and repair of existing access roads, including dust control measures.
- Installation, maintenance, repair and removal of temporary barricades, barricade lights, barricade flags, warning signs, construction access route signs, construction warning fence and signs and hazard markings.
- Installation, maintenance, repair and removal of temporary stormwater pipes.
- Installation, maintenance, repair and removal of temporary lights and lighting circuits.
- Installation, maintenance, repair and removal of temporary electrical circuit jumpers to maintain circuit connectivity across the work site.
- Installation, maintenance, repair and removal of temporary closed taxiway markers, sign and light covers.
- Testing and maintenance of existing and new lighting circuitry.
- Cleaning and maintenance of all paved areas.
- Construction escorts and escort vehicles.
- Security requirements, including training and airport security badges.
- Temporary airfield pavement markings, removal and placement, associated with construction work phasing. All markings shall be in accordance with item P-620.
- On site spoil area management, including but not limited to: Topsoil stripping, screening, replacement; site grading; temporary and/or permanent seeding and mulching; temporary soil erosion control devices; hauling and travel; site topographic survey as required; gate guards.
- Utility coordination with National Grid and OCWA.
- In general, all requirements associated with Construction Safety and Phasing Plan (CSPP) not otherwise paid for under contract items.

106-1.2 On Site Spoil Area. Approved spoil area(s) for the Contractor's use on this project are generally shown on the Contract Plans, however the exact position and features will be provided by Airport Operations and the RPR during construction.

The Contractor will be required to continuously grade the spoil area to maintain a neat and orderly condition. Erosion and sediment controls including compost filter sock, temporary seed and mulch, and other measures as deemed necessary by the RPR shall be installed and maintained by the Contractor. Existing topsoil shall be stripped, screened and replaced over embankment at the completion of spoiling operations. The Contractor will be required to grade and shape the spoil area to meet airport requirements. The site shall be graded smooth to maintain existing drainage patterns and be sloped in a manner to allow safe passage of the airport's finish grass mowing equipment. This may include restrictions on height, side slopes, and condition. At the completion of the project, the Contractor shall permanently seed and mulch the stockpile in accordance with specifications T-901 and T-908, and remove all temporary soil erosion and sediment control measures once turf is established.

METHOD OF MEASUREMENT

106-2.1 Measurement for payment of safety, security and maintenance of traffic will be made on a lump sum basis. Measurements for partial payment may be made at the discretion of the RPR as the work progresses based on contract time or percent of work completed.

BASIS OF PAYMENT

106-3.1 The lump sum price bid for safety, security and maintenance of traffic shall include all equipment, materials, labor and incidentals necessary to adequately and safely maintain and protect traffic.

In the event the contract completion date is extended, no additional payment will be made for safety, security and maintenance of traffic. Partial payments of the lump sum price bid may be made for this item at the discretion of the RPR as the work progresses based on contract time or work completed, less any deductions for unsatisfactory safety, security and maintenance of traffic.

No payment will be made under safety, security and maintenance of traffic for each calendar day during which there are substantial deficiencies in compliance with the Specification requirements of any subsection of this Section as determined by the RPR. The amount of such calendar day non-payment will be determined by dividing the lump sum amount bid for safety, security and maintenance of traffic by the number of calendar days between the date the Contractor commences work and the date of completion as designated in this proposal, without regard to any extension of time.

If the Contractor fails to maintain and protect traffic adequately and safely for a period of 24 hours, the Owner shall correct the adverse conditions by any means it deems appropriate and shall deduct the cost of the corrective work from any monies due the Contractor. The cost of this work shall be in addition to the liquidated damages and non-payment for safety, security and maintenance of traffic listed above.

However, where major nonconformance with the requirements of this Specification is noted by the RPR and prompt Contractor compliance is deemed not to be obtainable, all contract work may be stopped by direct order of the RPR regardless of whether corrections are made by the Owner as stated in the paragraph above.

Payment will be made under:

C-106-1	Safety, Security and Maintenance of Traffic - per lump sum

END OF ITEM C-106

Item C-107 Project Survey and Stakeout

DESCRIPTION

107-1.1 Project survey and stakeout shall be completed in accordance with this specification. The Contractor shall do all necessary surveying required to construct all elements of the Project. Project survey and stakeout shall be performed by competently qualified personnel acceptable to the Engineer. The survey and stakeout shall be progressed in advance of construction operations such that the layout does not impede the construction schedule. All survey work shall be provided under the direction of a Licensed Surveyor licensed in the State in which the project is located.

EQUIPMENT & MATERIALS

107-2.1 General. All instruments, equipment, stakes and any other material necessary to perform the work satisfactorily shall be provided by the Contractor. It shall be the Contractor's responsibility to maintain these stakes in their proper position and location at all times.

107-2.2 Equipment.

1. Surveying Equipment. Upon request, the Contractor shall make available to the RPR, a rod, level, and tripod. The rod shall be telescoping rod, 15 feet in length with hundredth of a foot graduations. The level shall be self-leveling and have documentation demonstrating it has been calibrated within twelve months of the project's commencement.

2. GPS Inspection Units.
   a. GPS units provided for a single contract shall be of the same model and manufacturer; and shall include, and be licensed to operate, the same versions of GPS planning software, data collection software, navigation software, stakeout software and post processing software. All software provided (including firmware) shall be the most current available from the manufacturer at the time of delivery of the GPS units. GPS inspection units should be of the same manufacturer as those used by the Contractor. GPS units shall not be more than 2 years old from the date of manufacturing to the time of delivery. To verify the age of the GPS units, the Contractor shall provide a dated copy of the manufacturer's receipt(s) for the purchase, lease or rental of the units.

   b. GPS units shall include both standard USB cable and Bluetooth wireless technology for data transfer.

   c. Data shall be capable of being copied onto or from a removable industry standard data storage card (e.g.: secure digital SD Card). Each GPS Unit shall include 2 data storage cards, each with a minimum capacity of 4 GB each.

   d. GPS units shall include the ability to import/export and display point and alignment data which is in XML format, and also import graphics files which are in DGN or DXF format.

   e. GPS units shall have an internal, or modular, rechargeable battery system capable of operating a minimum of 8 hours (may include interchangeable batteries), and shall include a battery charger.

f. GPS units shall include a hard or soft shell carry case, and all appropriate operation manuals.

3. Survey Grade GPS Inspection Units.

   a. The Contractor shall make available upon request, the RPR with one GPS Inspection Unit for use during the course of the project. GPS units shall be equipped to receive Global Positioning System (GPS), GLONASS and GNSS position data.

   b. GPS units shall be equipped to receive, and be capable of utilizing, Real Time Kinematics (RTK) correctional data (current version of RTCM format) through internet protocol as provided from the Continuously Operating Reference System (CORS) Network. This shall include all necessary communication devices, repeaters and systems, data service plans and communications to meet the minimum required accuracy and not exceed a 2 second latency at the rover. Whichever communication method is utilized by the Contractor to broadcast the CORS RTK correctional data, the Contractor shall ensure that the RTK data shall be available at all locations across the entire contract site during all hours of construction and inspection operations.

   c. GPS units shall include the capability to "localize" both the horizontal and vertical control to local project monumentation (also known as calibrate), while utilizing RTK corrections from a reference network.

   d. GPS units shall include either an integrated or modular communication device capable of receiving RTK correctional data to satisfy the requirement of using CORS RTK corrections.

   e. GPS units shall have the ability to display the number of satellites tracked at any one time, and indicate the accuracy quality of each measurement relative to the strength of signals, and the GDOP (Geometric Dilution of Precision).

   f. GPS Unit shall include dual frequency receivers.

   g. Minimum Required Kinematic Accuracy relative to primary project control (CORS): Horizontal: 0.033 ft. + 1.0 ppm; Vertical: 0.065 ft. + 1.0 ppm

   h. All necessary hardware and software shall be included (including communication drivers) to connect the GPS unit to a Tablet PC and communicate/exchange positional data with CADD software.

   i. The data controller shall permit the user to program and store multiple configurations (also known as user preferences) prior to the actual field measurements. Configurations shall be capable of being stored and recalled in the field.

   j. GPS units shall include one fixed height rover rod of 6.56 feet in length, one attachable bipod which is compatible with the rover rod, and one topo shoe.

   k. A GPS unit set up to operate as a base station shall include all necessary additional cables, hardware, fasteners or accessories necessary to install it in a fixed semi-permanent location, will not be considered as a rover unit, and therefore will not require a rover rod, a bi-pod, or a topo shoe

107-2.3 Materials. Stakes used for construction layout shall be sound hardwood stakes having minimum dimensions of 1 inch by 1 inch by 4 feet in length.

CONSTRUCTION METHODS

170-3.1 General. This work shall consist of providing all necessary survey work to establish, spatially position, and verify the locations of existing and proposed features and measure quantities of items in accordance with the contract documents or as directed by the RPR. This work includes but is not limited to the establishment, reestablishment or localization of primary and secondary control, the stakeout or layout of proposed features, the initialization, calibration and navigation of automated equipment operations, the location or verification of existing or of constructed features, the verification of geospatial data for proposed construction work and the coordination and sharing of survey data with the RPR.

The Contractor shall be responsible for trimming trees, brush and other objects from survey lines in advance of all survey work to permit accurate and unimpeded work by the survey crews.

107-3.2 Layout and stakeout. The exact position of all work shall be established from control points, baseline points or other points of similar nature which are shown on the Contract Drawings. Any error, apparent discrepancy or absence in or of data shown or required for accurately accomplishing the stakeout survey shall be referred to the Engineer for interpretation or furnishing when such is observed or required. Stakes shall be clearly and legibly marked based on computations and measurements made by the Contractor. Markings shall include centerline station, offset and cut or fill marks. If markings become faded or blurred, they shall be restored by the Contractor, if requested by the Engineer. Contractor shall locate and place all cut, fill, slope, fine grade or other stakes and points for the proper progress of the work. All control points shall be properly guarded and flagged for easy identification. Reference points, baselines, stakes and benchmarks for borrow pits shall be established by the Contractor. Permanent survey marker locations shall be established and referenced by the Contractor.

The Contractor shall be responsible for the accuracy of his work and shall maintain all reference points, stakes, etc., throughout the life of the Contract. Damaged or destroyed points, benchmarks or stakes, or any reference points made inaccessible by the progress of the construction, shall be replaced or transferred by the Contractor. Any of the above points which may be destroyed or damaged shall be transferred by the Contractor before they are damaged or destroyed. All control points shall be referenced by ties to acceptable objects and recorded. Any alterations or revisions in the ties shall be so noted and the information furnished to the Engineer immediately. All stakeout survey work shall be referenced to the centerlines shown on the Contract Drawings indicating station and offset. All computations necessary to establish the exact position of the work from control points shall be made by the Contractor. All computations, survey notes and other records necessary to accomplish the work shall be neatly made, and shall be made available to the Engineer upon request.

The Engineer may check all or any portion of the stakeout survey work or notes made by the Contractor. Any necessary correction to the work shall be made immediately by the Contractor. Such checking by the Engineer shall not relieve the Contractor of any responsibilities for the accuracy or completeness of his work.

Upon completion of all grading and paving work, the Contractor shall re-establish baseline points, control points, and centerline points at 100 foot stations. The baseline points, control points, and centerline points to be established shall be the same as those used to develop design quantities.

Existing markers, stakes, iron pins, and survey monuments which have a high probability of being disturbed during construction shall be properly tied into fixed reference points before being disturbed and accurately reset in their proper position upon completion of the work.

107-3.3 Verification of Existing Grades. This project was developed using a 3D CADD program. The 3D CADD program created 3D surface files of the existing surfaces, finished surfaces and other various surfaces required to complete the design.

Some volumetric quantities were calculated by comparing surface files of the applicable design surfaces and generating Triangle Volume Reports.

Existing grades on the surface files, where they do not match the locations of actual spot elevations shown on the topographic map, were developed by computer interpolation from those spot elevations. Prior to disturbing original grade, a Licensed Surveyor shall verify the accuracy of the existing ground surface by verifying spot elevations at the same locations where original field survey data was obtained as indicated on the topographic map. For this purpose, the RPR will provide the Contractor with a 3D CADD file of the topographic survey. Surveyor shall recognize that, due to the interpolation process, the actual ground surface at any particular location may differ somewhat from the interpolated surface shown on the design cross sections or obtained from the surface files. Surveyor's verification of original ground surface, however, shall be limited to verification of spot elevations as indicated herein, and no adjustments will be made to the original ground surface unless the Surveyor demonstrates that spot elevations shown are incorrect. For this purpose, spot elevations which are within 0.1 foot of the stated elevations for ground surfaces, or within 0.02 foot for hard surfaces (pavements, buildings, foundations, structures, etc.) shall be considered "no change". Only deviations in excess of these will be considered for adjustment of the original ground surface. If Surveyor's verification identifies discrepancies in the topographic map, Contractor shall notify RPR in writing at least two weeks before disturbance of existing grade to allow sufficient time to verify the submitted information and make adjustments to the design cross sections or surface files. Disturbance of existing grade in any area shall constitute acceptance by the Contractor of the accuracy of the original elevations shown on the topographic map for that area.

The Contractor's survey shall not exceed the following:

- Error of horizontal closure in feet shall not exceed 1 foot/5,000 feet
- Error of vertical closure in feet shall not exceed (0.05 feet)*(bench run length in miles)$^{1/2}$

A point data file of the Contractor's verification of original ground surface shall be provided in electronic format along with a printed hard copy. The point data shall be supplied in one ASCII file containing point number, northing, easting, elevation and descriptor. The data shall be left justified columns separated by commas with decimal points, but no slashes, colons and/or other separators.

107-3.4 Traditional Survey Stakeout. The Contractor shall field locate all features to be constructed from survey control points which are identified on the Plans. Any error, apparent discrepancy or absence in the data shown or required to appropriately accomplish the stakeout survey shall be referred to the RPR immediately for interpretation when such is observed or required.

The Contractor shall place two offset stakes or references points along the center line at maximum intervals of 50 feet and at such intermediate locations as required to determine location and direction. From computations and measurements made by the Contractor, these stakes shall be clearly and legibly marked with the center line station number, offset and cut or fill from which the establishment of the centerline location and elevation can be determined. If markings become illegible for any reason the markings shall be restored by the Contractor. The Contractor shall locate and place all cut, fill, slope, fine grade, or other stakes and points for the proper progress of the work with a maximum station spacing of 50 feet. All control points shall be properly protected and flagged for easy identification.

The Contractor shall be responsible for the accuracy of the work and shall maintain all applicable reference points, stakes, etc. Damaged or destroyed reference points or bench marks made inaccessible by the progress of the construction shall be replaced or transferred by the Contractor. All control points shall be referenced by ties (4 minimum) to specific points on acceptable objects and recorded. Any alterations or revisions in the ties shall be so noted and the information furnished to the RPR. All stakeout survey work related to control shall be referenced to the control line shown in the contract documents. Computations and survey notes necessary to establish the position of the work from control points, shall be made and maintained in a neat, legible and acceptable format by the Contractor. Computations, survey notes and other survey information shall be made available to the RPR within 3 work days from the request. The RPR may check all or any portion of the stakeout survey work or notes made by the Contractor. Such checking by the RPR shall not relieve the Contractor of any responsibilities for the accuracy or completeness of the work.

107-3.5 Automated Stakeout and Automated Machine Guidance Operations. Should the Contractor choose automated methods for the establishment, layout, measurement, equipment guidance or verification of work to be constructed, they shall submit their proposed automated methods including quality control measures as part of their contract control plan for acceptance by the RPR. AMG shall be in accordance with Item P-670, Automated Machine Guidance. When utilizing these methods, all horizontal and vertical survey control, roadway alignment control and existing terrain data shall be shared/exchanged electronically and kept current between the Contractor and the RPR. All original version files of electronic contract data shall be maintained and stored by the RPR.

Prior to beginning field operations, the Contractor and RPR shall mutually determine acceptable uses of and procedures for the technology being used, and how data can be exchanged for use in stakeout, automated machine operations, positional verification, quantity measurements and calculations. All record copies of survey and stakeout data shall be stored and shared in RPR accepted standard formats, and shall be derived primarily from the original electronic data, when provided by the RPR.

Automated survey operations have a high reliance on accurate control networks from which to make measurements, establish positions, and verify geospatial locations of features. Therefore, a strong contract control network in the field which is consistent with the project control used during the design of the contract is essential to the successful use of these technologies with the proposed digital terrain model and alignments. Consistent and well-designed site calibration (localization) for all automated machine guidance, is required to ensure the quality of the contract deliverables. The Contractor shall document which local horizontal and vertical control will be will be used for calibration during construction operations and how that calibration or adjustment will be maintained along the entire contract length. Continued incorporation of CORS Network is essential to maintaining the integrity of positional locations and elevations of features.

The RPR may perform quality assurance verifications of feature positions at any time during the contract. Dimensional tolerances shall hold a higher order of precedence than positional tolerances, but both may require verification. Quality assurance activities by the RPR will not relieve the Contractor of any responsibilities for the quality control of the accuracy or completeness of the work.

107-3.6 GPS Inspection Unit. The Contractor shall furnish, configure, install, maintain and remove a Global Positioning System (GPS) unit as needed for use by the RPR and their inspection staff, including the training of the RPR and their representatives on the use of the GPS unit provided. Additional requirements shall be as specified in Item P-670, Automated Machine Guidance.

All projects shall utilize the CORS as the spatial reference datum network from which RTK corrections are derived. The Contractor shall choose which communication technique and devices will be used which will insure the consistent and reliable delivery of RTK correctional data from the CORS to the GPS unit. When geographic location or lack of a reliable communications network prohibits the use of the CORS, the RPR may approve the use of a Survey Grade GPS Inspection unit as a base station in place of the CORS. The Contractor shall semi-permanently mount the base station in a stable and secure location where it shall not be disturbed by construction activities nor be easily damaged by vandalism and where it shall be capable of providing radio signal coverage over the entire contract area. If the base station cannot broadcast a signal that covers the entire site, the Contractor shall provide adequate repeater radios or other communications. A GPS unit installed as a base station for inspection operations shall only be moved with the approval of the RPR.

The GPS unit shall be maintained and remain in service a maximum of one week after the RPR requests its removal in writing. The Contractor shall maintain the GPS unit and software in good working condition and shall provide replacement due to breakdown, damage, or theft within 2 work days. The Contractor shall retain ownership of the GPS unit at the end of the contract.

107-3.7 GPS Training Provisions. For all GPS units, the RPR and/or their representatives shall be provided with a training session for GPS localization/calibration of the contract site. For all Survey Grade GPS units, the RPR and/or their representatives shall be provided with a minimum of two separate

training sessions on the use and operation of the GPS units. One of these two sessions shall occur within one week of delivery of GPS units to the site. The second of the two classes shall occur upon the request of the RPR. One additional training session shall be provided during each additional contract year that the GPS units are in service. All training shall be performed by a manufacturer-verified trainer who is approved by the RPR. The training shall occur at the RPR's Field Office or at a location agreed to by the RPR.

107-3.8 Survey Reference Points.

1. Existing horizontal and vertical control points for the Project are those designated on drawings or as determined from investigation of the existing conditions.
2. Locate and protect control points prior to starting Site Work and preserve permanent reference points during construction.
    a. Make no changes or relocations without prior approval of the RPR.
    b. Report to RPR when reference point is lost, destroyed or requires relocation because of necessary changes in grades or locations.
    c. Replace Project control points, which may be lost or destroyed. Airport control points shall be replaced in accordance with their requirements.
    d. Existing property corners, markers, stakes, iron pins, and survey monuments defining property lines which have a high probability of being disturbed during construction shall be properly tied into fixed reference points before being disturbed. If disturbed, they shall be accurately reset in their proper position upon completion of the work.

107-3.9 Project Layout Requirements.

1. Establish a sufficient number of permanent bench marks on Site, as may be required, referenced to data established by survey control points. Record locations of benchmarks with horizontal and vertical data on Project Record Documents.
2. From established control points, layout all Work by establishing all lines and grades at Site necessary to control Work. Contractor shall be responsible for all measurements that may be required for execution of Work to location and limit marks prescribed in appropriate Specification Sections or on Contract Drawings.
3. Furnish, at contractor expense, all such stakes, steel pins, equipment, tools and material and labor that may be required in laying out Work control points.
4. Establish lines and levels. Locate and layout by instrumentation and similar appropriate means:
    a. Verify property, grades, lines, levels and dimensions indicated.
    b. Site Improvements
        1) Provide stakes for grading, fill and topsoil placement.
        2) Layout utility slopes and invert elevations.
        3) Layout limits of pavement demolition and proposed pavement.
4. Verify and coordinate in field all existing and proposed underground components including civil, structural, utilities and other components prior to initiation of the Work. Advise RPR and/or FAA of any conflicts or discrepancies.

107-3.10 Documents.

1. Submit name, address and contact information of Surveyor to RPR.

2. On request of the RPR, submit documentation to certify accuracy of construction survey and stakeout work and compliance with Contract Documents.
3. Submit certificate signed by licensed surveyor certifying that elevations and locations of improvements are in conformance with Contract Documents. Should any work be in non-conformance with Contract Documents, Contractor shall identify all such non-conformance in the certificate.
4. Standards and Availability: Data and other measurements shall be recorded in accordance with standard and approved methods. All field notes, sketches, recordings, and computations in establishing above horizontal and vertical control points shall be available at all times during progress of Work for ready examination by RPR.
5. Maintain complete and accurate record data on underground utilities and obstructions, new and existing, encountered in execution of Work. Record data on Project Record Documents.
6. On completion of major site improvements, prepare certified survey showing dimensions, locations, angles, and elevations of construction.

107-3.11 Computer Aided Drafting & Design (CADD) and 3D Surface files. This project was developed using three-dimensional design software. After award and upon request, the successful bidder will be provided CADD files developed from AutoCAD Civil 3D, and 3D surface files for use. The surface files will be provided for the existing grade, finished grade, and other applicable design surface models. In addition, survey control for the project will be provided in electronic format and the alignments will be provided in XML format. The files may be used for survey and stakeout of the project, but may not be manipulated. A single CADD file will be provided as well, including 2D and 3D information.

The following 3D surfaces will be provided:

SURFACE	DESCRIPTION
Overall Project Site Existing Grade	3D surface of project site overall existing grade elevations per topographic survey prior to construction.
Proposed Finished Grade	3D surface representation of the project site overall proposed finished grade elevations per project design. This surface includes pavement and turf grades.

The following 2D CADD files will be provided:

FILE	DESCRIPTION
Existing Base Map	Existing topographic features, limits of pavement, physical features, existing contours, equipment, structures, lights, signs, known utilities, fence, pipes, and conduits, buildings, etc.
Proposed	Proposed work including alignments, survey data, limits of demolition, limits of pavement, physical features, proposed contours, equipment, structures, pavement marking, lights, signs, utilities, pipes, and conduits.

Unless otherwise shown on the Plans, the Contractor shall assume that the origin of proposed CAD symbols is at the center of the location of the feature. CAD symbols which are not at the center of origin include the following:

Symbol	Origin
Guidance Signs	Longitudinal center at end of sign closest to pavement edge.

The files were developed for the design and depiction of various 2D features (existing and proposed) and 3D features of existing, proposed, and subgrade surfaces. The surface files are depicted on the Contract

Drawings in the form of contours, profiles, typical sections, spot elevations, tables, and other details. The surface file of the existing surface is the database of points from the design topographic survey. The surface files of the other surfaces are the database of points for the surfaces used to design the project.

The Owner allows use of the CADD and surface files in the performance of its work and services on the project with the following **terms and conditions**:

1. That the Owner does not warrant or guarantee the information and data in the CADD and surface files and any accompanying documentation as a substitute for the sound judgment of the Contractor.
2. That the Contractor desires to make use of the CADD and surface files in conjunction with the Work to be provided to the Owner for the subject project.
3. That the Contractor has no rights to the information and data contained in the CADD and surface files or any translated or converted form of these files. The transfer shall not be considered to convey any proprietary interest in the information and data in the CADD and surface files or any translated or converted form of these files or subsequent version thereof.
4. That the information and data contained in the CADD and surface files or in any translated or converted form of these files shall not be used by the Contractor on any other project.
5. That the Contractor may not copy, distribute, sell, rent, sublicense or lease the CADD and surface files or any translated or converted form of these files or any accompanying documentation.
6. That no information or data contained in the CADD and surface files or any translated or converted form of these files shall be transferred in any electronic form without written permission of the Owner.
7. That after completion of the Work by the Contractor as part of this project, the Contractor shall remove the information and data contained in the CADD and surface files, or any translated or converted form of these files, from all of its electronic data processing systems. No electronic copies of the information and data contained in the CADD and surface files or any translated or converted form of these files shall be retained by the Contractor.
8. That the Contractor shall take all steps reasonably necessary to protect the CADD and surface files, or any translated or converted form of these files, from theft or use in a manner inconsistent with these terms and conditions.
9. That the Owner may terminate these terms and conditions at any time and the Contractor shall immediately remove the CADD and surface files, or any translated or converted form of these files, from their electronic data processing systems upon demand of the Owner.
10. That the Owner retains all rights not expressly granted. Nothing in these terms and conditions constitutes a waiver of the Owner's rights under any federal or state law.
11. That the Owner excludes any and all implied warranties, including warranties of merchantability and fitness for a particular purpose, and limits the Contractor's remedy to return of the CADD and surface files and documentation to the Owner for replacement.
12. That the Owner makes no warranty or representation, either express or implied, with respect to the CADD and surface files or accompanying documentation, including their quality, performance, merchantability, or fitness for a particular purpose. The CADD and surface files and documentation are provided "as is" and the Contractor assumes the entire risk as to their quality and performance.

13. That the Owner shall not be liable for any direct, indirect, special, incidental, or consequential damages arising out of the use of, inability to use, or any defect in the CADD and surface files or any translated or converted form of these files or any accompanying documentation.
14. That the Contractor shall indemnify and hold harmless the Owner, its officials and employees, and the RPR for any injury to the person or property of third parties arising out of the use of or any defect in the CADD and surface files or any translated or converted form of these files or any accompanying documentation.
15. That the Contractor shall indemnify and hold harmless the Owner, its officials and employees, and the RPR for any injury arising out of any infringement of the copyright law.
16. That the warranty and remedies set forth in these terms and conditions are exclusive and in lieu of all others, oral or written, express or implied.
17. That nothing contained in these terms and conditions shall be construed to represent or warrant that the Contractor has the right to reproduce or copy any or converted form of these files and the Contractor acknowledges that it has no right to reproduce and include copyright or trade secret notices, or patent rights on any copies, in whole or in part, in any form. All copies of each CADD and surface file remain the property of the Owner and any rights involving the copyright law as modified in 17 U.S.C. §101 et. seq. remain with the Owner.

The above listed terms and conditions are hereby accepted by the Contractor upon execution of the construction contract and transfer of the CAD files upon request.

METHOD OF MEASUREMENT

107-4.1 Measurement for payment of project survey and stakeout will be made on a lump sum basis. Measurement for partial payments, at the discretion of the RPR, will be in proportion to the total amount of contract work completed.

BASIS OF PAYMENT

107-5.1 The lump sum price bid shall include the cost of furnishing all labor, equipment, instruments and all other material necessary to satisfactorily complete the project surveying and stakeout.

Partial payments of the lump sum price bid may be made for this item as the work progresses, at the discretion of the RPR.

Payment will be made under:

Item C-107-1 Project Survey and Stakeout – per lump sum

END OF ITEM 107

Item C-110 Method of Estimating Percentage of Material Within Specification Limits (PWL)

110-1 General. When the specifications provide for acceptance of material based on the method of estimating percentage of material within specification limits (PWL), the PWL will be determined in accordance with this section. All test results for a lot will be analyzed statistically to determine the total estimated percent of the lot that is within specification limits. The PWL is computed using the sample average (X) and sample standard deviation (S_n) of the specified number (n) of sublots for the lot and the specification tolerance limits, L for lower and U for upper, for the particular acceptance parameter. From these values, the respective Quality index, Q_L for Lower Quality Index and/or Q_U for Upper Quality Index, is computed and the PWL for the lot for the specified n is determined from Table 1. All specification limits specified in the technical sections shall be absolute values. Test results used in the calculations shall be to the significant figure given in the test procedure.

There is some degree of uncertainty (risk) in the measurement for acceptance because only a small fraction of production material (the population) is sampled and tested. This uncertainty exists because all portions of the production material have the same probability to be randomly sampled. The Contractor's risk is the probability that material produced at the acceptable quality level is rejected or subjected to a pay adjustment. The Owner's risk is the probability that material produced at the rejectable quality level is accepted.

It is the intent of this section to inform the Contractor that, in order to consistently offset the Contractor's risk for material evaluated, production quality (using population average and population standard deviation) must be maintained at the acceptable quality specified or higher. In all cases, it is the responsibility of the Contractor to produce at quality levels that will meet the specified acceptance criteria when sampled and tested at the frequencies specified.

110-2 Method for computing PWL. The computational sequence for computing PWL is as follows:

a. Divide the lot into n sublots in accordance with the acceptance requirements of the specification.

b. Locate the random sampling position within the sublot in accordance with the requirements of the specification.

c. Make a measurement at each location, or take a test portion and make the measurement on the test portion in accordance with the testing requirements of the specification.

d. Find the sample average (X) for all sublot test values within the lot by using the following formula:

$$\mathbf{X = (x_1 + x_2 + x_3 + \ldots x_n) / n}$$

Where: X = Sample average of all sublot test values within a lot

$x_1, x_2, \ldots x_n$ = Individual sublot test values

n = Number of sublot test values

e. Find the sample standard deviation (S_n) by use of the following formula:

$$S_n = [(d_1^2 + d_2^2 + d_3^2 + \ldots d_n^2)/(n-1)]^{1/2}$$

Where: S_n = Sample standard deviation of the number of sublot test values in the set

$d_1, d_2, \ldots d_n$ = Deviations of the individual sublot test values $x_1, x_2, \ldots$ from the average value X

that is: $d_1 = (x_1 - X)$, $d_2 = (x_2 - X) \ldots d_n = (x_n - X)$

n = Number of sublot test values

f. For single sided specification limits (i.e., L only), compute the Lower Quality Index Q_L by use of the following formula:

$$Q_L = (X - L) / S_n$$

Where: L = specification lower tolerance limit

Estimate the percentage of material within limits (PWL) by entering Table 1 with Q_L, using the column appropriate to the total number (n) of measurements. If the value of Q_L falls between values shown on the table, use the next higher value of PWL.

g. For double-sided specification limits (i.e., L and U), compute the Quality Indexes Q_L and Q_U by use of the following formulas:

$$Q_L = (X - L) / S_n$$
and
$$Q_U = (U - X) / S_n$$

Where: L and U = specification lower and upper tolerance limits

Estimate the percentage of material between the lower (L) and upper (U) tolerance limits (PWL) by entering Table 1 separately with Q_L and Q_U, using the column appropriate to the total number (n) of measurements, and determining the percent of material above P_L and percent of material below P_U for each tolerance limit. If the values of Q_L fall between values shown on the table, use the next higher value of P_L or P_U. Determine the PWL by use of the following formula:

$$PWL = (P_U + P_L) - 100$$

Where: P_L = percent within lower specification limit

P_U = percent within upper specification limit

METHOD OF MEASUREMENT

110-3.1 No measurement will be made for direct payment of estimating percentage of material within specification limits. The cost shall be considered a subsidiary obligation in the completion of the work.

BASIS OF PAYMENT

110-4.1 No payment will be made separately or directly for estimating percentage of material within specification limits on any part of the work. All estimating percentage of material within specification

limits shall be considered a necessary and incidental part of the work and its cost shall be considered by the Contractor and included in the contract unit price for the pay items involved.

EXAMPLE OF PWL CALCULATION

Project: Example Project

Test Item: Item P-401, Lot A.

A. PWL Determination for Mat Density.

1. Density of four random cores taken from Lot A.

A-1 = 96.60
A-2 = 97.55
A-3 = 99.30
A-4 = 98.35
n = 4

2. Calculate average density for the lot.

$X = (x_1 + x_2 + x_3 + \ldots x_n) / n$
$X = (96.60 + 97.55 + 99.30 + 98.35) / 4$
X = 97.95% density

3. Calculate the standard deviation for the lot.

$S_n = [((96.60 - 97.95)^2 + (97.55 - 97.95)^2 + (99.30 - 97.95)^2 + (98.35 - 97.95)^2)) / (4 - 1)]^{1/2}$
$S_n = [(1.82 + 0.16 + 1.82 + 0.16) / 3]^{1/2}$
$S_n = 1.15$

4. Calculate the Lower Quality Index Q_L for the lot. (L=96.3)

$Q_L = (X - L) / S_n$
$Q_L = (97.95 - 96.30) / 1.15$
$Q_L = 1.4348$

5. Determine PWL by entering Table 1 with Q_L= 1.44 and n= 4.

PWL = 98

B. PWL Determination for Air Voids.

1. Air Voids of four random samples taken from Lot A.

A-1 = 5.00
A-2 = 3.74
A-3 = 2.30
A-4 = 3.25

2. Calculate the average air voids for the lot.

$X = (x_1 + x_2 + x_3 \ldots n) / n$
$X = (5.00 + 3.74 + 2.30 + 3.25) / 4$

$X = 3.57\%$

3. Calculate the standard deviation S_n for the lot.

$S_n = [((3.57 - 5.00)^2 + (3.57 - 3.74)^2 + (3.57 - 2.30)^2 + (3.57 - 3.25)^2) / (4 - 1)]^{1/2}$

$S_n = [(2.04 + 0.03 + 1.62 + 0.10) / 3]^{1/2}$

$S_n = 1.12$

4. Calculate the Lower Quality Index Q_L for the lot. (L= 2.0)

$Q_L = (X - L) / S_n$

$Q_L = (3.57 - 2.00) / 1.12$

$Q_L = 1.3992$

5. Determine P_L by entering Table 1 with $Q_L = 1.41$ and $n = 4$.

$P_L = 97$

6. Calculate the Upper Quality Index Q_U for the lot. (U= 5.0)

$Q_U = (U - X) / S_n$

$Q_U = (5.00 - 3.57) / 1.12$

$Q_U = 1.2702$

7. Determine P_U by entering Table 1 with $Q_U = 1.29$ and $n = 4$.

$P_U = 93$

8. Calculate Air Voids PWL

$PWL = (P_L + P_U) - 100$

$PWL = (97 + 93) - 100 = 90$

EXAMPLE OF OUTLIER CALCULATION (REFERENCE ASTM E178)

Project: Example Project

Test Item: Item P-401, Lot A.

A. Outlier Determination for Mat Density.

1. Density of four random cores taken from Lot A arranged in descending order.

A-3 = 99.30

A-4 = 98.35

A-2 = 97.55

A-1 = 96.60

2. From ASTM E178, Table 1, for n=4 an upper 5% significance level, the critical value for test criterion = 1.463.

3. Use average density, standard deviation, and test criterion value to evaluate density measurements.

a. For measurements greater than the average:

If (measurement - average)/(standard deviation) is less than test criterion, then the measurement is not considered an outlier.

For A-3, check if (99.30 - 97.95) / 1.15 is greater than 1.463.

Since 1.174 is less than 1.463, the value is not an outlier.

b. For measurements less than the average:

If (average - measurement)/(standard deviation) is less than test criterion, then the measurement is not considered an outlier.

For A-1, check if (97.95 - 96.60) / 1.15 is greater than 1.463.

Since 1.435 is less than 1.463, the value is not an outlier.

Note: In this example, a measurement would be considered an outlier if the density were:

Greater than (97.95 + 1.463 × 1.15) = 99.63%

OR

less than (97.95 - 1.463 × 1.15) = 96.27%.

Table 1. Table for Estimating Percent of Lot Within Limits (PWL)

Percent Within Limits (P_L and P_U)	Positive Values of Q (Q_L and Q_U)							
	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10
99	1.1541	1.4700	1.6714	1.8008	1.8888	1.9520	1.9994	2.0362
98	1.1524	1.4400	1.6016	1.6982	1.7612	1.8053	1.8379	1.8630
97	1.1496	1.4100	1.5427	1.6181	1.6661	1.6993	1.7235	1.7420
96	1.1456	1.3800	1.4897	1.5497	1.5871	1.6127	1.6313	1.6454
95	1.1405	1.3500	1.4407	1.4887	1.5181	1.5381	1.5525	1.5635
94	1.1342	1.3200	1.3946	1.4329	1.4561	1.4717	1.4829	1.4914
93	1.1269	1.2900	1.3508	1.3810	1.3991	1.4112	1.4199	1.4265
92	1.1184	1.2600	1.3088	1.3323	1.3461	1.3554	1.3620	1.3670
91	1.1089	1.2300	1.2683	1.2860	1.2964	1.3032	1.3081	1.3118
90	1.0982	1.2000	1.2290	1.2419	1.2492	1.2541	1.2576	1.2602
89	1.0864	1.1700	1.1909	1.1995	1.2043	1.2075	1.2098	1.2115
88	1.0736	1.1400	1.1537	1.1587	1.1613	1.1630	1.1643	1.1653
87	1.0597	1.1100	1.1173	1.1192	1.1199	1.1204	1.1208	1.1212
86	1.0448	1.0800	1.0817	1.0808	1.0800	1.0794	1.0791	1.0789
85	1.0288	1.0500	1.0467	1.0435	1.0413	1.0399	1.0389	1.0382
84	1.0119	1.0200	1.0124	1.0071	1.0037	1.0015	1.0000	0.9990
83	0.9939	0.9900	0.9785	0.9715	0.9671	0.9643	0.9624	0.9610
82	0.9749	0.9600	0.9452	0.9367	0.9315	0.9281	0.9258	0.9241
81	0.9550	0.9300	0.9123	0.9025	0.8966	0.8928	0.8901	0.8882
80	0.9342	0.9000	0.8799	0.8690	0.8625	0.8583	0.8554	0.8533
79	0.9124	0.8700	0.8478	0.8360	0.8291	0.8245	0.8214	0.8192
78	0.8897	0.8400	0.8160	0.8036	0.7962	0.7915	0.7882	0.7858
77	0.8662	0.8100	0.7846	0.7716	0.7640	0.7590	0.7556	0.7531
76	0.8417	0.7800	0.7535	0.7401	0.7322	0.7271	0.7236	0.7211
75	0.8165	0.7500	0.7226	0.7089	0.7009	0.6958	0.6922	0.6896
74	0.7904	0.7200	0.6921	0.6781	0.6701	0.6649	0.6613	0.6587
73	0.7636	0.6900	0.6617	0.6477	0.6396	0.6344	0.6308	0.6282
72	0.7360	0.6600	0.6316	0.6176	0.6095	0.6044	0.6008	0.5982
71	0.7077	0.6300	0.6016	0.5878	0.5798	0.5747	0.5712	0.5686
70	0.6787	0.6000	0.5719	0.5582	0.5504	0.5454	0.5419	0.5394
69	0.6490	0.5700	0.5423	0.5290	0.5213	0.5164	0.5130	0.5105
68	0.6187	0.5400	0.5129	0.4999	0.4924	0.4877	0.4844	0.4820
67	0.5878	0.5100	0.4836	0.4710	0.4638	0.4592	0.4560	0.4537
66	0.5563	0.4800	0.4545	0.4424	0.4355	0.4310	0.4280	0.4257
65	0.5242	0.4500	0.4255	0.4139	0.4073	0.4030	0.4001	0.3980
64	0.4916	0.4200	0.3967	0.3856	0.3793	0.3753	0.3725	0.3705
63	0.4586	0.3900	0.3679	0.3575	0.3515	0.3477	0.3451	0.3432
62	0.4251	0.3600	0.3392	0.3295	0.3239	0.3203	0.3179	0.3161
61	0.3911	0.3300	0.3107	0.3016	0.2964	0.2931	0.2908	0.2892

Percent Within Limits (P_L and P_U)	Positive Values of Q (Q_L and Q_U)							
	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10
60	0.3568	0.3000	0.2822	0.2738	0.2691	0.2660	0.2639	0.2624
59	0.3222	0.2700	0.2537	0.2461	0.2418	0.2391	0.2372	0.2358
58	0.2872	0.2400	0.2254	0.2186	0.2147	0.2122	0.2105	0.2093
57	0.2519	0.2100	0.1971	0.1911	0.1877	0.1855	0.1840	0.1829
56	0.2164	0.1800	0.1688	0.1636	0.1607	0.1588	0.1575	0.1566
55	0.1806	0.1500	0.1406	0.1363	0.1338	0.1322	0.1312	0.1304
54	0.1447	0.1200	0.1125	0.1090	0.1070	0.1057	0.1049	0.1042
53	0.1087	0.0900	0.0843	0.0817	0.0802	0.0793	0.0786	0.0781
52	0.0725	0.0600	0.0562	0.0544	0.0534	0.0528	0.0524	0.0521
51	0.0363	0.0300	0.0281	0.0272	0.0267	0.0264	0.0262	0.0260
50	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Percent Within Limits (P_L and P_U)	Negative Values of Q (Q_L and Q_U)							
	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10
49	-0.0363	-0.0300	-0.0281	-0.0272	-0.0267	-0.0264	-0.0262	-0.0260
48	-0.0725	-0.0600	-0.0562	-0.0544	-0.0534	-0.0528	-0.0524	-0.0521
47	-0.1087	-0.0900	-0.0843	-0.0817	-0.0802	-0.0793	-0.0786	-0.0781
46	-0.1447	-0.1200	-0.1125	-0.1090	-0.1070	-0.1057	-0.1049	-0.1042
45	-0.1806	-0.1500	-0.1406	-0.1363	-0.1338	-0.1322	-0.1312	-0.1304
44	-0.2164	-0.1800	-0.1688	-0.1636	-0.1607	-0.1588	-0.1575	-0.1566
43	-0.2519	-0.2100	-0.1971	-0.1911	-0.1877	-0.1855	-0.1840	-0.1829
42	-0.2872	-0.2400	-0.2254	-0.2186	-0.2147	-0.2122	-0.2105	-0.2093
41	-0.3222	-0.2700	-0.2537	-0.2461	-0.2418	-0.2391	-0.2372	-0.2358
40	-0.3568	-0.3000	-0.2822	-0.2738	-0.2691	-0.2660	-0.2639	-0.2624
39	-0.3911	-0.3300	-0.3107	-0.3016	-0.2964	-0.2931	-0.2908	-0.2892
38	-0.4251	-0.3600	-0.3392	-0.3295	-0.3239	-0.3203	-0.3179	-0.3161
37	-0.4586	-0.3900	-0.3679	-0.3575	-0.3515	-0.3477	-0.3451	-0.3432
36	-0.4916	-0.4200	-0.3967	-0.3856	-0.3793	-0.3753	-0.3725	-0.3705
35	-0.5242	-0.4500	-0.4255	-0.4139	-0.4073	-0.4030	-0.4001	-0.3980
34	-0.5563	-0.4800	-0.4545	-0.4424	-0.4355	-0.4310	-0.4280	-0.4257
33	-0.5878	-0.5100	-0.4836	-0.4710	-0.4638	-0.4592	-0.4560	-0.4537
32	-0.6187	-0.5400	-0.5129	-0.4999	-0.4924	-0.4877	-0.4844	-0.4820
31	-0.6490	-0.5700	-0.5423	-0.5290	-0.5213	-0.5164	-0.5130	-0.5105
30	-0.6787	-0.6000	-0.5719	-0.5582	-0.5504	-0.5454	-0.5419	-0.5394
29	-0.7077	-0.6300	-0.6016	-0.5878	-0.5798	-0.5747	-0.5712	-0.5686
28	-0.7360	-0.6600	-0.6316	-0.6176	-0.6095	-0.6044	-0.6008	-0.5982
27	-0.7636	-0.6900	-0.6617	-0.6477	-0.6396	-0.6344	-0.6308	-0.6282
26	-0.7904	-0.7200	-0.6921	-0.6781	-0.6701	-0.6649	-0.6613	-0.6587
25	-0.8165	-0.7500	-0.7226	-0.7089	-0.7009	-0.6958	-0.6922	-0.6896
24	-0.8417	-0.7800	-0.7535	-0.7401	-0.7322	-0.7271	-0.7236	-0.7211
23	-0.8662	-0.8100	-0.7846	-0.7716	-0.7640	-0.7590	-0.7556	-0.7531
22	-0.8897	-0.8400	-0.8160	-0.8036	-0.7962	-0.7915	-0.7882	-0.7858
21	-0.9124	-0.8700	-0.8478	-0.8360	-0.8291	-0.8245	-0.8214	-0.8192
20	-0.9342	-0.9000	-0.8799	-0.8690	-0.8625	-0.8583	-0.8554	-0.8533
19	-0.9550	-0.9300	-0.9123	-0.9025	-0.8966	-0.8928	-0.8901	-0.8882
18	-0.9749	-0.9600	-0.9452	-0.9367	-0.9315	-0.9281	-0.9258	-0.9241
17	-0.9939	-0.9900	-0.9785	-0.9715	-0.9671	-0.9643	-0.9624	-0.9610
16	-1.0119	-1.0200	-1.0124	-1.0071	-1.0037	-1.0015	-1.0000	-0.9990
15	-1.0288	-1.0500	-1.0467	-1.0435	-1.0413	-1.0399	-1.0389	-1.0382
14	-1.0448	-1.0800	-1.0817	-1.0808	-1.0800	-1.0794	-1.0791	-1.0789
13	-1.0597	-1.1100	-1.1173	-1.1192	-1.1199	-1.1204	-1.1208	-1.1212
12	-1.0736	-1.1400	-1.1537	-1.1587	-1.1613	-1.1630	-1.1643	-1.1653
11	-1.0864	-1.1700	-1.1909	-1.1995	-1.2043	-1.2075	-1.2098	-1.2115

Percent Within Limits (P_L and P_U)	Negative Values of Q (Q_L and Q_U)							
	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10
10	-1.0982	-1.2000	-1.2290	-1.2419	-1.2492	-1.2541	-1.2576	-1.2602
9	-1.1089	-1.2300	-1.2683	-1.2860	-1.2964	-1.3032	-1.3081	-1.3118
8	-1.1184	-1.2600	-1.3088	-1.3323	-1.3461	-1.3554	-1.3620	-1.3670
7	-1.1269	-1.2900	-1.3508	-1.3810	-1.3991	-1.4112	-1.4199	-1.4265
6	-1.1342	-1.3200	-1.3946	-1.4329	-1.4561	-1.4717	-1.4829	-1.4914
5	-1.1405	-1.3500	-1.4407	-1.4887	-1.5181	-1.5381	-1.5525	-1.5635
4	-1.1456	-1.3800	-1.4897	-1.5497	-1.5871	-1.6127	-1.6313	-1.6454
3	-1.1496	-1.4100	-1.5427	-1.6181	-1.6661	-1.6993	-1.7235	-1.7420
2	-1.1524	-1.4400	-1.6016	-1.6982	-1.7612	-1.8053	-1.8379	-1.8630
1	-1.1541	-1.4700	-1.6714	-1.8008	-1.8888	-1.9520	-1.9994	-2.0362

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM E178 Standard Practice for Dealing with Outlying Observations

END OF ITEM C-110

Item P-101 Preparation/Removal of Existing Pavements

DESCRIPTION

101-1 This item shall consist of preparation of existing pavement surfaces for overlay, surface treatments, removal of existing pavement, and other miscellaneous items. The work shall be accomplished in accordance with these specifications and the applicable plans.

EQUIPMENT AND MATERIALS

101-2.1 Equipment. All equipment and materials shall be specified here and in the following paragraphs or approved by the Resident Project Representative (RPR). The equipment shall not cause damage to the pavement to remain in place.

101-2.2 Bituminous concrete pavement. Materials for bituminous concrete pavement shall be in accordance with Item P-401, Asphalt Mix Pavement.

101-2.3 Emulsified asphalt. The emulsified asphalt shall conform to the requirements of ASTM D 977 or ASTM D 2397.

101-2.4 Herbicide. Herbicide shall be a commercially produced product made specifically for killing plants and their root systems. Herbicides shall be packaged in standard sealed containers marked with the name of the material, the name of the manufacturer, the net quantity contained therein and shall be in accordance with the provisions of the Federal and State Rules and Regulations in effect at the time of delivery.

101-2.5 Tack coat. Tack coat shall be in accordance with Item P-603, Emulsified Asphalt Tack Coat.

101-2.6 Surface treatment. Surface treatment shall be in accordance with Item P-608, Emulsified Asphalt Seal Coat.

CONSTRUCTION

101-3.1 Removal of existing pavement. The Contractor's removal operation shall be controlled to not damage adjacent pavement structure, and base material, cables, utility ducts, pipelines, or drainage structures which are to remain under the pavement. This paragraph covers removal of existing pavement for the following purposes: reducing the limits of existing pavement; removal of existing pavement necessary to abut new pavement to existing, and; removal of existing pavement which is being reconstructed. For pavement removal associated with pavement repairs, see paragraph 101-3.4.

a. Concrete pavement removal. Section not used.

b. Asphalt pavement removal. Asphalt pavement to be removed shall be saw cut to the full depth of the asphalt pavement around the perimeter of the area to be removed if there will be no new pavement installed abutting the cut. If there will be new asphalt pavement installed adjacent to the cut, the pavement shall be cut to the depth of the new adjacent layer/lift such that the joint for each layer/lift of pavement replacement is offset 1 foot from the joint in the preceding layer/lift. The material cannot be incorporated into embankments, and shall be disposed of in accordance with paragraph 101-3.11. Every effort should be made by the Contactor to recycle or re-use the material in other projects.

c. Repair or removal of Base, Subbase, and/or Subgrade. All failed granular material including base course, subbase course, and subgrade shall be removed and repaired as shown on the plans or as directed by the RPR. Materials and methods of construction shall comply with the applicable sections of these specifications. Any damage caused by Contractor's removal process shall be repaired at the Contractor's expense. The quantity of granular material excavated shall be included and paid for as Unclassified Excavation in Item P-152, Excavation, Subgrade and Embankment.

101-3.2 Preparation of joints and cracks. Section not used.

101-3.3 Removal of Foreign Substances/contaminates prior to overlay, seal-coat or remarking. Section not used.

101-3.4 Concrete and asphaltic concrete pavement repair. Section not used.

101-3.5 Cold milling. Milling operations shall not proceed until the herbicide manufacturer's instructions indicate that vegetation may be removed.

Milling shall be performed with a power-operated milling machine or grinder, capable of producing a uniform finished surface. The milling machine or grinder shall operate without tearing or gouging the underlaying surface. The milling machine or grinder shall be equipped with grade and slope controls, and a positive means of dust control. All millings shall be removed and disposed of in accordance with paragraph 101-3.11. If the Contractor mills or grinds deeper or wider than the plans specify, the Contractor shall replace the material removed with new material at the Contractor's Expense.

The milling machine shall have a minimum width of 7 feet and it shall be equipped with electronic grade control devices that will cut the surface to the grade specified. The tolerances shall be maintained within +0 inch and -1/4 inch of the specified grade. The machine must cut vertical edges and have a positive method of dust control. The machine must have the ability to either windrow the millings or cuttings, or remove the millings or cuttings from the pavement and load them into a truck.

Prior to disturbing original grade, Contractor shall verify the accuracy of existing elevations by verifying spot elevations at the same locations where original field survey data was obtained in accordance with Item C-107, Survey and Stakeout.

Should the Contractor elect to use Automated Machine Guidance (AMG), they shall do so in accordance with Item P-670, Automated Machine Guidance. The use of AMG shall be at no additional cost to the Owner.

Milled longitudinal or transverse vertical faces exceeding 1-1/2 inches in height that would be exposed to traffic shall be sloped or tapered by constructing temporary asphalt ramps, unless otherwise approved by the RPR. The maximum grade for temporary ramps shall not exceed 5 percent. The temporary ramp shall be removed prior to placement of tack coat or pavement courses. No payment will be made for placement or removal of temporary ramps.

a. Patching. Patching shall be performed in accordance with paragraph 101-3.4.

b. Profile milling. Profile milling of existing asphalt or concrete pavement shall be performed on areas indicated by the plans and details. The slope or grade of the milled surface shall be at the same slope as finished grade. The Contractor shall establish a starting reference by survey and utilize a stringline method for grade control. Adjacent passes of the milling equipment may take their reference from preceding passes using a short ski or shoe.

c. Milling to depth. Section not used.

d. Milling to remove delaminated pavement. In areas where the milled surface leaves a thin layer of pavement which is delaminated, or has the potential to become delaminated, the RPR will order the contractor to mill the surface to remove the delaminated layer. Prior to removing the delaminated pavement,

the limits of milling shall be boxed out to rectangular shapes. The outer limits shall be saw cut to a depth of 1 ½ inches to avoid further delamination due to the milling process. The Contractor shall mill the boxed out area to a depth of 1 ½ inches. The location of the limits of the delaminated pavement to be milled will be determined by the RPR.

e. Crack repair after milling. Section not used.

f. Clean-up. The Contractor shall sweep the milled surface daily and immediately after the milling until all residual materials are removed from the pavement surface. The Contractor shall wet down the milled pavement and thoroughly sweep and/or blow the surface to remove loose residual material. Waste materials shall be collected and removed from the pavement surface and adjacent areas by sweeping or vacuuming.

101-3.6. Section not used.

101-3.7 Maintenance. The Contractor shall perform all maintenance work necessary to keep the pavement in a satisfactory condition until the full section is complete and accepted by the RPR. The surface shall be kept clean and free from foreign material. The pavement shall be properly drained at all times. If cleaning is necessary or if the pavement becomes disturbed, any work repairs necessary shall be performed at the Contractor's expense.

101-3.8 Section not used.

101-3.9 Section not used.

101-3.10 Removal of Pipe, Structures and other Buried Items. Refer to D, drainage series technical specifications.

101-3.11 Spoil. Spoil material generated from asphalt pavement removal and asphalt pavement cold milling operations shall be disposed of off airport property. Every effort should be made by the Contactor to recycle or re-use the material in other projects.

All asphalt material shall be disposed of off airport property at a location selected by the contactor. No direct payment will be made for spoiling operations. The cost of spoiling material off-site shall be considered incidental to this Contract and the costs shall be included in the various pay items involved.

METHOD OF MEASUREMENT

101-4.1 Pavement removal. The unit of measurement for pavement removal shall be the square yard. Separate measurement will be made for each type and approximate depth of pavement removed by the Contractor. Any pavement removed outside the limits of removal because the pavement was damaged by negligence on the part of the Contractor shall not be included in the measurement for payment. No direct measurement or payment shall be made for saw cutting. Saw cutting shall be incidental to pavement removal.

101-4.2 Cold milling. The unit of measure for milling shall be by the square yard. Separate measurement will be made for profile milling, for each different area milled to depth, and for milling to remove delaminated pavement.

BASIS OF PAYMENT

101-5.1 Payment. Payment shall be made at contract unit price for the unit of measurement as specified above. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Item P 101-1	Asphalt Pavement Removal, 15" Average Thickness - per square yard
Item P 101-2	Asphalt Pavement Removal, 6" Average Thickness - per square yard
Item P-101-3	Profile Milling Asphalt Pavement - per square yard

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

AC 150/5380-6	Guidelines and Procedures for Maintenance of Airport Pavements.

ASTM International (ASTM)

ASTM D6690	Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements

END OF ITEM P-101

Item P-152 Excavation, Subgrade, and Embankment

DESCRIPTION

152-1.1 This item covers excavation, disposal, placement, and compaction of all materials within the limits of the work required to construct safety areas, runways, taxiways, aprons, and intermediate areas as well as other areas for drainage, building construction, parking, or other purposes in accordance with these specifications and in conformity to the dimensions and typical sections shown on the plans.

152-1.2 Classification. All material excavated shall be classified as defined below:

a. Unclassified excavation. Unclassified excavation shall consist of the excavation and disposal of all material, regardless of its nature, excluding stabilized layers of pavement (e.g. asphalt, concrete).

b. Borrow excavation. Borrow excavation shall consist of approved material required for the construction of embankments or for other portions of the work in excess of the quantity of usable material available from required excavations. Borrow material shall be obtained from areas inside the normal limits of necessary grading. Off site, supplemental borrow material is not anticipated for this project.

152-1.3 Unsuitable excavation. Unsuitable material shall be disposed of in accordance with paragraph 152-2.15. Materials containing vegetable or organic matter, such as muck, peat, organic silt, or sod shall be considered unsuitable for use in embankment construction. Material suitable for topsoil may be used for embankment construction outside of runway and taxiway safety areas, and outside of future paved areas, when approved by the RPR, provided the material is not needed for topsoil. Material excavated which is classified as unsuitable shall be paid for as Unclassified Excavation.

CONSTRUCTION METHODS

152-2.1 General. Before beginning excavation, grading, and embankment operations in any area, the area shall be cleared or cleared and grubbed.

The suitability of material to be placed in embankments shall be subject to approval by the RPR. All unsuitable material shall be disposed of in accordance with paragraph 152-2.15. All waste areas shall be graded to allow positive drainage of the area and adjacent areas. The surface elevation of waste areas shall be specified on the plans or approved by the RPR.

When the Contractor’s excavating operations encounter artifacts of historical or archaeological significance, the operations shall be temporarily discontinued and the RPR notified per Section 70, paragraph 70-20. At the direction of the RPR, the Contractor shall excavate the site in such a manner as to preserve the artifacts encountered and allow for their removal. Such excavation will be paid for as extra work.

Areas outside the limits of the pavement areas where the top layer of soil has become compacted by hauling or other Contractor activities shall be scarified and disked to a depth of 4 inches (100 mm), to loosen and pulverize the soil. Stones or rock fragments larger than 4 inches (100 mm) in their greatest dimension will not be permitted in the top 6 inches (150 mm) of the subgrade.

If it is necessary to interrupt existing surface drainage, sewers or under-drainage, conduits, utilities, or similar underground structures, the Contractor shall be responsible for and shall take all necessary precautions to preserve them or provide temporary services. When such facilities are encountered, the Contractor shall notify the RPR, who shall arrange for their removal if necessary. The Contractor, at their own expense, shall satisfactorily repair or pay the cost of all damage to such facilities or structures that may result from any of the Contractor's operations during the period of the contract.

a. Blasting. Blasting shall not be allowed.

152-2.2 Excavation. No excavation shall be started until the work has been staked out by the Contractor and the RPR has obtained from the Contractor, the survey notes of the elevations and measurements of the ground surface. The Contractor and RPR shall agree that the original ground lines shown on the original topographic mapping are accurate, or agree to any adjustments made to the original ground lines.

Digital terrain model (DTM) files of the existing surfaces, finished surfaces and other various surfaces were used to develop the design plans.

Volumetric quantities were calculated by comparing DTM files of the applicable design surfaces and generating Triangle Volume Reports. Electronic copies of DTM files and a paper copy of the original topographic map will be issued to the successful bidder.

Existing grades on the design cross sections or DTM's, where they do not match the locations of actual spot elevations shown on the topographic map, were developed by computer interpolation from those spot elevations. Prior to disturbing original grade, Contractor shall verify the accuracy of the existing ground surface by verifying spot elevations at the same locations where original field survey data was obtained as indicated on the topographic map. Contractor shall recognize that, due to the interpolation process, the actual ground surface at any particular location may differ somewhat from the interpolated surface shown on the design cross sections or obtained from the DTM's. Contractor's verification of original ground surface, however, shall be limited to verification of spot elevations as indicated herein, and no adjustments will be made to the original ground surface unless the Contractor demonstrates that spot elevations shown are incorrect. For this purpose, spot elevations which are within 0.1 foot (30 mm) of the stated elevations for ground surfaces, or within 0.04 foot (12 mm) for hard surfaces (pavements, buildings, foundations, structures, etc.) shall be considered "no change". Only deviations in excess of these will be considered for adjustment of the original ground surface. If Contractor's verification identifies discrepancies in the topographic map, Contractor shall notify the RPR in writing at least two weeks before disturbance of existing grade to allow sufficient time to verify the submitted information and make adjustments to the design cross sections or DTM's. Disturbance of existing grade in any area shall constitute acceptance by the Contractor of the accuracy of the original elevations shown on the topographic map for that area.

All areas to be excavated shall be stripped of vegetation and topsoil. Topsoil shall be stockpiled for future use in areas approved by the RPR. All suitable excavated material shall be used in the formation of embankment, subgrade, or other purposes as shown on the plans. All unsuitable material shall be disposed of in accordance with paragraph 152-2.15.

The grade shall be maintained so that the surface is well drained at all times.

When the volume of the excavation exceeds that required to construct the embankments to the grades as indicated on the plans, the excess shall be used to grade the areas of ultimate development or disposed of in accordance with paragraph 152-2.15. When the volume of excavation is not sufficient for constructing the embankments to the grades indicated, the deficiency shall be obtained from borrow areas.

a. Selective grading. When selective grading is indicated on the plans, the more suitable material designated by the RPR shall be used in constructing the embankment or in capping the pavement subgrade. If, at the time of excavation, it is not possible to place this material in its final location, it shall be stockpiled in approved areas until it can be placed. The more suitable material shall then be placed and compacted as specified. Selective grading shall be considered incidental to the work involved. The cost of stockpiling and placing the material shall be included in the various pay items of work involved.

b. Undercutting. Undercutting shall be performed only when directed by the Engineer as follows:

(1) In Excavated Areas Under Proposed Pavement: Rock, shale, hardpan, loose rock, boulders, or other material unsatisfactory for safety areas, subgrades under proposed pavement (runways, taxiways, aprons, roads, shoulders), shall be excavated to a minimum depth of 12 inches (300 mm) below the subgrade or to the depth specified by the RPR. Muck, peat, matted roots, or other yielding material, unsatisfactory for subgrade foundation, shall be removed to the depth directed by the RPR. Unsuitable materials shall be disposed of in accordance with paragraph 152-2.15. The cost is incidental to this item. This excavated material shall be paid for at the contract unit price per cubic yard for unclassified excavation. The excavated area shall be backfilled with suitable material obtained from the grading operations, Item P-209 Crushed Aggregate Base Course or Item P-160 Crushed Aggregate for Undercut Replacement and compacted to specified densities. Where rock cuts are made, any pockets created in the rock surface shall be drained in accordance with the details shown on the plans. Undercutting will be paid as unclassified excavation.

(2) In Embankment Areas Under Proposed Pavement: Muck, peat, matted roots or other yielding materials unsuitable for embankment foundation shall be removed to the depths directed by the RPR. Undercut areas under proposed pavement, wherever possible, shall be graded to drain to underdrains, or weeps shall be constructed to daylight at locations as directed by the RPR. This excavated material shall be paid for at the contract unit price per cubic yard for unclassified excavation. The excavated area shall be refilled with suitable material obtained from the grading operations or borrow areas as directed by the RPR and compacted to specified densities. Where rock cuts are made, any pockets created in the rock surface shall be shaped to drain freely, or as directed by the RPR. Undercut areas, wherever possible, shall be graded to drain to underdrains, or weeps shall be constructed to daylight at locations as directed by the RPR. No payment will be made for refilling the undercut area as it is considered an incidental and necessary part of the work involved.

(3) In Excavated Areas within Runway Safety Areas and turf areas: Rock, shale, hardpan, loose rock, boulders or other materials unsatisfactory for subgrades beneath topsoil shall be removed to a minimum depth of 12 inches below final grade, or as directed by the RPR. Muck, peat, matted roots or other yielding materials shall be removed to the depth directed by the RPR. This excavated material shall be paid for at the contract unit price per cubic yard for unclassified excavation. The excavated area shall be refilled with suitable material obtained from the grading operations or borrow areas as directed by the RPR and compacted to specified densities. Where rock cuts are made, any pockets created in the rock surface shall be shaped to drain freely, or as directed by the RPR. Undercut areas, wherever possible, shall be graded to drain to underdrains, or weeps shall be constructed to daylight at locations as directed by the RPR. No payment will be made for refilling the undercut area as it is considered an incidental and necessary part of the work involved.

c. Over-break. Over-break, including slides, is that portion of any material displaced or loosened beyond the finished work as planned or authorized by the RPR. All over-break shall be graded or removed by the Contractor and disposed of in accordance with paragraph 152-2.15. The RPR shall determine if the displacement of such material was unavoidable and their own decision shall be final.

Payment will not be made for the removal and disposal of over-break that the RPR determines as avoidable. Unavoidable over-break will be classified as “Unclassified Excavation.”

d. Removal of utilities. The removal of existing structures and utilities required to permit the orderly progress of work will be accomplished by the Contractor, as indicated on the plans. All existing foundations shall be excavated at least 2 feet (60 cm) below the top of subgrade or as indicated on the plans, and the material disposed of in accordance with paragraph 152-2.15. All foundations thus excavated shall be backfilled with suitable material and compacted as specified for embankment or as shown on the plans.

152-2.3 Borrow excavation. Borrow areas are not required.

152-2.4 Drainage excavation. Drainage excavation shall consist of excavating drainage ditches including intercepting, inlet, or outlet ditches; or other types as shown on the plans. The work shall be performed in sequence with the other construction. Ditches shall be constructed prior to starting adjacent excavation operations. All satisfactory material shall be placed in embankment fills; unsuitable material shall be placed in designated waste areas or as directed by the RPR. All necessary work shall be performed true to final line, elevation, and cross-section. The Contractor shall maintain ditches constructed on the project to the required cross-section and shall keep them free of debris or obstructions until the project is accepted.

152-2.5 Preparation of cut areas or areas where existing pavement has been removed. In those areas on which a subbase or base course is to be placed, the top 12 inches of subgrade shall be compacted to not less than 100 % of maximum density for non-cohesive soils, and 95% of maximum density for cohesive soils as determined by ASTM D698. As used in this specification, "non-cohesive" shall mean those soils having a plasticity index (PI) of less than 3 as determined by ASTM D4318.

152-2.6 Preparation of embankment area. All sod and vegetative matter shall be removed from the surface upon which the embankment is to be placed. The cleared surface shall be broken up by plowing or scarifying to a minimum depth of 6 inches (150 mm) and shall then be compacted per paragraph 152-2.10.

Sloped surfaces steeper than one (1) vertical to four (4) horizontal shall be plowed, stepped, benched, or broken up so that the fill material will bond with the existing material. When the subgrade is part fill and part excavation or natural ground, the excavated or natural ground portion shall be scarified to a depth of 12 inches (300 mm) and compacted as specified for the adjacent fill.

No direct payment shall be made for the work performed under this section. The necessary clearing and grubbing and the quantity of excavation removed will be paid for under the respective items of work.

152-2.7 Control Strip. The first half-day of construction of subgrade and/or embankment shall be considered as a control strip for the Contractor to demonstrate, in the presence of the RPR, that the materials, equipment, and construction processes meet the requirements of this specification. The sequence and manner of rolling necessary to obtain specified density requirements shall be determined. The maximum compacted thickness may be increased to a maximum of 12 inches (300 mm) upon the Contractor’s demonstration that approved equipment and operations will uniformly compact the lift to the specified density. The RPR must witness this demonstration and approve the lift thickness prior to full production.

Control strips that do not meet specification requirements shall be reworked, re-compacted, or removed and replaced at the Contractor’s expense. Full operations shall not begin until the control strip has been accepted by the RPR. The Contractor shall use the same equipment, materials, and construction methods

for the remainder of construction, unless adjustments made by the Contractor are approved in advance by the RPR.

152-2.8 Formation of embankments. The material shall be constructed in lifts as established in the control strip, but not less than 6 inches (150 mm) nor more than 12 inches (300 mm) of compacted thickness.

When more than one lift is required to establish the layer thickness shown on the plans, the construction procedure described here shall apply to each lift. No lift shall be covered by subsequent lifts until tests verify that compaction requirements have been met. The Contractor shall rework, re-compact and retest any material placed which does not meet the specifications.

The lifts shall be placed, to produce a soil structure as shown on the typical cross-section or as directed by the RPR. Materials such as brush, hedge, roots, stumps, grass and other organic matter, shall not be incorporated or buried in the embankment.

Earthwork operations shall be suspended at any time when satisfactory results cannot be obtained due to rain, freezing, or other unsatisfactory weather conditions in the field. Frozen material shall not be placed in the embankment nor shall embankment be placed upon frozen material. Material shall not be placed on surfaces that are muddy, frozen, or contain frost. The Contractor shall drag, blade, or slope the embankment to provide surface drainage at all times.

The material in each lift shall be within ±2% of optimum moisture content before rolling to obtain the prescribed compaction. The material shall be moistened or aerated as necessary to achieve a uniform moisture content throughout the lift. Natural drying may be accelerated by blending in dry material or manipulation alone to increase the rate of evaporation.

The Contractor shall make the necessary corrections and adjustments in methods, materials or moisture content to achieve the specified embankment density.

The RPR will take samples of excavated materials which will be used in embankment for testing and develop a Moisture-Density Relations of Soils Report (Proctor) in accordance with ASTM D 1557. A new Proctor shall be developed for each soil type based on visual classification.

Density tests will be taken by the RPR for every 3,000 square yards of compacted embankment for each lift which is required to be compacted, or other appropriate frequencies as determined by the RPR. In no case shall less than 2 density tests be taken per lift.

If the material has greater than 30% retained on the 3/4-inch (19.0 mm) sieve, follow AASHTO T-180 Annex Correction of maximum dry density and optimum moisture for oversized particles.

Rolling operations shall be continued until the embankment is compacted to not less than 100% of maximum density for non-cohesive soils, and 95% of maximum density for cohesive soils as determined by ASTM D1557. As used in this specification, "non-cohesive" shall mean those soils having a plasticity index (PI) of less than 3 as determined by ASTM D4318.

On all areas outside of the pavement areas, no compaction will be required on the top 4 inches which shall be prepared for a seedbed in accordance with Item T-901.

The in-place field density shall be determined in accordance with ASTM D1556, or ASTM 6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938. The RPR shall

perform all density tests. If the specified density is not attained, the area represented by the test or as designated by the RPR shall be reworked and/or re-compacted and additional random tests made. This procedure shall be followed until the specified density is reached.

Compaction areas shall be kept separate, and no lift shall be covered by another lift until the proper density is obtained.

During construction of the embankment, the Contractor shall route all construction equipment evenly over the entire width of the embankment as each lift is placed. Lift placement shall begin in the deepest portion of the embankment fill. As placement progresses, the lifts shall be constructed approximately parallel to the finished pavement grade line.

When rock, concrete pavement, asphalt pavement, and other embankment material are excavated at approximately the same time as the subgrade, the material shall be incorporated into the outer portion of the embankment and the subgrade material shall be incorporated under the future paved areas. Stones, fragmentary rock, and recycled pavement larger than 4 inches (100 mm) in their greatest dimensions will not be allowed in the top 12 inches (300 mm) of the subgrade. Rockfill shall be brought up in lifts as specified or as directed by the RPR and the finer material shall be used to fill the voids forming a dense, compact mass. Rock, cement concrete pavement, asphalt pavement, and other embankment material shall be disposed of in accordance with paragraph 152-2.15.

When the excavated material consists predominantly of rock fragments of such size that the material cannot be placed in lifts of the prescribed thickness without crushing, pulverizing or further breaking down the pieces, such material may be placed in the embankment as directed in lifts not exceeding 2 feet (60 cm) in thickness. Each lift shall be leveled and smoothed with suitable equipment by distribution of spalls and finer fragments of rock. The lift shall not be constructed above an elevation 4 feet (1.2 m) below the finished subgrade.

There will be no separate measurement of payment for compacted embankment. All costs incidental to placing in lifts, compacting, discing, watering, mixing, sloping, and other operations necessary for construction of embankments will be included in the contract price for excavation or other items.

152-2.9 Proof rolling. The purpose of proof rolling the subgrade is to identify any weak areas in the subgrade and not for compaction of the subgrade. After compaction is completed, the subgrade area shall be proof rolled with a 20 ton Tandem axle Dual Wheel Dump Truck loaded to the legal limit with tires inflated to normal operating pressure in the presence of the RPR. Apply a minimum of 75% coverage, or as specified by the RPR, under pavement areas. A coverage is defined as the application of one tire print over the designated area. Soft areas of subgrade that deflect more than 1 inch (25 mm) or show permanent deformation greater than 1 inch (25 mm) shall be removed and replaced with suitable material or reworked to conform to the moisture content and compaction requirements in accordance with these specifications.

152-2.10 Compaction requirements. The subgrade under areas to be paved shall be compacted to a depth of 12 inches (300 mm) and to a density of not less than 100 percent of the maximum dry density as determined by ASTM D698. The subgrade in areas outside the limits of the pavement areas shall be compacted to a depth of 12 inches (300 mm) and to a density of not less than 95 percent of the maximum density as determined by ASTM D698.

The material to be compacted shall be within ±2% of optimum moisture content before being rolled to obtain the prescribed compaction (except for expansive soils). When the material has greater than 30

percent retained on the ¾ inch (19.0 mm) sieve, follow the methods in ASTM D698 and the procedures in AASHTO T180 Annex for correction of maximum dry density and optimum moisture for oversized particles. Tests for moisture content and compaction will be taken at a minimum of 3,000 S.Y. of subgrade. In no case shall less than 2 density tests be taken. All quality assurance testing shall be done by the RPR.

The in-place field density shall be determined in accordance with ASTM D1556, or ASTM D6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938 within 12 months prior to its use on this contract. The gage shall be field standardized daily.

Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

If the specified density is not attained, the entire lot shall be reworked and/or re-compacted and additional random tests made. This procedure shall be followed until the specified density is reached.

All cut-and-fill slopes shall be uniformly dressed to the slope, cross-section, and alignment shown on the plans or as directed by the RPR and the finished subgrade shall be maintained.

152-2.11 Finishing and protection of subgrade. Finishing and protection of the subgrade is incidental to this item. Grading and compacting of the subgrade shall be performed so that it will drain readily. All low areas, holes or depressions in the subgrade shall be brought to grade. Scarifying, blading, rolling and other methods shall be performed to provide a thoroughly compacted subgrade shaped to the lines and grades shown on the plans. All ruts or rough places that develop in the completed subgrade shall be graded, re-compacted, and retested. The Contractor shall protect the subgrade from damage and limit hauling over the finished subgrade to only traffic essential for construction purposes.

The Contractor shall maintain the completed course in satisfactory condition throughout placement of subsequent layers. No subbase, base, or surface course shall be placed on the subgrade until the subgrade has been accepted by the RPR.

152-2.12 Haul. All hauling will be considered a necessary and incidental part of the work. The Contractor shall include the cost in the contract unit price for the pay of items of work involved. No payment will be made separately or directly for hauling on any part of the work.

The Contractor's equipment shall not cause damage to any excavated surface, compacted lift or to the subgrade as a result of hauling operations. Any damage caused as a result of the Contractor's hauling operations shall be repaired at the Contractor's expense.

The Contractor shall be responsible for providing, maintaining and removing any haul roads or routes within or outside of the work area, and shall return the affected areas to their former condition, unless otherwise authorized in writing by the Owner. No separate payment will be made for any work or materials associated with providing, maintaining and removing haul roads or routes.

152-2.13 Surface Tolerances. In those areas on which a subbase or base course is to be placed, the surface shall be tested for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified to a depth of at least 3 inches (75 mm), reshaped and re-compacted to grade until the required smoothness and accuracy are obtained and approved by the RPR. The Contractor shall perform all final smoothness and grade checks in the presence

of the RPR. Any deviation in surface tolerances shall be corrected by the Contractor at the Contractor's expense.

a. Smoothness. The finished surface shall not vary more than +/- ½ inch (12 mm) when tested with a 12-foot (3.7-m) straightedge applied parallel with and at right angles to the centerline. The straightedge shall be moved continuously forward at half the length of the 12-foot (3.7-m) straightedge for the full length of each line on a 50-foot (15-m) grid.

b. Grade. The grade and crown shall be measured on a 50-foot (15-m) grid and shall be within +/- 0.05 feet (15 mm) of the specified grade.

On safety areas, turfed areas and other designated areas within the grading limits where no subbase or base is to placed, grade shall not vary more than 0.10 feet (30 mm) from specified grade. Any deviation in excess of this amount shall be corrected by loosening, adding or removing materials, and reshaping.

152-2.14 Topsoil. When topsoil is specified or required as shown on the plans or under Item T-905, it shall be salvaged from stripping or other grading operations. The topsoil shall meet the requirements of Item T-905. The topsoil shall be stockpiled at locations approved by the RPR. Stockpiles shall not be placed on areas that subsequently will require any excavation or embankment fill nor shall impede any airport operating surfaces. Measurement for stripping topsoil shall be included in the quantity for Unclassified Excavation.

Upon completion of grading operations, stockpiled topsoil shall be handled and placed as shown on the plans and as required in Item T-905. Topsoil shall be paid for as provided in Item T-905. No direct payment will be made for topsoil under Item P-152.

152-2.15 Spoil. All excess material from excavation, subgrade and embankment operations for the base bid scope of work shall be disposed of on airport property within the spoil area capped liner system, and shall be stockpiled at the locations shown on the plans.

All excess material from excavation, subgrade and embankment operations for the add on #1 scope of work shall be disposed of on airport property outside the spoil area capped liner system, and shall be stockpiled at the locations shown on the plans.

No direct payment will be made for spoiling operations. The cost of spoiling material shall be considered incidental to this Contract and the costs shall be included in the various pay items involved. Refer to specification C-106 Safety, Security and Maintenance of Traffic for additional information.

METHOD OF MEASUREMENT

152-3.1 Measurement for payment specified by the cubic yard shall be computed by comparison of digital terrain model (DTM) surfaces used for the computation of neat line design quantities. The surfaces shall be the original ground line established by field cross-sections and the final theoretical surface shown on the plans, subject to verification by the RPR.

Prior to determination of final quantities, the Engineer will field verify that the Contractor has met grading tolerances by means of field cross sections. Field cross sections will be taken randomly at intervals not exceeding 500 feet, however, a minimum of three sections will be taken for each baseline or centerline.

If the final grades are in tolerance and acceptable to the Engineer and Owner, then no adjustments will be made to the neat line quantities.

If the final grades are not in tolerance, but the deviation is acceptable to the Engineer and Owner, then adjustments will be made to the neat line quantities based on a final topographic survey or final cross sections.

If the final grades are not in tolerance and are not acceptable to the Engineer and Owner, then the Contractor shall regrade the areas that are out of tolerance. Upon completion of regrading operations, Engineer will field verify that the Contractor has met grading tolerances as stated above.

The quantity of unclassified excavation to be paid for shall be the number of cubic yards measured in its original position. Measurement shall not include the quantity of materials excavated without authorization beyond normal slope lines, or the quantity of material used for purposes other than those directed.

BASIS OF PAYMENT

152-4.1 Unclassified excavation payment shall be made at the contract unit price per cubic yard. This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item P-152-1	Unclassified Excavation - per cubic yard

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO T-180	Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop

ASTM International (ASTM)

ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3))
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2700 kN-m/m^3))
ASTM D6938	Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

Advisory Circulars (AC)

AC 150/5370-2	Operational Safety on Airports During Construction Software

Software

FAARFIELD – FAA Rigid and Flexible Iterative Elastic Layered Design

U.S. Department of Transportation

FAA RD-76-66 Design and Construction of Airport Pavements on Expansive Soils

END OF ITEM P-152

Item P-153 Controlled Low-Strength Material (CLSM)

DESCRIPTION

153-1.1 This item shall consist of furnishing, transporting, and placing a controlled low-strength material (CLSM) as flowable backfill in trenches or at other locations shown on the plans or as directed by the Resident Project Representative (RPR).

MATERIALS

153-2.1 Materials.

a. Cement. Cement shall conform to the requirements of ASTM C 150 Type I or II.

b. Fly ash. Fly ash shall conform to ASTM C618, Class C or F.

c. Fine aggregate (sand). Fine aggregate shall conform to the requirements of ASTM C33 except for aggregate gradation. Any aggregate gradation which produces the specified performance characteristics of the CLSM and meets the following requirements, will be accepted.

Sieve Size	Percent Passing by weight
3/4 inch (19.0 mm)	100
No. 200 (75 μm)	0 - 12

d. Water. Water used in mixing or curing shall be from potable water sources. Other sources shall be tested in accordance with ASTM C1602 prior to use. Dyes and other methods of coloring the backfill material may be incorporated if desired.

MIX DESIGN

153-3.1 Proportions. The Contractor shall submit, to the RPR, a mix design including the proportions and source of aggregate, fly ash, cement, water, and approved admixtures. No CLSM mixture shall be produced for payment until the RPR has given written approval of the proportions. The proportions shall be prepared by a laboratory and shall remain in effect for the duration of the project. The proportions shall establish a single percentage or weight for aggregate, fly ash, cement, water, and any admixtures proposed. Laboratory costs are incidental to this item.

a. Compressive strength. CLSM shall be designed to achieve a 28-day compressive strength of 100 to 200 psi (690 to 1379 kPa) when tested in accordance with ASTM D4832, with no significant strength gain after 28 days.

b. Consistency. Design CLSM to achieve a consistency that will produce an approximate 8-inch (200 mm) diameter circular-type spread without segregation. CLSM consistency shall be determined per ASTM D6103.

CONSTRUCTION METHODS

153-4.1 Placement.

a. Placement. CLSM may be placed by any reasonable means from the mixing unit into the space to be filled. Agitation is required during transportation and waiting time. Placement shall be performed so structures or pipes are not displaced from their final position and intrusion of CLSM into unwanted areas is avoided. The material shall be brought up uniformly to the fill line shown on the plans or as directed by the RPR. Each placement of CLSM shall be as continuous an operation as possible. If CLSM is placed in more than one lift, the base lift shall be free of surface water and loose foreign material prior to placement of the next lift.

b. Contractor Quality Control. The Contractor shall collect all batch tickets to verify the CLSM delivered to the project conforms to the mix design. The Contractor shall verify daily that the CLSM is consistent with 153-3.1a and 153-3.1b. Adjustments shall be made as necessary to the proportions and materials as needed. The Contractor shall provide all batch tickets to the RPR.

c. Limitations of placement. CLSM shall not be placed on frozen ground. Mixing and placing may begin when the air or ground temperature is at least 35°F (2°C) and rising. Mixing and placement shall stop when the air temperature is 40°F (4°C) and falling or when the anticipated air or ground temperature will be 35°F (2°C) or less in the 24-hour period following proposed placement. At the time of placement, CLSM shall have a temperature of at least 40°F (4°C). Conduits, pipes, and any other item which has the ability to float, must be secured to prevent floatation prior to placement of CLSM.

153-4.2 Curing and protection

a. Curing. The air in contact with the CLSM shall be maintained at temperatures above freezing for a minimum of 72 hours. If the CLSM is subjected to temperatures below 32°F (0°C), the material may be rejected by the RPR if damage to the material is observed.

b. Protection. The CLSM shall not be subject to loads and shall remain undisturbed by construction activities for a period of 48 hours or until a compressive strength of 15 psi (105 kPa) is obtained. The Contractor shall be responsible for providing evidence to the RPR that the material has reached the desired strength. Acceptable evidence shall be based upon compressive tests made in accordance with paragraph 153-3.1a.

153-4.3 Quality Assurance (QA) Acceptance. CLSM QA acceptance shall be based upon batch tickets provided by the Contractor to the RPR to confirm that the delivered material conforms to the mix design.

METHOD OF MEASUREMENT

153-5.1 Measurement.

Controlled low-strength material (CLSM) shall be measured by the number of cubic yards as specified, completed, and accepted.

BASIS OF PAYMENT

153-6.1 Payment.

Controlled low-strength material (CLSM) shall be paid for at the contract unit price per cubic yard. Payment shall be full compensation for all materials, equipment, labor, and incidentals required to complete the work as specified.

Payment will be made under:

Item P-153-1 Controlled Low Strength Material (CLSM) - per cubic yard

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C33	Standard Specification for Concrete Aggregates
ASTM C150	Standard Specification for Portland Cement
ASTM C618	Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C595	Standard Specification for Blended Hydraulic Cements
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D4832	Standard Test Method for Preparation and Testing of Controlled Low-Strength Material (CLSM) Test Cylinders
ASTM D6103	Flow Consistency of Controlled Low Strength Material (CLSM)

END OF ITEM P-153

Item P-156 Cement Treated Subgrade

DESCRIPTION

156-1.1 This item shall consist of constructing one or more courses of a mixture of soil, stabilizer, and water in accordance with this specification, and in conformity with the lines, grades, thickness, and typical cross-sections shown on the plans.

MATERIALS

156-2.1 Cement. Cement shall conform to the requirements of ASTM C150, Type I, II, or V; ASTM C595, Type IS, IL, IP, or IT.

156-2.2 Water. Water used in mixing or curing shall be from potable water sources. Other sources shall be tested in accordance with ASTM C1602 prior to use.

156-2.3 Soil. The soil for this work shall consist of on-site materials free of roots, sod, weeds, and stones larger than 2-1/2 inches and have a sulfate content of less than 0.3%.

COMPOSITION

156-3.1 Soil-cement mixture. Cement shall be added at an application rate of **5** percent of dry unit weight of soil.

156-3.2 Tolerances. At final compaction, the cement and water content for each course of subgrade treatment shall conform to the following tolerances:

Tolerances

Material/Properties	Target	Tolerance	Specifications
Cement	**5**%	0 to +1%	% Total Dry Materials
Moisture Content	Optimum +2%	0 to +1%	ASTM D1557

WEATHER LIMITATIONS

156-4.1 Weather limitation. Do not construct subgrade when weather conditions detrimentally affect the quality of the materials. Do not apply cement unless the air temperature is at least 40°F and rising. Do not apply cement to soils that are frozen or contain frost. Do not apply cement when conditions are too windy to allow even distribution of the cement to the subgrade. If the air temperature falls below 35°F, protect completed treated areas against freezing. Remove and replace any damaged portion of the completed treated area with new material in accordance with this specification.

EQUIPMENT

156-5.1 Equipment. All equipment necessary to grade, scarify, spread, mix and compact the material shall be provided. The Resident Project Representative (RPR) must approve the Contractor's proposed equipment prior to the start of the treatment.

CONSTRUCTION METHODS

156-6.1 General. This specification is to construct a subgrade consisting of a uniform cement mixture which shall be free from loose or segregated areas. The subgrade shall be of uniform density and moisture content, well mixed for its full depth and have a smooth surface suitable for placing subsequent courses. The Contractor shall be responsible for meeting the above requirements.

Prior to any treatment, the subgrade shall be constructed as specified in Item P-152, Excavation, Subgrade and Embankment, and shaped to conform to the typical sections, lines, and grades as shown on the plans.

The mixing machine must give visible indication at all times that it is cutting, pulverizing and mixing the material uniformly to the proper depth over the full width of the cut.

156-6.2 Application. Cement shall be uniformly spread only over an area where the initial mixing operations and compaction can be completed during the same workday. The cement shall not be applied when wind conditions are detrimental to proper application. Cement shall be spread in such a manner as to minimize a dust nuisance. The distribution bar shall be at a maximum 3 feet above the subgrade. A canvas shroud shall surround the distribution bar and shall extend to the subgrade. A motor grader shall not be used to spread the lime. Adequate moisture shall be added to the cement/soil mixture to maintain the proper moisture content. Materials shall be handled, stored, and applied in accordance with all federal, state, and local requirements.

156-6.3 Mixing Procedure. The full depth of the treated subgrade shall be mixed with equipment as approved by the RPR. Cement shall not be left exposed for more than one (1) hour after distribution. Mixing and pulverization shall continue until the soil cement mixture contains no clods greater than 1-1/2 inches in size. Final moisture content of the mix shall be determined by the Contractor immediately prior to compaction in accordance with ASTM D2216 or ASTM D4959.

156-6.4 Control Strip. The first half-day of construction shall be considered the control strip. The Contractor shall demonstrate, in the presence of the RPR, that the materials, equipment, and construction processes meet the requirements of the specification. The sequence and manner of rolling necessary to obtain specified density requirements shall be determined. Control strips that do not meet specification requirements shall be reworked, re-compacted, or removed and replaced at the Contractor's expense. Full operations shall not continue until the control strip has been accepted by the RPR. Upon acceptance of the control strip by the RPR, the Contractor shall use the same equipment, materials, and construction methods for the remainder of construction, unless adjustments made by the Contractor are approved in advance by the RPR.

156-6.5 Treatment Application and Depth Checks. The amount of cement applied shall be monitored by the Contractor to assure that no less than the amount of cement required by the mix design is applied. The depth of stabilization shall be measured by the Contractor no less than 2 tests per day of material placed; test shall be witnessed by the RPR. Measurements shall be made in test holes excavated to show the full depth of mixing.

156-6.6 Compaction. The moisture content shall be within the tolerance as specified in paragraph 156-3.2. The field density of the compacted mixture shall be at least 95% of the maximum density as specified in paragraph 156-6.10. Compaction of the soil/cement mixture shall begin within 30 minutes after mixing the cement into the subgrade. All compaction operations shall be completed within 2 hours from the start of mixing.

Perform in-place density test immediately after completion of compaction to determine degree of compaction. If the material fails to meet the density requirements, compaction shall continue or the material shall be removed and replaced. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

156-6.7 Finishing and curing. After the final lift or course of treated subgrade has been compacted, it shall be brought to the required lines and grades in accordance with the typical sections. Finished portions of treated subgrade shall be protected to prevent equipment from marring, permanently deforming, or damaging completed work.

Not later than 24 hours after completion of final finishing, the surface shall be cured by application of an emulsified asphalt or application of an curing compound or other moisture retention methods as approved by the RPR.

Sufficient protection from freezing shall be provided for at least 7 days after its construction or as approved by the RPR.

156-6.8 Maintenance. The Contractor shall maintain the entire treated subgrade in good condition from the start of work until all the work has been completed, cured, and accepted by the RPR. When material has been exposed to excessive rain, snow, or freeze-thaw conditions, prior to placement of additional material, the Contractor shall verify that materials still meets all specification requirements. The cost shall be incidental to this item.

156-6.9 Surface tolerance. In those areas on which a subbase or base course is to be placed, the surface shall be tested for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified to a depth of at least 3 inches, reshaped and re-compacted to grade until the required smoothness and accuracy are obtained and approved by the RPR. The Contractor shall perform all final smoothness and grade checks in the presence of the RPR. Any deviation in surface tolerances shall be corrected by the Contractor at the Contractor's expense.

a. Smoothness. The finished surface shall not vary more than +/- 1/2 inch when tested with a 12-foot straightedge applied parallel with and at right angles to the centerline. The straightedge shall be moved continuously forward at half the length of the 12-foot straightedge for the full length of each line on a 50-foot grid.

b. Grade. The grade and crown shall be measured on a 50-foot grid and shall be within +/-0.05 feet of the specified grade.

156-6.10 Acceptance sampling and testing. Aggregate base course shall be accepted for density and thickness on an area basis. Testing frequency shall be a minimum of one (1) compaction and thickness test per 1,000 square yards of stabilized subgrade, but not less than four (4) tests per day of production. Sampling locations will be determined on a random basis per ASTM D3665.

a. Density. All testing shall be done by the RPR.

The field density of the compacted mixture shall be at least 95% of the maximum density as determined by ASTM D558. The in-place field density shall be determined in accordance with ASTM D1556. The in-place moisture content shall be determined in accordance with ASTM D2216. If the material fails to meet the density requirements, compaction shall continue or the material shall be removed and replaced. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

b. Thickness. The thickness of the base course shall be within +0 and -1/2 inch of the specified thickness as determined by depth tests taken by the Contractor in the presence of the RPR for each sublot. Where the thickness is deficient by more than 1/2-inch, the material shall be removed to full depth and replaced, at Contractor's expense.

METHOD OF MEASUREMENT

156-7.1 The amount of cement treated subgrade shall be based on the number of square yards complete and accepted.

BASIS OF PAYMENT

156-8.1 Payment for placement shall be made at the contract unit price per square yard for the cement treated subgrade for the thickness specified. The price shall be full compensation for all preparation, delivering, placing and mixing these materials, and all labor, equipment, tools and incidentals necessary to complete this item.

Payment will be made under:

Item P 156-1	Cement treated subgrade, 12” thick – per square yard

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C150	Standard Specification for Portland Cement
ASTM C595	Standard Specification for Blended Hydraulic Cements
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D558	Standard Test Methods for Moisture-Density (Unit Weight) Relations of Soil-Cement Mixtures
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2,700 kN-m/m^3))
ASTM D1663	Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders
ASTM D2216	Test Methods for Laboratory Determination of Water (Moisture) Soil and Rock by Mass
ASTM D2487	Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D4318	Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils
ASTM D4959	Standard Test Method for Determination of Water Content of Soil by Direct Heating
ASTM D6938	Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

END OF ITEM P-156

Item P-160 Crushed Stone for Undercut Replacement

DESCRIPTION

160-1.1 This item shall consist of a graded crushed Stone material to be used as a replacement for subgrade undercut to bridge unstable subgrade material. Crushed Stone shall be placed in accordance with these Specifications and shall conform to the dimensions shown on the Contract Drawings and as established by the RPR.

MATERIALS

160-2.1 Crushed Stone. Crushed Stone shall be from ledge rock and shall free from coatings of clay, silt, organic material, or other objectionable materials. Stones shall contain no clay lumps or balls. The sodium sulfate soundness loss shall not exceed 12%, or the magnesium sulfate soundness loss shall not exceed 18%, after five cycles, when tested in accordance with ASTM C88. The Stone shall have at least 90% by weight of particles with at least two fractured faces and 100% with at least one fractured face per ASTM D5821. The area of each face shall be equal to at least 75% of the smallest mid-sectional area of the piece. When two fractured faces are contiguous, the angle between the planes of fractures shall be at least 30 degrees to count as two fractured faces. Crushed aggregate is not allowed.

Gradation, when tested in accordance with ASTM C117, shall be in accordance with ASTM C33 Size Number 2 Stone as shown in the table below.

TABLE 1. REQUIREMENTS FOR GRADATION OF NO. 2 CRUSHED STONE

Sieve Size	Design Range Percentage by Weight Passing Sieves
3 Inch	100
2-1/2 Inch	90-100
2 inch	35-70
1-1/2 Inch	0-15
3/4 Inch	0-5

Other commercially graded readily available materials may be accepted at the RPR's discretion provided the material performs as intended.

CONSTRUCTION METHODS

160-3.1 Placing. Crushed Stone shall be placed in layers of uniform thickness. The maximum depth of a compacted layer shall be 12 inches unless otherwise directed by the RPR. In multi-layer construction, crushed Stone shall be placed in approximately equal-depth layers. The surface of the compacted material shall be kept moist until covered with the next layer.

160-3.2 Compaction. Immediately upon completion of the spreading operations, crushed Stone shall be thoroughly compacted such that the crushed Stone locks together and becomes stable. Crushed Stone shall be compacted to the density of the adjacent subgrade, unless otherwise directed by the RPR. The type and weight of rollers shall be sufficient to compact the material to the required density.

METHOD OF MEASUREMENT

160-4.1 The quantity of crushed Stone for undercut replacement will be determined by measurement of the number of cubic yards of material actually constructed and accepted by the RPR as complying with the plans and specifications.

BASIS OF PAYMENT

160-5. Payment shall be made at the contract unit price per cubic yard for crushed Stone for undercut replacement. This price shall be full compensation for furnishing all materials, for preparing and placing these materials, and for all labor, equipment tools, and incidentals necessary to complete the item.

Payment will be made under:

Item P-160-1 - Crushed stone for undercut replacement - per cubic yard

END OF ITEM P-160

Item P-209 Crushed Aggregate Base Course

DESCRIPTION

209-1.1 This item consists of a base course composed of crushed aggregate base constructed on a prepared course in accordance with these specifications and in conformity to the dimensions and typical cross-sections shown on the plans.

MATERIALS

209-2.1 Crushed aggregate base. Crushed aggregate shall consist of clean, sound, durable particles of crushed limestone and shall be free from coatings of clay, silt, organic material, clay lumps or balls or other deleterious materials or coatings. Crushed gravel is not allowed. The method used to produce the crushed stone shall result in the fractured particles in the finished product as consistent and uniform as practicable. Fine aggregate portion, defined as the portion passing the No. 4 (4.75 mm) sieve shall consist of fines from the coarse aggregate crushing operation. The fine aggregate shall be produced by crushing stone that meet the coarse aggregate requirements for wear and soundness. Aggregate base material requirements are listed in the following table.

Crushed Aggregate Base Material Requirements

Material Test	Requirement	Standard
Coarse Aggregate		
Resistance to Degradation	Loss: 45% maximum	ASTM C131
Soundness of Aggregates by Use of Sodium Sulfate **or** Magnesium Sulfate	Loss after 5 cycles: 12% maximum using Sodium sulfate - or - 18% maximum using magnesium sulfate	ASTM C88
Percentage of Fractured Particles	Minimum 90% by weight of particles with at least two fractured faces and 98% with at least one fractured face[1]	ASTM D5821
Flat Particles, Elongated Particles, or Flat and Elongated Particles	10% maximum, by weight, of flat, elongated, or flat and elongated particles [2]	ASTM D4791
Clay lumps and friable particles	Less than or equal to 3 percent	ASTM C142
Fine Aggregate		
Liquid limit	Less than or equal to 25	ASTM D4318
Plasticity Index	Not more than five (5)	ASTM D4318

[1] The area of each face shall be equal to at least 75% of the smallest mid-sectional area of the piece. When two fractured faces are contiguous, the angle between the planes of fractures shall be at least 30 degrees to count as two fractured faces.

[2] A flat particle is one having a ratio of width to thickness greater than five (5); an elongated particle is one having a ratio of length to width greater than five (5).

209-2.2 Gradation requirements. The gradation of the aggregate base material shall meet the requirements of the gradation given in the following table when tested per ASTM C117 and ASTM C136. The gradation shall be well graded from coarse to fine and shall not vary from the lower limit on one sieve to the high limit on an adjacent sieve or vice versa.

Gradation of Aggregate Base

Sieve Size	Design Range Percentage by Weight passing	Contractor's Final Gradation	Job Control Grading Band Tolerances[1] (Percent)
2 inch	100		0
1-1/2 inch	95-100		±5
1 inch	70-95		±8
3/4 inch	55-85		±8
No. 4	30-60		±8
No. 40[2]	10-30		±5
No. 200[2]	0-10		±3

[1] The "Job Control Grading Band Tolerances for Contractor's Final Gradation" in the table shall be applied to "Contractor's Final Gradation" to establish a job control grading band. The full tolerance still applies if application of the tolerances results in a job control grading band outside the design range.

[2] The fraction of material passing the No 200 (75 μm) sieve shall not exceed two-thirds the fraction passing the No 40 (425 μm) sieve.

209-2.3 Sampling and Testing.

a. Aggregate base materials. The Contractor shall take samples of the aggregate base in accordance with ASTM D75 to verify initial aggregate base requirements and gradation. Material shall meet the requirements in paragraph 209-2.1. This sampling and testing will be the basis for approval of the aggregate base quality requirements.

b. Gradation requirements. The Contractor shall take at least two aggregate base samples per day in the presence of the Resident Project Representative (RPR) to check the final gradation. Sampling shall be per ASTM D75. Material shall meet the requirements in paragraph 209-2.2. The samples shall be taken from the in-place, un-compacted material at sampling points and intervals designated by the RPR.

In lieu of daily testing for Gradation Requirements, Contractor may elect to place aggregate in stockpiles prior to transporting to the project site. Construction and sampling of stockpiles shall be in accordance with ASTM D-75. The maximum stockpile size shall not exceed 4,000 c.y unless authorized by the RPR. Testing shall be in accordance with ASTM C117 and C136. A stockpile shall be considered acceptable for transportation to the project site when the samples tested meet the Gradation Requirements.

At least two weeks prior to the start of production, the Contractor shall inform the RPR of the methods which are proposed for providing aggregate to the project site so that arrangements can be made for sampling and testing aggregates.

209-2.4 Separation Geotextile. Separation geotextile shall be Class 2, 0.02 sec^{-1} permittivity per ASTM D4491, Apparent opening size per ASTM D4751 with 0.60 mm maximum average roll value.

CONSTRUCTION METHODS

209-3.1 Control strip. The first half-day of construction shall be considered the control strip. The Contractor shall demonstrate, in the presence of the RPR, that the materials, equipment, and construction processes meet the requirements of the specification. The sequence and manner of rolling necessary to obtain specified density requirements shall be determined. The maximum compacted thickness may be increased to a maximum of 12 inches (300 mm) upon the Contractor's demonstration that approved equipment and operations will uniformly compact the lift to the specified density. The RPR must witness this demonstration and approve the lift thickness prior to full production.

Control strips that do not meet specification requirements shall be reworked, re-compacted or removed and replaced at the Contractor's expense. Full operations shall not continue until the control strip has been accepted by the RPR. The Contractor shall use the same equipment, materials, and construction methods for the remainder of construction, unless adjustments made by the Contractor are approved by the RPR.

209-3.2 Preparing underlying subgrade and/or subbase. The underlying subgrade and/or subbase shall be checked and accepted by the RPR before base course placing and spreading operations begin. Re-proof rolling of the subgrade or proof rolling of the subbase in accordance with Item P-152, at the Contractor's expense, may be required by the RPR if the Contractor fails to ensure proper drainage or protect the subgrade and/or subbase. Any ruts or soft, yielding areas due to improper drainage conditions, hauling, or any other cause, shall be corrected before the base course is placed. To ensure proper drainage, the spreading of the base shall begin along the centerline of the pavement on a crowned section or on the high side of the pavement with a one-way slope.

209-3.3 Production. The aggregate shall be uniformly blended and, when at a satisfactory moisture content per paragraph 209-3.5, the approved material may be transported directly to the placement.

209-3.4 Placement. The aggregate shall be placed and spread on the prepared underlying layer by spreader boxes or other devices as approved by the RPR, to a uniform thickness and width. The equipment shall have positive thickness controls to minimize the need for additional manipulation of the material. Dumping from vehicles that require re-handling shall not be permitted. Hauling over the uncompacted base course shall not be permitted.

The aggregate shall meet gradation and moisture requirements prior to compaction. The base course shall be constructed in lifts as established in the control strip, but not less than 4 inches (100 mm) nor more than 12 inches (300 mm) of compacted thickness.

When more than one lift is required to establish the layer thickness shown on the plans, the construction procedure described here shall apply to each lift. No lift shall be covered by subsequent lifts until tests verify that compaction requirements have been met. The Contractor shall rework, re-compact and retest any material placed which does not meet the specifications at the Contractor's expense.

209-3.5 Compaction. Immediately after completion of the spreading operations, compact each layer of the base course, as specified, with approved compaction equipment. The number, type, and weight of rollers shall be sufficient to compact the material to the required density within the same day that the aggregate is placed on the subgrade.

The field density of each compacted lift of material shall be at least100% of the maximum density of laboratory specimens prepared from samples of the base material delivered to the jobsite. The laboratory specimens shall be compacted and tested in accordance with ASTM D1557. The moisture content of the material during placing operations shall be within ±2 percentage points of the optimum moisture content as determined by ASTM D1557. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified. If the material has greater than 30% retained on the 3/4-inch (19.0

mm) sieve, follow AASHTO T-180 Annex Correction of Maximum Dry Density and Optimum Moisture for Oversized Particles.

209-3.6 Weather limitations. Material shall not be placed unless the ambient air temperature is at least 40°F (4°C) and rising. Work on base course shall not be conducted when the subgrade or subbase is wet or frozen or the base material contains frozen material.

209-3.7 Maintenance. The base course shall be maintained in a condition that will meet all specification requirements. When material has been exposed to excessive rain, snow, or freeze-thaw conditions, prior to placement of additional material, the Contractor shall verify that materials still meet all specification requirements. Equipment may be routed over completed sections of base course, provided that no damage results and the equipment is routed over the full width of the completed base course. Any damage resulting to the base course from routing equipment over the base course shall be repaired by the Contractor at the Contractor's expense.

209-3.8 Surface tolerances. After the course has been compacted, the surface shall be tested for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified to a depth of at least 3 inches (75 mm), reshaped and recompacted to grade until the required smoothness and accuracy are obtained and approved by the RPR. Any deviation in surface tolerances shall be corrected by the Contractor at the Contractor's expense. The smoothness and accuracy requirements specified here apply only to the top layer when base course is constructed in more than one layer.

a. Smoothness. The finished surface shall not vary more than 3/8-inch (9 mm) when tested with a 12-foot (3.7-m) straightedge applied parallel with and at right angles to the centerline. The straightedge shall be moved continuously forward at half the length of the 12-foot (3.7-m) straightedge for the full length of each line on a 50-foot (15-m) grid.

b. Grade. The grade and crown shall be measured on a 50-foot (15-m) grid and shall be within +0 and -1/2 inch (12 mm) of the specified grade.

209-3.9 Acceptance sampling and testing. Crushed aggregate base course shall be accepted for density and thickness on an area basis. Two tests shall be made for density and thickness for each 1200 square yds. Sampling locations will be determined on a random basis per ASTM D3665.

a. Density. The RPR shall perform all density tests.

Each area shall be accepted for density when the field density is at least 100% of the maximum density of laboratory specimens compacted and tested per ASTM D1557. The in-place field density shall be determined per ASTM D1553 or ASTM D6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938. If the specified density is not attained, the area represented by the failed test must be reworked and/or recompacted and two additional random tests made. This procedure shall be followed until the specified density is reached. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

b. Thickness. Depth tests shall be made by test holes at least 3 inches (75 mm) in diameter that extend through the base. The thickness of the base course shall be within +0 and -1/2 inch (12 mm) of the specified thickness as determined by depth tests taken by the Contractor in the presence of the RPR for each area. Where the thickness is deficient by more than 1/2-inch (12 mm), the Contractor shall correct such areas at no additional cost by scarifying to a depth of at least 3 inches (75 mm), adding new material of proper gradation, and the material shall be blended and recompacted to grade. The Contractor shall replace, at his expense, base material where depth tests have been taken.

Contractor may check grade and crown by survey provided a survey is performed on the approved subgrade/subbase prior to placing base material. The survey shall be along centerline, or ridge lines at 50

foot intervals with elevations taken along sections at 50 foot intervals. In addition, elevations shall be taken at all grade breaks and vertical curves. Contractor shall survey the finished surface of the base course at the same locations that the survey was taken on the subgrade/subbase. Contractor shall provide an analysis of the difference in elevations between the two surveys to the RPR for approval.

Alternate methods of checking the fine grade may be used only when authorized by the RPR.

209-3.10 Removal of water. The Contractor is responsible for removal of water regardless of its source. Measures shall be taken to protect the excavation from surface water runoff as well as for dewatering the excavation from any water which has entered the excavation. The cost of the removal of water shall be considered as a subsidiary obligation of the Contractor and included in the contract price for the pay items of work involved.

METHOD OF MEASUREMENT

209-4.1 The quantity of crushed aggregate base course will be determined by measurement of the number of cubic yards of material actually constructed and accepted by the RPR as complying with the plans and specifications. Base materials shall not be included in any other excavation quantities.

209-4.2 Separation geotextile shall be measured by the number of square yards of material placed and accepted by the RPR as complying with the plans and specifications excluding seam overlaps and edge anchoring.

BASIS OF PAYMENT

209-5.1 Payment shall be made at the contract unit price per cubic yard for crushed aggregate base course. This price shall be full compensation for furnishing all materials, for preparing and placing these materials, and for all labor, equipment tools, and incidentals necessary to complete the item.

209-5.2 Payment shall be made at the contract unit price per square yard for separation geotextile. The price shall be full compensation for furnishing all labor, equipment, material, anchors and incidentals necessary to complete the item.

Payment will be made under:

Item P-209-1	Crushed Aggregate Base Course – per cubic yard
Item P-209-2	Separation Geotextile – per square yard

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C29	Standard Test Method for Bulk Density (“Unit Weight”) and Voids in Aggregate
ASTM C88	Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C117	Standard Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing

ASTM C131	Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C142	Standard Test Method for Clay Lumps and Friable Particles in Aggregates
ASTM D75	Standard Practice for Sampling Aggregates
ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3))
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2700 kN-m/m^3))
ASTM D2167	Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D2419	Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate
ASTM D3665	Standard Practice for Random Sampling of Construction Materials
ASTM D4318	Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4491	Standard Test Methods for Water Permeability of Geotextiles by Permittivity
ASTM D4643	Standard Test Method for Determination of Water Content of Soil and Rock by Microwave Oven Heating
ASTM D4751	Standard Test Methods for Determining Apparent Opening Size of a Geotextile
ASTM D4791	Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM D5821	Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate
ASTM D6938	Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM D7928	Standard Test Method for Particle-Size Distribution (Gradation) of Fine-Grained Soils Using the Sedimentation (Hydrometer) Analysis

American Association of State Highway and Transportation Officials (AASHTO)

M288	Standard Specification for Geosynthetic Specification for Highway Applications

END OF ITEM P-209

Item P-401 Asphalt Mix Pavement

DESCRIPTION

401-1.1 This item shall consist of pavement courses composed of mineral aggregate and asphalt binder mixed in a central mixing plant and placed on a prepared base or stabilized course in accordance with these specifications and shall conform to the lines, grades, thicknesses, and typical cross-sections shown on the plans. Each course shall be constructed to the depth, typical section, and elevation required by the plans and shall be rolled, finished, and approved before the placement of the next course.

MATERIALS

401-2.1 Aggregate. Aggregates shall consist of crushed stone, crushed gravel, screenings, natural sand, and mineral filler, as required. The aggregates should have no known history of detrimental pavement staining due to ferrous sulfides, such as pyrite. Coarse aggregate is the material retained on the No. 4 sieve. Fine aggregate is the material passing the No. 4 sieve.

a. Coarse aggregate. Coarse aggregate shall consist of sound, tough, durable particles, free from films of matter that would prevent thorough coating and bonding with the asphalt material and free from organic matter and other deleterious substances. Coarse aggregate material requirements are given in the table that follows.

Coarse Aggregate Material Requirements

Material Test	Requirement	Standard
Resistance to Degradation	Loss: 40% maximum	ASTM C131
Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate	Loss after 5 cycles: 12% maximum using Sodium sulfate - or - 18% maximum using magnesium sulfate	ASTM C88
Clay lumps and friable particles	1.0 % maximum	ASTM C142
Percentage of Fractured Particles	For pavements designed for aircraft gross weights of 60,000 pounds or more: Minimum 75% by weight of particles with at least two fractured faces and 85% with at least one fractured face[1]	ASTM D5821
Flat, Elongated, or Flat and Elongated Particles	8% maximum, by weight, of flat, elongated, or flat and elongated particles at 5:1 [2]	ASTM D4791

[1] The area of each face shall be equal to at least 75% of the smallest mid-sectional area of the piece. When two fractured faces are contiguous, the angle between the planes of fractures shall be at least 30 degrees to count as two fractured faces.

[2] A flat particle is one having a ratio of width to thickness greater than five (5); an elongated particle is one having a ratio of length to width greater than five (5).

b. Fine aggregate. Fine aggregate shall consist of clean, sound, tough, durable, angular shaped particles produced by crushing stone, or gravel and shall be free from coatings of clay, silt, or other objectionable matter. Natural (non-manufactured) sand may be used to obtain the gradation of the fine aggregate blend or to improve the workability of the mix. Fine aggregate material requirements are listed in the table that follows.

Fine Aggregate Material Requirements

Material Test	Requirement	Standard
Liquid limit	25 maximum	ASTM D4318
Plasticity Index	4 maximum	ASTM D4318
Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate	Loss after 5 cycles: 10% maximum using Sodium sulfate - or - 15% maximum using magnesium sulfate	ASTM C88
Clay lumps and friable particles	1.0% maximum	ASTM C142
Sand equivalent	45 minimum	ASTM D2419
Natural Sand	0% to 15% maximum by weight of total aggregate	ASTM D1073

c. Sampling. ASTM D75 shall be used in sampling coarse and fine aggregate.

401-2.2 Mineral filler. Mineral filler (baghouse fines) may be added in addition to material naturally present in the aggregate. Mineral filler shall meet the requirements of ASTM D242.

Mineral Filler Requirements

Material Test	Requirement	Standard
Plasticity Index	4 maximum	ASTM D4318

401-2.3 Asphalt binder. Asphalt binder shall conform to ASTM D6373 Performance Grade (PG) **76-22**.

Asphalt Binder PG Plus Test Requirements

Material Test	Requirement	Standard
Elastic Recovery	75% minimum	ASTM D6084[1]

[1] Follow procedure B on RTFO aged binder.

401-2.4 Anti-stripping agent. Any anti-stripping agent or additive (anti-strip) shall be heat stable and shall not change the asphalt binder grade beyond specifications. Anti-strip shall be an approved material of the New York State Department of Transportation.

COMPOSITION

401-3.1 Composition of mixture(s). The asphalt mix shall be composed of a mixture of aggregates, filler and anti-strip agent if required, and asphalt binder. The aggregate fractions shall be sized, handled in separate size groups, and combined in such proportions that the resulting mixture meets the grading requirements of the job mix formula (JMF).

401-3.2 Job mix formula (JMF) laboratory. The laboratory used to develop the JMF shall possess a current certificate of accreditation, listing ASTM D3666 from a national accrediting authority and all test methods required for developing the JMF; and be listed on the accrediting authority's website. A copy of the laboratory's current accreditation and accredited test methods shall be submitted to the Resident Project Representative (RPR) prior to start of construction.

401-3.3 Job mix formula (JMF). No asphalt mixture shall be placed until an acceptable mix design has been submitted to the RPR for review and accepted in writing. The RPR's review shall not relieve the Contractor of the responsibility to select and proportion the materials to comply with this section.

When the project requires asphalt mixtures of differing aggregate gradations and/or binders, a separate JMF shall be submitted for each mix. Add anti-stripping agent to meet tensile strength requirements.

The JMF shall be prepared by an accredited laboratory that meets the requirements of paragraph 401-3.2. The asphalt mixture shall be designed using procedures contained in Asphalt Institute MS-2 Mix Design Manual, 7th Edition**.** Samples shall be prepared and compacted using the gyratory compactor in accordance with ASTM D6925.

Should a change in sources of materials be made, a new JMF must be submitted to the RPR for review and accepted in writing before the new material is used. After the initial production JMF has been approved by the RPR and a new or modified JMF is required for whatever reason, the subsequent cost of the new or modified JMF, including a new control strip when required by the RPR, will be borne by the Contractor.

The RPR may request samples at any time for testing, prior to and during production, to verify the quality of the materials and to ensure conformance with the applicable specifications.

The JMF shall be submitted in writing by the Contractor at least 30 days prior to the start of paving operations. The JMF shall be developed within the same construction season using aggregates proposed for project use.

The JMF shall be dated, and stamped or sealed by the responsible professional Engineer of the laboratory and shall include the following items as a minimum:

- Manufacturer's Certificate of Analysis (COA) for the asphalt binder used in the JMF in accordance with paragraph 401-2.3. Certificate of asphalt performance grade is with modifier already added, if used and must indicate compliance with ASTM D6373. For plant modified asphalt binder, certified test report indicating grade certification of modified asphalt binder.
- Manufacturer's Certificate of Analysis (COA) for the anti-stripping agent if used in the JMF in accordance with paragraph 401-2.4.
- Certified material test reports for the course and fine aggregate and mineral filler in accordance with paragraphs 401-2.1.
- Percent passing each sieve size for individual gradation of each aggregate cold feed and/or hot bin; percent by weight of each cold feed and/or hot bin used; and the total combined gradation in the JMF.
- Specific Gravity and absorption of each coarse and fine aggregate.

- Percent natural sand.
- Percent fractured faces.
- Percent by weight of flat particles, elongated particles, and flat and elongated particles (and criteria).
- Percent of asphalt.
- Number of gyrations
- Laboratory mixing and compaction temperatures.
- Supplier-recommended field mixing and compaction temperatures.
- Plot of the combined gradation on a 0.45 power gradation curve.
- Graphical plots of air voids, voids in the mineral aggregate (VMA), and unit weight versus asphalt content. To achieve minimum VMA during production, the mix design needs to account for material breakdown during production.
- Tensile Strength Ratio (TSR).
- Type and amount of Anti-strip agent when used.
- Asphalt Pavement Analyzer (APA) results.
- Date the JMF was developed. Mix designs that are not dated or which are from a prior construction season shall not be accepted.

Table 1. Asphalt Design Criteria

Test Property	Value	Test Method
Number of gyrations	75	
Air voids (%)	3.5	ASTM D3203
Percent voids in mineral aggregate (VMA), minimum	See Table 2	ASTM D6995
Tensile Strength Ratio (TSR)[1]	not less than 80 at a saturation of 70-80%	ASTM D4867
Asphalt Pavement Analyzer (APA)[2,3]	Less than 10 mm @ 4000 passes	AASHTO T340 at 250 psi hose pressure at 64°C test temperature

[1] Test specimens for TSR shall be compacted at 7 ± 1.0 % air voids. In areas subject to freeze-thaw, use freeze-thaw conditioning in lieu of moisture conditioning per ASTM D4867.

[2] AASHTO T340 at 100 psi hose pressure at 64°C test temperature may be used in the interim. If this method is used the required Value shall be less than 5 mm @ 8000 passes

[3] Where APA not available , use Hamburg Wheel test (AASHTO T-324) 10mm @ 20,000 passes at 50°C.

The mineral aggregate shall be of such size that the percentage composition by weight, as determined by laboratory sieves, will conform to the gradation or gradations specified in Table 2 when tested in accordance with ASTM C136 and ASTM C117.

The gradations in Table 2 represent the limits that shall determine the suitability of aggregate for use from the sources of supply; be well graded from coarse to fine and shall not vary from the low limit on one sieve to the high limit on the adjacent sieve, or vice versa.

Table 2. Aggregate - Asphalt Pavements

Sieve Size	Percentage by Weight Passing Sieve	
	Gradation 1	**Gradation 2**
1 inch	100	--
3/4 inch	90-100	100
1/2 inch	68-88	90-100
3/8 inch	60-82	72-88
No. 4	45-67	53-73
No. 8	32-54	38-60
No. 16	22-44	26-48
No. 30	15-35	18-38
No. 50	9-25	11-27
No. 100	6-18	6-18
No. 200	3-6	3-6
Minimum Voids in Mineral Aggregate (VMA)[1]	14.0	15.0
Asphalt Percent:		
Stone or gravel	4.5-7.0	5.0-7.5
Recommended Minimum Construction Lift Thickness	3 inch	2 inch

[1] To achieve minimum VMA during production, the mix design needs to account for material breakdown during production.

The aggregate gradations shown are based on aggregates of uniform specific gravity. The percentages passing the various sieves shall be corrected when aggregates of varying specific gravities are used, as indicated in the Asphalt Institute MS-2 Mix Design Manual, 7th Edition.

401-3.4 Reclaimed asphalt pavement (RAP). RAP shall not be used.

401-3.5 Control Strip. Full production shall not begin until an acceptable control strip has been constructed and accepted in writing by the RPR**.** The Contractor shall prepare and place a quantity of asphalt according to the JMF. The underlying grade or pavement structure upon which the control strip is to be constructed shall be the same as the remainder of the course represented by the control strip.

The Contractor will not be allowed to place the control strip until the Contractor quality control program (CQCP), showing conformance with the requirements of paragraph 401-5.1, has been accepted, in writing, by the RPR.

The control strip will consist of at least 250 tons or 1/2 sublot, whichever is greater. The control strip shall be placed in two lanes of the same width and depth to be used in production with a longitudinal cold joint. The cold joint must be cut back in accordance with paragraph 401-4.14 using the same procedure that will be used during production. The cold joint for the control strip will be an exposed construction joint at least four (4) hours old or when the mat has cooled to less than 160°F. The equipment used in construction of the control strip shall be the same type, configuration and weight to be used on the project.

The control strip will be considered acceptable by the RPR if the gradation, asphalt content, and VMA are within the action limits specified in paragraph 401-5.5a; and Mat density greater than or equal to 94.5%, air voids 3.5% +/- 1%, and joint density greater than or equal to 92.5%.

If the control strip is unacceptable, necessary adjustments to the JMF, plant operation, placing procedures, and/or rolling procedures shall be made and another control strip shall be placed. Unacceptable control strips shall be removed at the Contractor's expense.

The control strip will be considered one lot for payment based upon the average of a minimum of 3 samples (no sublots required for control strip). Payment will only be made for an acceptable control strip in accordance with paragraph 401-8.1 using a lot pay factor equal to 100.

CONSTRUCTION METHODS

401-4.1 Weather limitations. The asphalt shall not be placed upon a wet surface or when the surface temperature of the underlying course is less than specified in Table 3. The temperature requirements may be waived by the RPR, if requested; however, all other requirements including compaction shall be met.

Table 3. Surface Temperature Limitations of Underlying Course

Mat Thickness	Base Temperature (Minimum), °F
3 inches or greater	40
Greater than 2 inches but less than 3 inches	45

401-4.2 Asphalt plant. Plants used for the preparation of asphalt shall conform to the requirements of American Association of State Highway and Transportation Officials (AASHTO) M156 including the following items.

a. Inspection of plant. The RPR, or RPR's authorized representative, shall have access, at all times, to all areas of the plant for checking adequacy of equipment; inspecting operation of the plant: verifying weights, proportions, and material properties; and checking the temperatures maintained in the preparation of the mixtures.

b. Storage bins and surge bins. The asphalt mixture stored in storage and/or surge bins shall meet the same requirements as asphalt mixture loaded directly into trucks. Asphalt mixture shall not be stored in storage and/or surge bins for a period greater than twelve (12) hours. If the RPR determines there is an excessive heat loss, segregation, or oxidation of the asphalt mixture due to temporary storage, temporary storage shall not be allowed.

401-4.3 Aggregate stockpile management. Aggregate stockpiles shall be constructed in a manner that prevents segregation and intermixing of deleterious materials. Aggregates from different sources shall be

stockpiled, weighed and batched separately at the asphalt batch plant. Aggregates that have become segregated or mixed with earth or foreign material shall not be used.

A continuous supply of materials shall be provided to the work to ensure continuous placement.

401-4.4 Hauling equipment. Trucks used for hauling asphalt shall have tight, clean, and smooth metal beds. To prevent the asphalt from sticking to the truck beds, the truck beds shall be lightly coated with a minimum amount of paraffin oil, lime solution, or other material approved by the RPR. Petroleum products shall not be used for coating truck beds. Each truck shall have a suitable cover to protect the mixture from adverse weather. When necessary, to ensure that the mixture will be delivered to the site at the specified temperature, truck beds shall be insulated or heated and covers shall be securely fastened.

401-4.4.1 Material transfer vehicle (MTV). Material Transfer Vehicles, or other devices as approved by the RPR, shall be used due to the improvement in smoothness and decrease in both physical and thermal segregation. Material transfer vehicles used to transfer the material from the hauling equipment to the paver, shall use a self-propelled, material transfer vehicle with a swing conveyor that can deliver material to the paver without making contact with the paver. The MTV shall be able to move back and forth between the hauling equipment and the paver providing material transfer to the paver, while allowing the paver to operate at a constant speed. The Material Transfer Vehicle will have remixing and storage capability to prevent physical and thermal segregation.

401-4.5 Asphalt pavers. Asphalt pavers shall be self-propelled with an activated heated screed, capable of spreading and finishing courses of asphalt that will meet the specified thickness, smoothness, and grade. The paver shall have sufficient power to propel itself and the hauling equipment without adversely affecting the finished surface. The asphalt paver shall be equipped with a control system capable of automatically maintaining the specified screed grade and elevation.

If the spreading and finishing equipment in use leaves tracks or indented areas, or produces other blemishes in the pavement that are not satisfactorily corrected by the scheduled operations, the use of such equipment shall be discontinued.

The paver shall be capable of paving to a minimum width specified in paragraph 401-4.12.

401-4.6 Rollers. The number, type, and weight of rollers shall be sufficient to compact the asphalt to the required density while it is still in a workable condition without crushing of the aggregate, depressions or other damage to the pavement surface. Rollers shall be in good condition, clean, and capable of operating at slow speeds to avoid displacement of the asphalt. All rollers shall be specifically designed and suitable for compacting asphalt concrete and shall be properly used. Rollers that impair the stability of any layer of a pavement structure or underlying soils shall not be used.

401-4.7 Density device. The Contractor shall have on site a density gauge during all paving operations in order to assist in the determination of the optimum rolling pattern, type of roller and frequencies, as well as to monitor the effect of the rolling operations during production paving. The Contractor shall supply a qualified technician during all paving operations to calibrate the gauge and obtain accurate density readings for all new asphalt. These densities shall be supplied to the RPR upon request at any time during construction. No separate payment will be made for supplying the density gauge and technician.

401-4.8 Preparation of asphalt binder. The asphalt binder shall be heated in a manner that will avoid local overheating and provide a continuous supply of the asphalt binder to the mixer at a uniform temperature. The temperature of unmodified asphalt binder delivered to the mixer shall be sufficient to provide a suitable viscosity for adequate coating of the aggregate particles, but shall not exceed 325°F when added to the aggregate. The temperature of modified asphalt binder shall be no more than 350°F when added to the aggregate.

401-4.9 Preparation of mineral aggregate. The aggregate for the asphalt shall be heated and dried. The maximum temperature and rate of heating shall be such that no damage occurs to the aggregates. The

temperature of the aggregate and mineral filler shall not exceed 350°F when the asphalt binder is added. Particular care shall be taken that aggregates high in calcium or magnesium content are not damaged by overheating. The temperature shall not be lower than is required to obtain complete coating and uniform distribution on the aggregate particles and to provide a mixture of satisfactory workability.

401-4.10 Preparation of Asphalt mixture. The aggregates and the asphalt binder shall be weighed or metered and mixed in the amount specified by the JMF. The combined materials shall be mixed until the aggregate obtains a uniform coating of asphalt binder and is thoroughly distributed throughout the mixture. Wet mixing time shall be the shortest time that will produce a satisfactory mixture, but not less than 25 seconds for batch plants. The wet mixing time for all plants shall be established by the Contractor, based on the procedure for determining the percentage of coated particles described in ASTM D2489, for each individual plant and for each type of aggregate used. The wet mixing time will be set to achieve 95% of coated particles. For continuous mix plants, the minimum mixing time shall be determined by dividing the weight of its contents at operating level by the weight of the mixture delivered per second by the mixer. The moisture content of all asphalt upon discharge shall not exceed 0.5%.

401-4.11 Application of Tack Coat. Immediately before placing the asphalt mixture, the underlying course shall be cleaned of all dust and debris.

A tack coat shall be applied in accordance with Item P-603 to all vertical and horizontal asphalt and concrete surfaces prior to placement of the first and each subsequent lift of asphalt mixture.

401-4.12 Laydown plan, transporting, placing, and finishing. Prior to the placement of the asphalt, the Contractor shall prepare a laydown plan with the sequence of paving lanes and width to minimize the number of cold joints; the location of any temporary ramps; laydown temperature; and estimated time of completion for each portion of the work (milling, paving, rolling, cooling, etc.). The laydown plan and any modifications shall be approved by the RPR.

Deliveries shall be scheduled so that placing and compacting of asphalt is uniform with minimum stopping and starting of the paver. Hauling over freshly placed material shall not be permitted until the material has been compacted, as specified, and allowed to cool to approximately ambient temperature. The Contractor, at their expense, shall be responsible for repair of any damage to the pavement caused by hauling operations.

Contractor shall survey each lift of asphalt surface course and certify to RPR that every lot of each lift meets the grade tolerances of paragraph 401-6.2d before the next lift can be placed.

Edges of existing asphalt pavement abutting the new work shall be saw cut and the cut off material and laitance removed. Apply a tack coat in accordance with P-603 before new asphalt material is placed against it.

The speed of the paver shall be regulated to eliminate pulling and tearing of the asphalt mat. Placement of the asphalt mix shall begin along the centerline of a crowned section or on the high side of areas with a one way slope unless shown otherwise on the laydown plan as accepted by the RPR. The asphalt mix shall be placed in consecutive adjacent lanes having a minimum width of 15 feet except where edge lanes require less width to complete the area. Additional screed sections attached to widen the paver to meet the minimum lane width requirements must include additional auger sections to move the asphalt mixture uniformly along the screed extension.

The longitudinal joint in one course shall offset the longitudinal joint in the course immediately below by at least one foot; however, the joint in the surface top course shall be at the centerline of crowned pavements. Transverse joints in one course shall be offset by at least 10 feet from transverse joints in the previous course. Transverse joints in adjacent lanes shall be offset a minimum of 10 feet. On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impractical, the asphalt may be spread and luted by hand tools.

The RPR may at any time, reject any batch of asphalt, on the truck or placed in the mat, which is rendered unfit for use due to contamination, segregation, incomplete coating of aggregate, or overheated asphalt mixture. Such rejection may be based on only visual inspection or temperature measurements. In the event of such rejection, the Contractor may take a representative sample of the rejected material in the presence of the RPR, and if it can be demonstrated in the laboratory, in the presence of the RPR, that such material was erroneously rejected, payment will be made for the material at the contract unit price.

Areas of segregation in the surface course, as determined by the RPR, shall be removed and replaced at the Contractor's expense. The area shall be removed by saw cutting and milling a minimum of the construction lift thickness as specified in paragraph 401-3.3, Table 2 for the approved mix design. The area to be removed and replaced shall be a minimum width of the paver and a minimum of 10 feet long.

401-4.13 Compaction of asphalt mixture. After placing, the asphalt mixture shall be thoroughly and uniformly compacted by self-propelled rollers. The surface shall be compacted as soon as possible when the asphalt has attained sufficient stability so that the rolling does not cause undue displacement, cracking or shoving. The sequence of rolling operations and the type of rollers used shall be at the discretion of the Contractor. The speed of the roller shall, at all times, be sufficiently slow to avoid displacement of the hot mixture and be effective in compaction. Any surface defects and/or displacement occurring as a result of the roller, or from any other cause, shall be corrected at the Contractor's expense.

Sufficient rollers shall be furnished to handle the output of the plant. Rolling shall continue until the surface is of uniform texture, true to grade and cross-section, and the required field density is obtained. To prevent adhesion of the asphalt to the roller, the wheels shall be equipped with a scraper and kept moistened with water as necessary.

In areas not accessible to the roller, the mixture shall be thoroughly compacted with approved power tampers.

Any asphalt that becomes loose and broken, mixed with dirt, contains check-cracking, or in any way defective shall be removed and replaced with fresh hot mixture and immediately compacted to conform to the surrounding area. This work shall be done at the Contractor's expense. Skin patching shall not be allowed.

401-4.14 Joints. The formation of all joints shall be made to ensure a continuous bond between the courses and obtain the required density. All joints shall have the same texture as other sections of the course and meet the requirements for smoothness and grade.

The roller shall not pass over the unprotected end of the freshly laid asphalt except when necessary to form a transverse joint. When necessary to form a transverse joint, it shall be made by means of placing a bulkhead or by tapering the course. The tapered edge shall be cut back to its full depth and width on a straight line to expose a vertical face prior to placing the adjacent lane. In both methods, all contact surfaces shall be coated with an asphalt tack coat before placing any fresh asphalt against the joint.

Longitudinal joints which have been left exposed for more than four (4) hours; the surface temperature has cooled to less than 175°F; or are irregular, damaged, uncompacted or otherwise defective shall be cut back with a cutting wheel or pavement saw a maximum of 3 inches to expose a clean, sound, uniform vertical surface for the full depth of the course. All cutback material and any laitance produced from cutting joints shall be removed from the project. Asphalt tack coat in accordance with P-603 shall be applied to the clean, dry joint prior to placing any additional fresh asphalt against the joint. The cost of this work shall be considered incidental to the cost of the asphalt.

401-4.15 Saw-cut grooving. Refer to specification P-621.

401-4.16 Diamond grinding. Diamond grinding shall be completed prior to pavement grooving. Diamond grinding shall be accomplished by sawing with saw blades impregnated with industrial diamond abrasive.

Diamond grinding shall be performed with a machine designed specifically for diamond grinding capable of cutting a path at least 3 feet wide. The saw blades shall be 1/8-inch wide with a sufficient number of blades to create grooves between 0.090 and 0.130 inches wide; and peaks and ridges approximately 1/32 inch higher than the bottom of the grinding cut. The actual number of blades will be determined by the Contractor and depend on the hardness of the aggregate. Equipment or grinding procedures that cause ravels, aggregate fractures, spalls or disturbance to the pavement will not be permitted. Contractor shall demonstrate to the RPR that the grinding equipment will produce satisfactory results prior to making corrections to surfaces. Grinding will be tapered in all directions to provide smooth transitions to areas not requiring grinding. The slurry resulting from the grinding operation shall be continuously removed and the pavement left in a clean condition. The Contractor shall apply a surface treatment per P-608 to all areas that have been subject to grinding.

401-4.17 Nighttime paving requirements. The Contractor shall provide adequate lighting during any nighttime construction. A lighting plan shall be submitted by the Contractor and approved by the RPR prior to the start of any nighttime work. All work shall be in accordance with the approved CSPP and lighting plan.

CONTRACTOR QUALITY CONTROL (CQC)

401-5.1 General. The Contractor shall develop a Contractor Quality Control Program (CQCP) in accordance with Item C-100. No partial payment will be made for materials without an approved CQCP.

401-5.2 Contractor quality control (QC) facilities. The Contractor shall provide or contract for testing facilities in accordance with Item C-100. The RPR shall be permitted unrestricted access to inspect the Contractor's QC facilities and witness QC activities. The RPR will advise the Contractor in writing of any noted deficiencies concerning the QC facility, equipment, supplies, or testing personnel and procedures. When the deficiencies are serious enough to be adversely affecting the test results, the incorporation of the materials into the work shall be suspended immediately and will not be permitted to resume until the deficiencies are satisfactorily corrected.

401-5.3 Contractor QC testing. The Contractor shall perform all QC tests necessary to control the production and construction processes applicable to these specifications and as set forth in the approved CQCP. The testing program shall include, but not necessarily be limited to, tests for the control of asphalt content, aggregate gradation, temperatures, aggregate moisture, field compaction, and surface smoothness. A QC Testing Plan shall be developed as part of the CQCP.

a. Asphalt content. A minimum of two tests shall be performed per day in accordance with ASTM D6307 or ASTM D2172 for determination of asphalt content. When using ASTM D6307, the correction factor shall be determined as part of the first test performed at the beginning of plant production; and as part of every tenth test performed thereafter. The asphalt content for the day will be determined by averaging the test results.

b. Gradation. Aggregate gradations shall be determined a minimum of twice per day from mechanical analysis of extracted aggregate in accordance with ASTM D5444, ASTM C136, and ASTM C117.

c. Moisture content of aggregate. The moisture content of aggregate used for production shall be determined a minimum of once per day in accordance with ASTM C566.

d. Moisture content of asphalt. The moisture content shall be determined once per day in accordance with AASHTO T329 or ASTM D1461.

e. Temperatures. Temperatures shall be checked, at least four times per day, at necessary locations to determine the temperatures of the dryer, the asphalt binder in the storage tank, the asphalt at the plant, and the asphalt at the job site.

f. In-place density monitoring. The Contractor shall conduct any necessary testing to ensure that the specified density is being achieved. A nuclear gauge may be used to monitor the pavement density in accordance with ASTM D2950.

g. Smoothness for Contractor Quality Control.

The Contractor shall perform smoothness testing in transverse and longitudinal directions daily to verify that the construction processes are producing pavement with variances less than 1/4 inch in 12 feet, identifying areas that may pond water which could lead to hydroplaning of aircraft. If the smoothness criteria are not met, appropriate changes and corrections to the construction process shall be made by the Contractor before construction continues.

The Contractor may use a 12-foot straightedge, a rolling inclinometer meeting the requirements of ASTM E2133 or rolling external reference device that can simulate a 12-foot straightedge approved by the RPR. Straight-edge testing shall start with one-half the length of the straightedge at the edge of pavement section being tested and then moved ahead one-half the length of the straightedge for each successive measurement. Testing shall be continuous across all joints. The surface irregularity shall be determined by placing the freestanding (unleveled) straightedge on the pavement surface and allowing it to rest upon the two highest spots covered by its length, and measuring the maximum gap between the straightedge and the pavement surface in the area between the two high points. If the rolling inclinometer or external reference device is used, the data may be evaluated using either the FAA profile program, ProFAA, or FHWA ProVal, using the 12-foot straightedge simulation function.

Smoothness readings shall not be made across grade changes or cross slope transitions. The transition between new and existing pavement shall be evaluated separately for conformance with the plans.

(1) Transverse measurements. Transverse measurements shall be taken for each day's production placed. Transverse measurements shall be taken perpendicular to the pavement centerline each 50 feet or more often as determined by the RPR. The joint between lanes shall be tested separately to facilitate smoothness between lanes.

(2) Longitudinal measurements. Longitudinal measurements shall be taken for each day's production placed. Longitudinal tests shall be parallel to the centerline of paving; at the center of paving lanes when widths of paving lanes are less than 20 feet; and at the third points of paving lanes when widths of paving lanes are 20 ft or greater. When placement abuts previously placed material the first measurement shall start with one half the length of the straight edge on the previously placed material.

Deviations on the final surface course in either the transverse or longitudinal direction that will trap water greater than 1/4 inch shall be corrected with diamond grinding per paragraph 401-4.16 or by removing and replacing the surface course to full depth. Grinding shall be tapered in all directions to provide smooth transitions to areas not requiring grinding. All areas in which diamond grinding has been performed shall be subject to the final pavement thickness tolerances specified in paragraph 401-6.1d(3). Areas that have been ground shall be sealed with a surface treatment in accordance with Item P-608. To avoid the surface treatment creating any conflict with runway or taxiway markings, it may be necessary to seal a larger area.

Control charts shall be kept to show area of each day's placement and the percentage of corrective grinding required. Corrections to production and placement shall be initiated when corrective grinding is required. If the Contractor's machines and/or methods produce significant areas that need corrective actions in excess of 10 percent of a day's production, production shall be stopped until corrective measures are implemented by the Contractor.

h. Grade. Grade shall be evaluated daily to allow adjustments to paving operations when grade measurements do not meet specifications. As a minimum, grade shall be evaluated prior to and after the placement of the first lift and after placement of the surface lift.

Measurements will be taken at appropriate gradelines (as a minimum at center and edges of paving lane) and longitudinal spacing as shown on cross-sections and plans. The final surface of the pavement will not vary from the gradeline elevations and cross-sections shown on the plans by more than 1/2 inch vertically and 0.1 feet laterally. The documentation will be provided by the Contractor to the RPR by the end of the following working day.

Areas with humps or depressions that exceed grade or smoothness criteria and that retain water on the surface must be ground off provided the course thickness after grinding is not more than 1/2 inch less than the thickness specified on the plans. Grinding shall be in accordance with paragraph 401-4.16.

The Contractor shall repair low areas or areas that cannot be corrected by grinding by removal of deficient areas to the depth of the final course plus 1/2 inch and replacing with new material. Skin patching is not allowed.

401-5.4 Sampling. When directed by the RPR, the Contractor shall sample and test any material that appears inconsistent with similar material being sampled, unless such material is voluntarily removed and replaced or deficiencies corrected by the Contractor. All sampling shall be in accordance with standard procedures specified.

401-5.5 Control charts. The Contractor shall maintain linear control charts for both individual measurements and range (i.e., difference between highest and lowest measurements) for aggregate gradation, asphalt content, and VMA. The VMA for each day will be calculated and monitored by the QC laboratory.

Control charts shall be posted in a location satisfactory to the RPR and kept current. As a minimum, the control charts shall identify the project number, the contract item number, the test number, each test parameter, the Action and Suspension Limits applicable to each test parameter, and the Contractor's test results. The Contractor shall use the control charts as part of a process control system for identifying potential problems and assignable causes before they occur. If the Contractor's projected data during production indicates a problem and the Contractor is not taking satisfactory corrective action, the RPR may suspend production or acceptance of the material.

a. Individual measurements. Control charts for individual measurements shall be established to maintain process control within tolerance for aggregate gradation, asphalt content, and VMA. The control charts shall use the job mix formula target values as indicators of central tendency for the following test parameters with associated Action and Suspension Limits:

Control Chart Limits for Individual Measurements

Sieve	Action Limit	Suspension Limit
3/4 inch	±6%	±9%
1/2 inch	±6%	±9%
3/8 inch	±6%	±9%
No. 4	±6%	±9%
No. 16	±5%	±7.5%
No. 50	±3%	±4.5%
No. 200	±2%	±3%
Asphalt Content	±0.45%	±0.70%
Minimum VMA	-0.5%	-1.0%

b. Range. Control charts shall be established to control gradation process variability. The range shall be plotted as the difference between the two test results for each control parameter. The Suspension Limits specified in the table that follows are based on a sample size of n = 2. Should the Contractor elect to perform more than two tests per lot, the Suspension Limits shall be adjusted by multiplying the Suspension Limit by 1.18 for n = 3 and by 1.27 for n = 4.

Control Chart Limits Based on Range

Sieve	Suspension Limit
1/2 inch	11%
3/8 inch	11%
No. 4)	11%
No. 16	9%
No. 50	6%
No. 200	3.5%
Asphalt Content	0.8%

c. Corrective Action. The CQCP shall indicate that appropriate action shall be taken when the process is believed to be out of tolerance. The Plan shall contain rules to gauge when a process is out of control and detail what action will be taken to bring the process into control. As a minimum, a process shall be deemed out of control and production stopped and corrective action taken, if:

(1) One point falls outside the Suspension Limit line for individual measurements or range; or

(2) Two points in a row fall outside the Action Limit line for individual measurements.

401-5.6 QC reports. The Contractor shall maintain records and shall submit reports of QC activities daily, in accordance with Item C-100.

MATERIAL ACCEPTANCE

401-6.1 Acceptance sampling and testing. Unless otherwise specified, all acceptance sampling and testing necessary to determine conformance with the requirements specified in this section will be performed by the RPR at no cost to the Contractor except that coring as required in this section shall be completed and paid for by the Contractor.

a. Quality assurance (QA) testing laboratory. The QA testing laboratory performing these acceptance tests will be accredited in accordance with ASTM D3666. The QA laboratory accreditation will be current and listed on the accrediting authority's website. All test methods required for acceptance sampling and testing will be listed on the lab accreditation.

b. Lot size. A standard lot will be equal to one day's production divided into approximately equal sublots of between 400 to 600 tons. When only one or two sublots are produced in a day's production, the sublots will be combined with the production lot from the previous or next day.

Where more than one plant is simultaneously producing asphalt for the job, the lot sizes will apply separately for each plant.

c. Asphalt air voids. Plant-produced asphalt will be tested for air voids on a sublot basis.

(1) Sampling. Material from each sublot shall be sampled in accordance with ASTM D3665. Samples shall be taken from material deposited into trucks at the plant or at the job site in accordance with ASTM D979. The sample of asphalt may be put in a covered metal tin and placed in an oven for not less than 30 minutes nor more than 60 minutes to maintain the material at or above the compaction temperature as specified in the JMF.

(2) Testing. Air voids will be determined for each sublot in accordance with ASTM D3203 for a set of three compacted specimens prepared in accordance with ASTM D6925.

d. In-place asphalt mat and joint density. Each sublot will be tested for in-place mat and joint density as a percentage of the theoretical maximum density (TMD).

(1) Sampling. The Contractor will cut minimum 5-inch diameter samples in accordance with ASTM D5361. The Contractor shall furnish all tools, labor, and materials for cleaning, and filling the cored pavement. Laitance produced by the coring operation shall be removed immediately after coring, and core holes shall be filled within one day after sampling in a manner acceptable to the RPR.

(2) Bond. Each lift of asphalt shall be bonded to the underlying layer. If cores reveal that the surface is not bonded, additional cores shall be taken as directed by the RPR to determine the extent of unbonded areas. Unbonded areas shall be removed by milling and replaced at no additional cost as directed by the RPR.

(3) Thickness. Thickness of each lift of surface course will be evaluated by the RPR for compliance to the requirements shown on the plans after any necessary corrections for grade. Measurements of thickness will be made using the cores extracted for each sublot for density measurement. The maximum allowable deficiency at any point will not be more than 1/4 inch less than the thickness indicated for the lift. Average thickness of lift, or combined lifts, will not be less than the indicated thickness. Where the thickness tolerances are not met, the lot or sublot shall be corrected by the Contractor at his expense by removing the deficient area and replacing with new pavement. The Contractor, at his expense, may take additional cores as approved by the RPR to circumscribe the deficient area.

(4) Mat density. One core shall be taken from each sublot. Core locations will be determined by the RPR in accordance with ASTM D3665. Cores for mat density shall not be taken closer than one foot (30 cm) from a transverse or longitudinal joint. The bulk specific gravity of each cored sample will be determined in accordance with ASTM D2726. The percent compaction (density) of each sample will be determined by dividing the bulk specific gravity of each sublot sample by the TMD for that sublot.

(5) Joint density. One core centered over the longitudinal joint shall be taken for each sublot that has a longitudinal joint. Core locations will be determined by the RPR in accordance with ASTM D3665. The bulk specific gravity of each core sample will be determined in accordance with ASTM D2726. The percent compaction (density) of each sample will be determined by dividing the bulk specific gravity of each joint density sample by the average TMD for the lot. The TMD used to determine the joint density at joints formed between lots will be the lower of the average TMD values from the adjacent lots.

401-6.2 Acceptance criteria.

a. General. Acceptance will be based on the implementation of the Contractor Quality Control Program (CQCP) and the following characteristics of the asphalt and completed pavements: air voids, mat density, joint density, grade**.**

b. Air Voids and Mat density. Acceptance of each lot of plant produced material for mat density and air voids will be based on the percentage of material within specification limits (PWL). If the PWL of the lot equals or exceeds 90%, the lot will be acceptable. Acceptance and payment will be determined in accordance with paragraph 401-8.1.

c. Joint density. Acceptance of each lot of plant produced asphalt for joint density will be based on the PWL. If the PWL of the lot is equal to or exceeds 90%, the lot will be considered acceptable. If the PWL is less than 90%, the Contractor shall evaluate the reason and act accordingly. If the PWL is less than 80%, the Contractor shall cease operations and until the reason for poor compaction has been determined. If the PWL is less than 71%, the pay factor for the lot used to complete the joint will be reduced by five (5) percentage points. This lot pay factor reduction will be incorporated and evaluated in accordance with paragraph 401-8.1.

d. Grade. The final finished surface of the pavement shall be surveyed to verify that the grade elevations and cross-sections shown on the plans do not deviate more than 1/2 inch vertically or 0.1 feet laterally.

Cross-sections of the pavement shall be taken at a minimum 50-foot longitudinal spacing, at all longitudinal grade breaks, and at start and end of each lane placed. Minimum cross-section grade points shall include grade at centerline, ± 10 feet of centerline, and edge of taxiway pavement.

The survey and documentation shall be stamped and signed by a licensed surveyor. Payment for sublots that do not meet grade for over 25% of the sublot shall not be more than 95%.

e. Profilograph roughness for QA Acceptance. Not used.

401-6.3 Percentage of material within specification limits (PWL). The PWL will be determined in accordance with procedures specified in Item C-110. The specification tolerance limits (L) for lower and (U) for upper are contained in Table 5.

Table 5. Acceptance Limits for Air Voids and Density

Test Property	Pavements Specification Tolerance Limits	
	L	**U**
Air Voids Total Mix (%)	2.0	5.0
Surface Course Mat Density (%)	92.8	-
Base Course Mat Density (%)	92.0	-
Joint density (%)	90.5	--

a. Outliers. All individual tests for mat density and air voids will be checked for outliers (test criterion) in accordance with ASTM E178, at a significance level of 5%. Outliers will be discarded, and the PWL will be determined using the remaining test values. The criteria in Table 5 is based on production processes which have a variability with the following standard deviations: Surface Course Mat Density (%), 1.30; Base Course Mat Density (%), 1.55; Joint Density (%), 1.55.

The Contractor should note that (1) 90 PWL is achieved when consistently producing a surface course with an average mat density of at least 94.5% with 1.30% or less variability, (2) 90 PWL is achieved when consistently producing a base course with an average mat density of at least 94.0% with 1.55% or less variability, and (3) 90 PWL is achieved when consistently producing joints with an average joint density of at least 92.5% with 1.55% or less variability.

401-6.4 Resampling pavement for mat density.

a. General. Resampling of a lot of pavement will only be allowed for mat density, and then, only if the Contractor requests same, in writing, within 48 hours after receiving the written test results from the RPR. A retest will consist of all the sampling and testing procedures contained in paragraphs 401-6.1d and 401-6.2b. Only one resampling per lot will be permitted.

(1) A redefined PWL will be calculated for the resampled lot. The number of tests used to calculate the redefined PWL will include the initial tests made for that lot plus the retests.

(2) The cost for resampling and retesting shall be borne by the Contractor.

b. Payment for resampled lots. The redefined PWL for a resampled lot will be used to calculate the payment for that lot in accordance with Table 6.

c. Outliers. Check for outliers in accordance with ASTM E178, at a significance level of 5%.

METHOD OF MEASUREMENT

401-7.1 Measurement. Asphalt shall be measured by the number of tons of asphalt used in the accepted work. Batch weights or truck scale weights will be used to determine the basis for the tonnage.

BASIS OF PAYMENT

401-8.1 Payment. Payment for a lot of asphalt meeting all acceptance criteria as specified in paragraph 401-6.2 shall be made based on results of tests for mat density and air voids. Payment for acceptable lots

shall be adjusted according to paragraph 401-8.1c for mat density and air voids; and paragraph 401-6.2c for joint density, subject to the limitation that:

a. The total project payment for plant mix asphalt pavement shall not exceed 100 percent of the product of the contract unit price and the total number of tons (kg) of asphalt used in the accepted work.

b. The price shall be compensation for furnishing all materials, for all preparation, mixing, and placing of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

c. Basis of adjusted payment. The pay factor for each individual lot shall be calculated in accordance with Table 6. A pay factor shall be calculated for both mat density and air voids. The lot pay factor shall be the higher of the two values when calculations for both mat density and air voids are 100% or higher. The lot pay factor shall be the product of the two values when only one of the calculations for either mat density or air voids is 100% or higher. The lot pay factor shall be the lower of the two values when calculations for both mat density and air voids are less than 100%. If PWL for joint density is less than 71% then the lot pay factor shall be reduced by 5% but be no higher than 95%.

For each lot accepted, the adjusted contract unit price shall be the product of the lot pay factor for the lot and the contract unit price. Payment shall be subject to the total project payment limitation specified in paragraph 401-8.1a. Payment in excess of 100% for accepted lots of asphalt shall be used to offset payment for accepted lots of asphalt pavement that achieve a lot pay factor less than 100%.

Payment for sublots which do not meet grade in accordance with paragraph 401-6.2d after correction for over 25% of the sublot shall be reduced by 5%.

Table 6. Price adjustment schedule[1]

Percentage of material within specification limits (PWL)	Lot pay factor (percent of contract unit price)
96 – 100	106
90 – 95	PWL + 10
75 – 89	0.5 PWL + 55
55 – 74	1.4 PWL – 12
Below 55	Reject [2]

[1] Although it is theoretically possible to achieve a pay factor of 106% for each lot, actual payment above 100% shall be subject to the total project payment limitation specified in paragraph 401-8.1a.

[2] The lot shall be removed and replaced. However, the RPR may decide to allow the rejected lot to remain. In that case, if the RPR and Contractor agree in writing that the lot shall not be removed, it shall be paid for at 50% of the contract unit price and the total project payment shall be reduced by the amount withheld for the rejected lot.

d. Profilograph Roughness. Not used.

401-8.1 Payment.

Payment will be made under:

Item P-401-1	Asphalt Surface Course, Gradation 2 - per ton
Item P-401-2	Asphalt Base Course, Gradation 1 - per ton

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C29	Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate
ASTM C88	Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C117	Standard Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C127	Standard Test Method for Density, Relative Density (Specific Gravity) and Absorption of Coarse Aggregate
ASTM C131	Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C142	Standard Test Method for Clay Lumps and Friable Particles in Aggregates
ASTM C566	Standard Test Method for Total Evaporable Moisture Content of Aggregate by Drying
ASTM D75	Standard Practice for Sampling Aggregates
ASTM D242	Standard Specification for Mineral Filler for Bituminous Paving Mixtures
ASTM D946	Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction
ASTM D979	Standard Practice for Sampling Asphalt Paving Mixtures
ASTM D1073	Standard Specification for Fine Aggregate for Asphalt Paving Mixtures
ASTM D1188	Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Coated Samples
ASTM D2172	Standard Test Method for Quantitative Extraction of Bitumen from Asphalt Paving Mixtures
ASTM D1461	Standard Test Method for Moisture or Volatile Distillates in Asphalt Paving Mixtures
ASTM D2041	Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
ASTM D2419	Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate
ASTM D2489	Standard Practice for Estimating Degree of Particle Coating of Bituminous-Aggregate Mixtures

ASTM D2726	Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures
ASTM D2950	Standard Test Method for Density of Bituminous Concrete in Place by Nuclear Methods
ASTM D3203	Standard Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures
ASTM D3381	Standard Specification for Viscosity-Graded Asphalt Cement for Use in Pavement Construction
ASTM D3665	Standard Practice for Random Sampling of Construction Materials
ASTM D3666	Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials
ASTM D4318	Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4552	Standard Practice for Classifying Hot-Mix Recycling Agents
ASTM D4791	Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM D4867	Standard Test Method for Effect of Moisture on Asphalt Concrete Paving Mixtures
ASTM D5361	Standard Practice for Sampling Compacted Asphalt Mixtures for Laboratory Testing
ASTM D5444	Standard Test Method for Mechanical Size Analysis of Extracted Aggregate
ASTM D5821	Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate
ASTM D6084	Standard Test Method for Elastic Recovery of Bituminous Materials by Ductilometer
ASTM D6307	Standard Test Method for Asphalt Content of Hot Mix Asphalt by Ignition Method
ASTM D6373	Standard Specification for Performance Graded Asphalt Binder
ASTM D6752	Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Automatic Vacuum Sealing Method
ASTM D6925	Standard Test Method for Preparation and Determination of the Relative Density of Hot Mix Asphalt (HMA) Specimens by Means of the SuperPave Gyratory Compactor.
ASTM D6926	Standard Practice for Preparation of Bituminous Specimens Using Marshall Apparatus
ASTM D6927	Standard Test Method for Marshall Stability and Flow of Bituminous Mixtures
ASTM D6995	Standard Test Method for Determining Field VMA based on the Maximum Specific Gravity of the Mix (Gmm)

ASTM E11	Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves
ASTM E178	Standard Practice for Dealing with Outlying Observations
ASTM E1274	Standard Test Method for Measuring Pavement Roughness Using a Profilograph
ASTM E950	Standard Test Method for Measuring the Longitudinal Profile of Traveled Surfaces with an Accelerometer Established Inertial Profiling Reference
ASTM E2133	Standard Test Method for Using a Rolling Inclinometer to Measure Longitudinal and Transverse Profiles of a Traveled Surface

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO M156	Standard Specification for Requirements for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures.
AASHTO T329	Standard Method of Test for Moisture Content of Hot Mix Asphalt (HMA) by Oven Method
AASHTO T324	Standard Method of Test for Hamburg Wheel-Track Testing of Compacted Asphalt Mixtures
AASHTO T 340	Standard Method of Test for Determining the Rutting Susceptibility of Hot Mix Asphalt (APA) Using the Asphalt Pavement Analyzer (APA)

Asphalt Institute (AI)

Asphalt Institute Handbook MS-26, Asphalt Binder

Asphalt Institute MS-2 Mix Design Manual, 7th Edition

AI State Binder Specification Database

Federal Highway Administration (FHWA)

Long Term Pavement Performance Binder Program

FAA Advisory Circulars (AC)

AC 150/5320-6	Airport Pavement Design and Evaluation

FAA Orders

5300.1	Modifications to Agency Airport Design, Construction, and Equipment Standards

FAA Software

FAARFIELD

END OF ITEM P-401

Item P-407 Asphalt Treated Permeable Base Course (ATPB)

DESCRIPTION

407-1.1 This item consists of an asphalt treated permeable (drainable) base (ATPB) composed of mineral aggregate, and asphalt cement mixed in a central mixing plant and placed on a prepare subgrade or subbase course in accordance with these specifications and shall conform to the lines, grades, thickness, and typical cross sections shown in the plans.

MATERIALS

407-2.1 Aggregate. Use aggregate consisting of clean, sound, hard, durable, angular particles of crushed gravel or crushed stone and shall meet the gradation requirements of ASTM D448 Size 78. Fine aggregate shall consist of natural sand or manufactured sand meeting the requirements of ASTM C33. The aggregate shall meet the material requirements in Table 407-2.1.

Table 407-2.1. Aggregate Material Requirements

Material Test	Requirement	Standard
Coarse Aggregate		
Resistance to Degradation	Loss: 40% maximum	ASTM C131
Soundness of Aggregates by Use of Sodium Sulfate **or** Magnesium Sulfate	Loss after 5 cycles: 10% maximum using Sodium sulfate - or - 15% maximum using magnesium sulfate	ASTM C88
Fractured Faces	90% by weight of particles with at least 2 fractured faces	ASTM D5821
Flat Particles, Elongated Particles, or Flat and Elongated Particles[1]	10% maximum, by weight, for fraction retained on the 3/8 inch (9.5mm) sieve and 10% maximum, by weight, for the fraction passing the 3/8-inch (9.5 mm) sieve	ASTM D4791
Clay lumps and friable particles	Less than or equal to 3 percent	ASTM C142
Fine Aggregate		
Clay lumps and friable particles	Less than or equal to 3 percent	ASTM C142
Soundness of Aggregates by Use of Sodium Sulfate **or** Magnesium Sulfate	Loss after 5 cycles: 10% maximum using Sodium sulfate - or - 15% maximum using magnesium sulfate	ASTM C88

[1] A flat particle is one having a ratio of width to thickness greater than five (5); an elongated particle is one having a ratio of length to width greater than five (5).

407-2.2 Sampling and testing.

a. Aggregate base materials. The Contractor shall take samples of the aggregate base stockpile in accordance with ASTM D75 to verify initial aggregate base requirements and gradation. Material shall meet the requirements in paragraph 407-2.1. This sampling and testing will be the basis for approval of the aggregate base quality requirements.

407-2.3 Asphalt binder. Asphalt binder shall conform to ASTM D6373 Performance Grade (PG) **76-22**.

407-2.4 Anti-stripping agent. Anti-stripping agent or additive (anti-strip) shall be heat stable and shall not change the asphalt binder grade beyond specifications. Anti-strip shall be an approved material of the

New York State Department of Transportation.

407-2.5 Bond Breaker. Not Used.

407-2.6 Separation Geotextile. Not used.

COMPOSITION OF MIXTURE

407-3.1 Mix design. The Job Mix Formula (JMF) shall be composed of a mixture of open graded aggregate, a minimum of 0.5% antistrip agent and asphalt binder. An acceptable mix will have a minimum of 2% asphalt binder, sufficient to cover 95% of mixture with a shiny black appearance with minimal draindown at 200°F and will bind the compacted mix. When the aggregates are blended and mixed with the asphalt cement at 250°F and compacted at 150°F , the JMF shall have a permeability of not less than 500 ft/day nor more than 1,500 ft/day when tested with constant head permeability test ASTM D2434/AASHTO T215.

407-3.2 Submittals. At least 30 days prior to the placement of the ATPB, the Contractor shall submit certified test reports to the RPR for those materials proposed for use during construction, as well as the mix design information for the material. The submittal package shall include the following:

a. Sources of materials, including aggregate, asphalt binder, additives, and bond-breaking materials (if used).

b. Physical properties of the aggregates, asphalt binder, antistrip agent, and bond-breaking materials.

c. Percent of asphalt.

d. Amount of antistrip agent.

e. Permeability of JMF.

No ATPB material shall be placed until the submittal is accepted in writing by the RPR. During production, the Contractor shall submit batch tickets for each delivered load.

CONSTRUCTION METHODS

407-4.1 Control strip. The contractor shall produce, place, and compact a control strip of at least 250 ft. The Contractor shall demonstrate, in the presence of the RPR, that the materials, equipment, and construction processes meet the requirements of the specification. Control strips that do not meet specification requirements shall be removed and replaced at the Contractor's expense. Full operations shall not continue until the control strip has been accepted by the RPR. Upon acceptance of the control strip by the RPR, the Contractor shall use the same equipment, materials, and construction methods for the remainder of construction, unless adjustments made by the Contractor are approved in advance by the RPR.

When additional effort beyond that provided by the paver is required to seat the aggregate, additional compaction shall not be initiated until mixture has cooled to below 175°F (or lower as determined during construction of the test strip). One to two passes of a self-propelled, steel-wheel static roller with weight between 5 and 12 tons (4.5 to 10.9 metric tons) is usually sufficient. The roller shall be in good condition and shall be capable of reversing without backlash and of compacting the ATPB without undue displacement or excessive crushing of the aggregate. The actual rolling pattern and sequence shall be established during placement of the control strip and approved by the RPR. In areas inaccessible to the

paver and roller, hand operated vibrator-plate compactors may be used to seat the aggregate.

The control strip ATPB layer shall be considered acceptable when aggregate is completely coated with asphalt cement with minimal evidence of crushing; the surface is firm, unyielding and stable under construction traffic; and the layer meets the field permeability per paragraph 407-3.1.

407-4.2 Weather limitations. The ATPB material shall not be mixed or placed while the air temperature is below 40°F (4°C). The ATPB shall not be placed on frozen underlying courses or mixed when aggregate is frozen. The ATPB may not be placed when rainfall is occurring or where rain is imminent.

407-4.3 Equipment. All equipment necessary to mix, transport, place, compact, and finish the ATPB material shall be furnished by the Contractor and approved by the RPR. The equipment will be inspected by the RPR prior to the start of construction operations.

407-4.4 Preparation of the underlying course. The underlying course shall be checked and accepted by the RPR before placing operations begin. Prior to placing the material, the final grade should be firm, moist and free of frost. Use of chemicals to eliminate frost will not be permitted.

407-4.5 Mixing. The batch plant site, layout, equipment, and provisions for transporting material shall ensure a continuous supply of material to the work. Stockpiles shall be constructed in a manner that prevents segregation and intermixing of deleterious materials. Free access to the plant must be provided to the RPR at all times for inspection of the plant's equipment and operation and for sampling the ATPB mixture and its components.

407-4.6 Hauling. The ATPB mixture shall be transported from the plant to the job site in trucks or other hauling equipment having beds that are smooth and clean. Truck bed covers shall be provided to protect the ATPB during transport from rain. Reject loads having crusts of unworkable material or have become wet. Do not haul over freshly placed material.

407-4.7 Placing. The ATPB material shall be placed using an asphalt paver. The ATPB shall be installed in a single 6 inch lift.

407-4.8 Compaction. The ATPB material shall be compacted using the approved compaction equipment and roller pattern/sequence, as determined in the approved control strip. Sufficient rollers shall be furnished to handle the output of the plant. If the rolling pattern/sequence results in undue displacement of the surface, or causes crushing of the aggregate, work shall be stopped until the cause(s) can be determined and corrections are made. The roller shall not pass over the unprotected end of the freshly laid mixture except when necessary to form a transverse joint.

407-4. 9 Joints. The formation of all joints shall be made in such a manner as to ensure a continuous bond between old and new sections of the course. All joints shall present the same texture and smoothness as other sections of the course. Transverse joints shall be formed by placement of a bulkhead or by tapering the mixture. Tapered joints shall be cut back full depth and width creating a vertical joint before placing additional mixture against the joint. Joints which are irregular, damaged shall be cut back to expose a clean, sound surface for full depth of course.

407-4.10 Quality Control. The Contractor shall perform tests for smoothness, grade, gradation, and asphalt content daily. Asphalt content and gradation must be within job tolerances or appropriate steps taken to maintain production control within tolerances. Any area not meeting smoothness and grade shall be corrected by the Contractor at the Contractor's expense. The Contractor shall provide gradation, asphalt content, batch tickets, smoothness, and grade data to the RPR on a daily basis.

a. Asphalt Content. Determine asphalt content a minimum of two times per day in accordance with ASTM D6307 or ASTM D2172. Batch tickets must indicate the amount of aggregate, asphalt binder,

and antistrip agent for each batch.

b. Gradation. Determine aggregate gradation a minimum of two times per day from mechanical analysis of extracted aggregate in accordance with ASTM D5444, ASTM C136 and ASTM C117.

c. Smoothness. The finished surface shall not vary more than ±3/8-inch when tested with a 12-foot straightedge applied parallel with and at right angles to the centerline, and. moved continuously forward at half the length of the 12-foot straightedge for the full length of each line on a 25-foot grid. The Contractor shall correct any high spots more than 3/8 inch in 12-foot with a grinding machine or remove and replace the material at the Contractor's expense. Any areas that have been ground shall have curing compound reapplied.

d. Grade. The grade shall be measured on a 25-foot grid and shall be within +/- 0.05 feet of the specified grade. When the surface is more than 1/2 inch above the grade shown in the plans, the surface shall be corrected at the Contractor's expense to an elevation that falls within a tolerance of 1/4 inch (6 mm).

407-4.11 Field Permeability. One test shall be performed by the Contractor in the presence of the RPR 1,200 square yards. Test locations will be determined on a random basis in accordance with ASTM D3665. The permeability of the base will be determined in accordance with ASTM C1701. If it can be demonstrated that a 1 gallon container of water will flow through the layer within approximately 1 minute the RPR can waive additional permeability testing.

407-4.12 Bond breaker. Not used.

407-4.13 Maintenance. The completed ATPB shall be maintained by the Contractor in a condition to meet all specification requirements until the pavement has been placed. Placement of the next higher pavement layer shall be made as soon as practicable but no more than thirty (30) calendar days after placement of the ATPB. The ATPB shall not be opened to traffic until the mixture has cooled to ambient temperature. Traffic on ATPB should be kept to a minimum to avoid contamination, rutting, or displacement of the ATPB. Limit traffic on ATPB to equipment needed to construct next higher pavement layer.

MATERIAL ACCEPTANCE

407-5.1 Sampling and testing. All acceptance sampling and testing necessary to determine conformance with the requirements specified in this section will be performed by the RPR for each 1,200 square yards. Sampling locations will be determined by the RPR on a random basis per ASTM D3665. The Contractor shall bear the cost of providing curing facilities for the strength specimens.

a. Thickness. One core shall be drilled by the Contractor for thickness determination for each 1,200 square yards. Thickness will be determined by measuring the depth of core hole.

Alternately, if approved by the RPR, thickness may be determined by survey on a 25-foot by 25- foot grid. Prior to placement of the stabilized drainage layer, the Contractor surveys the subgrade on a 25-foot grid relative to centerline of ATPB. After placement of the ATPB, survey the surface on the same grid and the thickness of the stabilized drainage layer is determined.

METHOD OF MEASUREMENT

407-6.1 Measurement. The quantity of ATPB to be paid for shall be the number of tons of material placed, and accepted in the completed base course.

BASIS OF PAYMENT

407-7.1 Payment. Payment will be made at the contract unit price per ton for ATPB as measured by RPR. This price shall be full compensation for furnishing all materials, for all preparation, mixing, placing, compacting curing and placement of overlaying bond breaker; and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item P-407-1	Asphalt treated permeable base course (ATPB) - per ton.

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C33	*Standard Specification for Concrete Aggregates*
ASTM D75	*Standard Practice for Sampling Aggregates*
ASTM C88	*Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate*
ASTM C131	*Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine*
ASTM C142	*Standard Test Method for Clay Lumps and Friable Particles in Aggregates*
ASTM D448	*Standard Classification for Sizes of Aggregate for Road and Bridge Construction*
ASTM D2434	*Standard Test Method for Permeability of Granular Soils (Constant Head)*
ASTM D3665	*Standard Practice for Random Sampling of Construction Materials*
ASTM C1701	*Standard Test Method for Infiltration Rate of In Place Pervious Concrete*

American Association of State Highway and Transportation Officials (AASHTO)

M288	*Standard Specification for Geosynthetic Specification for Highway Applications*
T215	*Standard Method of Test for Permeability of Granular Soils (Constant Head)*

END ITEM P-407

Item P-603 Emulsified Asphalt Tack Coat

DESCRIPTION

603-1.1 This item shall consist of preparing and treating an asphalt or concrete surface with asphalt material in accordance with these specifications and in reasonably close conformity to the lines shown on the plans.

MATERIALS

603-2.1 Asphalt materials. The asphalt material shall be an emulsified asphalt as specified in ASTM D3628,shown in Table 1, as an asphalt application for tack coat appropriate to local conditions. The emulsified asphalt shall not be diluted. The Contractor shall provide a copy of the manufacturer's Certificate of Analysis (COA) for the asphalt material to the Resident Project Representative (RPR) before the asphalt material is applied for review and acceptance. The furnishing of COA for the asphalt material shall not be interpreted as a basis for final acceptance. The manufacturer's COA may be subject to verification by testing the material delivered for use on the project.

Table 1 Bituminous Material

Type and Grade	Specification	Application Temperatures	
		Deg. F	Deg. C
Emulsified Asphalt			
MS-1	ASTM D 977	70-160	20-70
HFMS-1	ASTM D 977	70-160	20-70
SS-1	ASTM D 977	70-160	20-70
SS-1h	ASTM D 977	70-160	20-70
CSS-1	ASTM D 2397	70-160	20-70
CSS-1h	ASTM D 2397	70-160	20-70

CONSTRUCTION METHODS

603-3.1 Weather limitations. The tack coat shall be applied only when the existing surface is dry and the atmospheric temperature is 50°F (10°C) or above; the temperature has not been below 35°F (2°C) for the 12 hours prior to application; and when the weather is not foggy or rainy. The temperature requirements may be waived when directed by the RPR.

603-3.2 Equipment. The Contractor shall provide equipment for heating and applying the emulsified asphalt material. The emulsion shall be applied with a manufacturer-approved computer rate-controlled asphalt distributor. The equipment shall be in good working order and contain no contaminants or diluents in the tank. Spray bar tips must be clean, free of burrs, and of a size to maintain an even distribution of the emulsion. Any type of tip or pressure source is suitable that will maintain predetermined flow rates and constant pressure during the application process with application speeds under eight (8) miles per hour (13 km per hour) or seven (700) feet per minute (213 m per minute).

The equipment will be tested under pressure for leaks and to ensure proper set-up before use to verify truck set-up (via a test-shot area), including but not limited to, nozzle tip size appropriate for application, spray-bar height and pressure and pump speed, evidence of triple-overlap spray pattern, lack of leaks, and any other factors relevant to ensure the truck is in good working order before use.

The distributor truck shall be equipped with a minimum 12-foot (3.7-m) spreader spray bar with individual nozzle control with computer-controlled application rates. The distributor truck shall have an easily accessible thermometer that constantly monitors the temperature of the emulsion, and have an operable mechanical tank gauge that can be used to cross-check the computer accuracy. If the distributor is not equipped with an operable quick shutoff valve, the prime operations shall be started and stopped on building paper.

The distributor truck shall be equipped to effectively heat and mix the material to the required temperature prior to application as required. Heating and mixing shall be done in accordance with the manufacturer's recommendations. Do not overheat or over mix the material.

The distributor shall be equipped with a hand sprayer.

Asphalt distributors must be calibrated annually in accordance with ASTM D2995. The Contractor must furnish a current calibration certification for the asphalt distributor truck from any State or other agency as approved by the RPR.

A power broom and/or power blower suitable for cleaning the surfaces to which the asphalt tack coat is to be applied shall be provided.

603-3.3 Application of emulsified asphalt material. The emulsified asphalt shall not be diluted. Immediately before applying the emulsified asphalt tack coat, the full width of surface to be treated shall be swept with a power broom and/or power blower to remove all loose dirt and other objectionable material.

The emulsified asphalt material shall be uniformly applied with an asphalt distributor at the Emulsion Application Bar Rate appropriate for the conditions and surface specified in the table below. The type of asphalt material and application rate shall be approved by the RPR prior to application.

Emulsified Asphalt

Surface Type	Residual Rate, gal/SY (L/square meter)	Emulsion Application Bar Rate, gal/SY (L/square meter)
New asphalt	0.02-0.05 (0.09-0.23)	0.03-0.07 (0.13-0.32)
Existing asphalt	0.04-0.07 (0.18-0.32)	0.06-0.11 (0.27-0.50)
Milled Surface	0.04-0.08 (0.18-0.36)	.0.06-0.12 (0.27-0.54)

After application of the tack coat, the surface shall be allowed to cure without being disturbed for the period of time necessary to permit drying and setting of the tack coat. This period shall be determined by the RPR. The Contractor shall protect the tack coat and maintain the surface until the next course has been placed. When the tack coat has been disturbed by the Contractor, tack coat shall be reapplied at the Contractor's expense.

603-3.4 Freight and waybills The Contractor shall submit waybills and delivery tickets, during progress of the work. Before the final statement is allowed, file with the RPR certified waybills and certified delivery tickets for all emulsified asphalt materials used in the construction of the pavement covered by the contract. Do not remove emulsified asphalt material from storage until the initial outage and temperature measurements have been taken. The delivery or storage units will not be released until the final outage has been taken.

METHOD OF MEASUREMENT

603-4.1 The emulsified asphalt material for tack coat shall be measured by the gallon. Volume shall be corrected to the volume at 60°F (16°C) in accordance with Table IV-3. The emulsified asphalt material paid for will be the measured quantities used in the accepted work, provided that the measured quantities are not 10% over the specified application rate. Any amount of emulsified asphalt material more than 10% over the specified application rate for each application will be deducted from the measured quantities, except for irregular areas where hand spraying of the emulsified asphalt material is necessary. Water added to emulsified asphalt will not be measured for payment.

BASIS OF PAYMENT

603.5-1 Payment shall be made at the contract unit price per gallon of emulsified asphalt material. This price shall be full compensation for furnishing all materials, for all preparation, delivery, and application of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item P-603-1	Emulsified Asphalt Tack Coat - per gallon

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM D1250	Standard Guide for Use of the Petroleum Measurement Tables
ASTM D2995	Standard Practice for Estimating Application Rate and Residual Application Rate of Bituminous Distributors
ASTM D3628	Standard Practice for Selection and Use of Emulsified Asphalts

TABLE IV-3 TEMPERATURE-VOLUME CORRECTIONS FOR EMULSIFIED ASPHALTS

°C	°F	*M	°C	°F	*M	°C	°F	*M	°C	°F	*M	°C	°F	*M
10.0	50	1.00250	20.0	68	0.99800	30.0	86	0.99350	40.0	104	0.98900	50.0	122	0.98450
10.6	51	1.00225	20.6	69	0.99775	30.6	87	0.99325	40.6	105	0.98875	50.6	123	0.98425
11.1	52	1.00200	21.1	70	0.99750	31.1	88	0.99300	41.1	106	0.98850	51.1	124	0.98400
11.7	53	1.00175	21.7	71	0.99725	31.7	89	0.99275	41.7	107	0.98825	51.7	125	0.98375
12.2	54	1.00150	22.2	72	0.99700	32.2	90	0.99250	42.2	108	0.98800	52.2	126	0.98350
12.8	55	1.00125	22.8	73	0.99675	32.8	91	0.99225	42.8	109	0.98775	52.8	127	0.98325
13.3	56	1.00100	23.3	74	0.99650	33.3	92	0.99200	43.3	110	0.98750	53.3	128	0.98300
13.9	57	1.00075	23.9	75	0.99625	33.9	93	0.99175	43.9	111	0.98725	53.9	129	0.98275
14.4	58	1.00050	24.4	76	0.99600	34.4	94	0.99150	44.4	112	0.98700	54.4	130	0.98250
15.0	59	1.00025	25.0	77	0.99575	35.0	95	0.99125	45.0	113	0.98675	55.0	131	0.98225
15.6	60	1.00000	25.6	78	0.99550	35.6	96	0.99100	45.6	114	0.98650	55.6	132	0.98200
16.1	61	0.99975	26.1	79	0.99525	36.1	97	0.99075	46.1	115	0.98625	56.1	133	0.98175
16.7	62	0.99950	26.7	80	0.99500	36.7	98	0.99050	46.7	116	0.98600	56.7	134	0.98150
17.2	63	0.99925	27.2	81	0.99475	37.2	99	0.99025	47.2	117	0.98575	57.2	135	0.98125
17.8	64	0.99900	27.8	82	0.99450	37.8	100	0.99000	47.8	118	0.98550	57.8	136	0.98100
18.3	65	0.99875	28.3	83	0.99425	38.3	101	0.98975	48.3	119	0.98525	58.3	137	0.98075
18.9	66	0.99850	28.9	84	0.99400	38.9	102	0.98950	48.9	120	0.98500	58.9	138	0.98050
19.4	67	0.99825	29.4	85	0.99375	39.4	103	0.98925	49.4	121	0.98475	59.4	139	0.98025

TABLE IV-3 TEMPERATURE-VOLUME CORRECTIONS FOR EMULSIFIED ASPHALTS

°C	°F	*M	°C	°F	*M	°C	°F	*M	°C	°F	*M	°C	°F	*M
60.0	140	0.98000	68.3	155	0.97625	76.7	170	0.97250						
60.6	141	0.97975	68.9	156	0.97600	77.2	171	0.97225						
61.1	142	0.97950	69.4	157	0.97575	77.8	172	0.97200						
61.7	143	0.97925	70.0	158	0.97550	78.3	173	0.97175						
62.2	144	0.97900	70.6	159	0.97525	78.9	174	0.97150						
62.8	145	0.97875	71.1	160	0.97500	79.4	175	0.97125						
63.3	146	0.97850	71.7	161	0.97475	80.0	176	0.97100						
63.9	147	0.97825	72.2	162	0.97450	80.6	177	0.97075						
64.4	148	0.97800	72.8	163	0.97425	81.1	178	0.97050						
65.0	149	0.97775	73.3	164	0.97400	81.7	179	0.97025						
65.6	150	0.97750	73.9	165	0.97375	82.2	180	0.97000						
66.1	151	0.97725	74.4	166	0.97350	82.8	181	0.96975						
66.7	152	0.97700	75.0	167	0.97325	83.3	182	0.96950						
67.2	153	0.97675	75.6	168	0.97300	83.9	183	0.96925						
67.8	154	0.97650	76.1	169	0.97275	84.4	184	0.96900						

°C = Observed Temperature in Degrees Celsius.

°F = Temperature in Degrees Fahrenheit.

*M = Multiplier for correcting volumes to the basis of 15.6 °C (60°F).

END ITEM P-603

Item P-605 Joint Sealants for Pavements

DESCRIPTION

605-1.1 This item shall consist of providing and installing a resilient and adhesive joint sealing material capable of effectively sealing joints in pavement; joints between different types of pavements; and cracks in existing pavement.

MATERIALS

605-2.1 Joint sealants. Joint sealant materials shall meet the requirements of the following types as indicated on the Contract Drawings:

ASTM D5893	Standard Specifications for Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements
ASTM D6690	Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements

Each lot or batch of sealant shall be delivered to the jobsite in the manufacturer's original sealed container. Each container shall be marked with the manufacturer's name, batch or lot number, the safe heating temperature, and shall be accompanied by the manufacturer's certification stating that the sealant meets the requirements of this specification.

605-2.2 Pavement Joint Adhesive. Joint adhesive materials shall meet the requirements of the following types as indicated on the Contract Drawings:

ASTM D5329	Standard Test Methods for Sealants and Fillers, Hot-Applied, for Joints and Cracks in Asphalt Pavements and Portland Cement Concrete Pavements

Each lot or batch of adhesive shall be delivered to the jobsite in the manufacturer's original sealed container. Each container shall be marked with the manufacturer's name, batch or lot number, the safe heating temperature, and shall be accompanied by the manufacturer's certification stating that the sealant meets the requirements of this specification.

605-2.3 Backer rod. The material furnished shall be a compressible, non-shrinking, non-staining, non-absorbing material that is non-reactive with the joint sealant in accordance with ASTM D5249. The backer-rod material shall be 25% ± 5 % larger in diameter than the nominal width of the joint. Type 1 backer rods shall be used for hot-applied sealants. Type 1 or Type 3 backer rods shall be used for cold-applied sealants.

CONSTRUCTION METHODS

605-3.1 Time of application. Joints shall be sealed as soon after completion of the curing period as feasible and before the pavement is opened to traffic, including construction equipment. The pavement temperature shall be 50°F (10°C) and rising at the time of application of the poured joint sealing material. Do not apply sealant if moisture is observed in the joint.

605-3.2 Equipment. Machines, tools, and equipment used in the performance of the work required by this section shall be approved before the work is started and maintained in satisfactory condition at all

times. Submit a list of proposed equipment to be used in performance of construction work including descriptive data, 30 days prior to use on the project.

a. Tractor-mounted routing tool. Provide a routing tool, used for removing old sealant from the joints, of such shape and dimensions and so mounted on the tractor that it will not damage the sides of the joints. The tool shall be designed so that it can be adjusted to remove the old material to varying depths as required. The use of V-shaped tools or rotary impact routing devices will not be permitted. Hand-operated spindle routing devices may be used to clean and enlarge random cracks.

b. Concrete saw. Provide a self-propelled power saw, with water-cooled diamond or abrasive saw blades, for cutting joints to the depths and widths specified.

c. Sandblasting equipment. The Contractor must demonstrate sandblasting equipment including the air compressor, hose, guide and nozzle size, under job conditions, before approval in accordance with paragraph 605-3.3. The Contractor shall demonstrate, in the presence of the Resident Project Representative (RPR), that the method cleans the joint and does not damage the joint.

d. Waterblasting equipment. The Contractor must demonstrate waterblasting equipment including the pumps, hose, guide and nozzle size, under job conditions, before approval in accordance with paragraph 605-3.3. The Contractor shall demonstrate, in the presence of the RPR, that the method cleans the joint and does not damage the joint.

e. Hand tools. Hand tools may be used, when approved, for removing defective sealant from a crack and repairing or cleaning the crack faces. Hand tools should be carefully evaluated for potential spalling effects prior to approval for use.

f. Hot-poured sealing equipment. The unit applicators used for heating and installing ASTM D6690 joint sealant materials shall be mobile and shall be equipped with a double-boiler, agitator-type kettle with an oil medium in the outer space for heat transfer; a direct-connected pressure-type extruding device with a nozzle shaped for inserting in the joint to be filled; positive temperature devices for controlling the temperature of the transfer oil and sealant; and a recording type thermometer for indicating the temperature of the sealant. The applicator unit shall be designed so that the sealant will circulate through the delivery hose and return to the inner kettle when not in use.

g. Cold-applied, single-component sealing equipment. The equipment for installing ASTM D5893 single component joint sealants shall consist of an extrusion pump, air compressor, following plate, hoses, and nozzle for transferring the sealant from the storage container into the joint opening. The dimension of the nozzle shall be such that the tip of the nozzle will extend into the joint to allow sealing from the bottom of the joint to the top. Maintain the initially approved equipment in good working condition, serviced in accordance with the supplier's instructions, and unaltered in any way without obtaining prior approval. Small hand-held air-powered equipment (i.e., caulking guns) may be used for small applications.

605-3.3 Preparation of joints. Pavement joints for application of material in this specification must be dry, clean of all scale, dirt, dust, curing compound, and other foreign matter. The Contractor shall demonstrate, in the presence of the RPR, that the method cleans the joint and does not damage the joint. All existing joint sealant in joints designated to be sealed shall be removed

a. Sawing. All joints shall be sawed in accordance with specifications and plan details. Immediately after sawing the joint, the resulting slurry shall be completely removed from joint and adjacent area by flushing with a jet of water, and by use of other tools as necessary.

b. Sealing. Immediately before sealing, the joints shall be thoroughly cleaned of all remaining laitance, curing compound, filler, protrusions of hardened concrete, old sealant and other foreign material from the sides and upper edges of the joint space to be sealed. Cleaning shall be accomplished by sandblasting, tractor-mounted routing equipment, concrete saw or waterblaster as specified in paragraph

605-3.2. The newly exposed concrete joint faces and the pavement surface extending a minimum of 1/2 inch (12 mm) from the joint edge shall be sandblasted clean. Sandblasting shall be accomplished in a minimum of two passes. One pass per joint face with the nozzle held at an angle directly toward the joint face and not more than 3 inches (75 mm) from it. After final cleaning and immediately prior to sealing, blow out the joints with compressed air and leave them completely free of debris and water. The joint faces shall be surface dry when the seal is applied.

c. Backer Rod. When the joint opening is of a greater depth than indicated for the sealant depth, plug or seal off the lower portion of the joint opening using a backer rod in accordance with paragraph 605-2.2 to prevent the entrance of the sealant below the specified depth. Take care to ensure that the backer rod is placed at the specified depth and is not stretched or twisted during installation.

d. Bond-breaking tape. Not used.

605-3.4 Installation of sealants. Joints shall be inspected for proper width, depth, alignment, and preparation, and shall be approved by the RPR before sealing is allowed. Sealants shall be installed in accordance with the following requirements:

Immediately preceding, but not more than 50 feet (15 m) ahead of the joint sealing operations, perform a final cleaning with compressed air. Fill the joints from the bottom up to 1/4 inch (6 mm) ±1/16 inch (2 mm) below the top of pavement surface; or bottom of groove for grooved pavement. Remove and discard excess or spilled sealant from the pavement by approved methods. Install the sealant in such a manner as to prevent the formation of voids and entrapped air. In no case shall gravity methods or pouring pots be used to install the sealant material. Traffic shall not be permitted over newly sealed pavement until authorized by the RPR. When a primer is recommended by the manufacturer, apply it evenly to the joint faces in accordance with the manufacturer's instructions. Check the joints frequently to ensure that the newly installed sealant is cured to a tack-free condition within the time specified.

605-3.5 Inspection. The Contractor shall inspect the joint sealant for proper rate of cure and set, bonding to the joint walls, cohesive separation within the sealant, reversion to liquid, entrapped air and voids. Sealants exhibiting any of these deficiencies at any time prior to the final acceptance of the project shall be removed from the joint, wasted, and replaced as specified at no additional cost to the airport.

605-3.6 Clean-up. Upon completion of the project, remove all unused materials from the site and leave the pavement in a clean condition.

METHOD OF MEASUREMENT

605-4.1 Joint sealing material shall be measured by the linear foot of sealant in place, completed, and accepted.

BASIS OF PAYMENT

605-5.1 Payment for joint sealing material shall be made at the contract unit price per linear foot. The price shall be full compensation for furnishing all materials, for all preparation, delivering, and placing of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item P-605-1	Joint Sealing Filler - per linear foot

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM D789	Standard Test Method for Determination of Relative Viscosity of Polyamide (PA)
ASTM D5249	Standard Specification for Backer Material for Use with Cold- and Hot-Applied Joint Sealants in Portland-Cement Concrete and Asphalt Joints
ASTM D5893	Standard Specification for Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements
ASTM D6690	Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt

Advisory Circulars (AC)

AC 150/5340-30	Design and Installation Details for Airport Visual Aids

END ITEM P-605

Item P-608 Emulsified Asphalt Seal Coat

DESCRIPTION

608-1.1 This item shall consist of the application of a emulsified asphalt surface treatment composed of an emulsion of natural and refined asphalt materials, water and a polymer additive, for taxiways and runways with the application of a suitable aggregate to maintain adequate surface friction; and airfield secondary and tertiary pavements including low-speed taxiways, shoulders, overruns, roads, parking areas, and other general applications with or without aggregate applied as designated on the plans. The terms seal coat, asphalt sealer, and asphalt material are interchangeable throughout this specification. The term emulsified asphalt means an emulsion of natural and refined asphalt materials.

MATERIALS

608-2.1 Aggregate. The aggregate material shall be a dry, clean, dust and dirt free, sound, durable, angular shaped manufactured specialty sand, such as that used as an abrasive, with a Mohs hardness of 6 to 8. The Contractor shall submit the specialty sand manufacturer's technical data and a manufacturer's Certificate of Analysis (COA) indicating that the specialty sand meets the requirements of the specification to the RPR prior to start of construction. The sand must be approved for use by the RPR and shall meet the following gradation limits when tested in accordance with ASTM C136 and ASTM C117:

Aggregate Material Gradation Requirements[1]

Sieve Designation (square openings)	Individual Percentage Retained by Weight
No. 10 (2.00 mm)	0
No. 14 (1.41 mm)	0-4
No. 16 (1.18 mm)	0-8
No. 20 (850 µm)	0-35
No. 30 (600 µm)	20-50
No. 40 (425 µm)	10-45
No. 50 (300 µm)	0-20
No. 70 (212 µm)	0-5
No. 100 (150 µm)	0-2
No. 200 (75 µm)	0-2

[1] Locally available sand or abrasive material that is slightly outside of the gradation requirements may be approved by the RPR with concurrence by the seal coat manufacturer for the use of locally available sand or abrasive material. The RPR and manufacturer's field representative should verify acceptance during application of Control strips indicated under paragraph 608-3.2.

The Contractor shall provide a certification showing particle size analysis and properties of the material delivered for use on the project. The Contractor's certification may be subject to verification by testing the material delivered for use on the project.

608-2.2 Asphalt Emulsion. The asphalt emulsion shall meet the properties in the following table:

Concentrated Asphalt Emulsion Properties

Properties	Specification	Limits
Viscosity, Saybolt Furol at 77°F (25°C)	ASTM D7496	20 – 100 seconds
Residue by Distillation or Evaporation	ASTM D6997 or ASTM D6934	57% minimum
Sieve Test	ASTM D6933	0.1% maximum
24-hour Stability	ASTM D6930	1% maximum
5-day Settlement Test	ASTM D6930	5.0% maximum
Particle Charge [1]	ASTM D7402	Positive 6.5 maximum pH

[1] pH may be used in lieu of the particle charge test which is sometimes inconclusive in slow setting, asphalt emulsions.

The asphalt material base residue shall contain not less than 20% gilsonite, or uintaite and shall not contain any tall oil pitch or coal tar material and shall contain no less than one percent (1%) polymer.

Tests on Residue from Distillation or Evaporation

Properties	Specification	Limits
Viscosity at 275°F (135°C)	ASTM D4402	1750 cts maximum
Solubility in 1, 1, 1 trichloroethylene	ASTM D2042	97.5% minimum
Penetration	ASTM D5	50 dmm maximum
Asphaltenes	ASTM D2007	15% minimum
Saturates	ASTM D2007	15% maximum
Polar Compounds	ASTM D2007	25% minimum
Aromatics	ASTM D2007	15% minimum

The asphalt emulsion, when diluted in the volumetric proportion of one-part concentrated asphalt material to one part hot water shall have the following properties:

One-to-One Dilution Emulsion Properties

Properties	Specification	Limits
In Ready-to-Apply Form, one part concentrate to one part water, by volume		
Viscosity, Saybolt Furol at 77°F (25°C)	ASTM D7496	5 – 50 seconds
Residue by Distillation or Evaporation	ASTM D6997 or ASTM D6934	28.5% minimum
Pumping Stability [1]		Pass

[1] Pumping stability is tested by pumping one pint (475 ml) of seal coat diluted one (1) part concentrate to one (1) part water, at 77°F (25°C), through a 1/4-inch (6 mm) gear pump operating 1750 rpm for 10 minutes with no significant separation or coagulation.

The Contractor shall provide a copy of the manufacturer's Certificate of Analysis (COA) for the emulsified asphalt delivered to the project. If the asphalt emulsion is diluted at other than the manufacturer's facility, the Contractor shall provide a supplemental COA from an independent laboratory verifying the asphalt emulsion properties.

The COA shall be provided to and approved by the RPR before the emulsified asphalt is applied. The furnishing of the vendor's certified test report for the asphalt material shall not be interpreted as a basis for final acceptance. The manufacturer's COA may be subject to verification by testing the material delivered for use on the project.

The asphalt material storage and handling temperature shall be between 50°F - 160°F (10°C - 70°C) and the material shall be protected from freezing, or whenever outside temperature drops below 40°F (4°C) for prolonged time periods.

Contractor shall provide a list of airport pavement projects, exposed to similar climate conditions, where this product has been successfully applied within at least 5 years of the project.

608-2.3 Water. Water used in mixing or curing shall be from potable water sources. Other sources shall be tested in accordance with ASTM C1602 prior to use. Water used in making and diluting the emulsion shall be potable, with a maximum hardness of 90ppm calcium and 15ppm magnesium; deleterious iron, sulfates, and phosphates maximum 7ppm, and less than 1ppm of organic byproducts. Water shall be a minimum of 140°F (60°C) prior to adding to emulsion.

608-2.4 Polymer. The polymer shall meet the properties in the following table:

Polymer Properties

Properties	Limits
Solids Content	47% to 65%, Percent by Weight
Weight	8.0 to 9.0 pounds/gallon (1.07 to 1.17 kg/L)
pH	3.0 to 8.0
Particle Charge	Nonionic/Cationic
Mechanical Stability	Excellent
Film Forming Temperature, °C	+5°C, minimum
Tg, °C	22°C, maximum

The manufacturer shall provide a copy of the Certificate of Analysis (COA) for the polymer used in the seal coat; and the Contractor shall include the COA with the emulsified asphalt COA when submitting to the RPR.

608-2.5 Seal Coat with Aggregate. Not used.

COMPOSITION AND APPLICATION RATE

608-3.1 Application Rate. The approximate amounts of materials per square yard (square meter) for the asphalt surface treatment shall be as provided in the table for the treatment area(s) at the specified dilution rate(s) as noted on the plans. The actual application rates will vary within the range specified to suit field conditions and will be recommended by the manufacturer's representative and approved by the RPR from the test area/sections evaluation.

Application Rate

Dilution Rate	Quantity of Emulsion gal/yd^2 (l/m^2)	Quantity of Aggregate lb/yd^2 (kg/m^2)
1:1	0.10-0.17 (0.45-0.77)	0.20-0.50 (0.11-0.27)

608-3.2 Control areas and control strips. Prior to full application, the control strip must be accepted by the RPR. The surface preparation, personnel, equipment, and method of operation used on the test area(s) and control strip(s) shall be the same as used on the remainder of the work.

A qualified manufacturer's representative shall be present in the field to assist the Contractor in applying control areas and/or control strips to determine the appropriate application rate of both emulsion and aggregate to be approved by the RPR.

A test area(s) and control strip(s) shall be applied for each differing asphalt pavement surface identified in the project. The test area(s) and control strip(s) shall be used to determine the material application rate(s) of both emulsion and sand prior to full production.

a. For taxiway, taxilane and apron surfaces. Prior to full application, the Contractor shall place test areas at varying application rates as recommended by the Contractor's manufacturer's representative to determine appropriate application rate(s). The test areas will be located on representative section(s) of the pavement to receive the asphalt surface treatment designated by the RPR.

b. For runway and high-speed exit taxiway surfaces. Prior to full application, the Contractor shall place a series of control strips a minimum of 300 feet (90 m) long by 12 feet (3.6 m) wide, or width of anticipated application, whichever is greater, at varying application rates as recommended by the manufacturer's representative and acceptable to the RPR to determine appropriate application rate(s). The control strips should be separated by a minimum of 200 feet between control strips. The area to be tested will be located on a representative section of the pavement to receive the asphalt surface treatment designated by the RPR. The control strips should be placed under similar field conditions as anticipated for the actual application. The skid resistance of the existing pavement shall be determined for each control strip with a continuous friction measuring equipment (CFME). The skid resistance of existing pavement can be immediately adjacent to the control strip or at the same location as the control strip if testing prior to application. The Contractor may begin testing the skid resistance of runway and high-speed exit taxiway control strips after application of the asphalt surface treatment has fully cured, generally 8 to 36 hours after application of the control strips depending on site and environmental conditions. Aircraft shall not be permitted on the runway or high speed exit taxiway control strips until such time as the Contractor validates that its surface friction meets the maintenance planning friction levels in AC 150/5320-12, Table 3-2 when tested at speeds of 40 and 60 mph (65 and 95 km/h) wet with approved CFME.

If the control strip should prove to be unsatisfactory, necessary adjustments to the application rate, placement operations, and equipment shall be made. Additional control strips shall be placed and additional skid resistance tests performed and evaluated. Full production shall not begin without the RPR's approval of an appropriate application rate(s). Acceptable control strips shall be paid for in accordance with paragraph 608-8.1.

If operational conditions preclude placement of a control strip on the pavement to be sealed, it may be applied on a pavement with similar surface texture.

CONSTRUCTION METHODS

608-4.1 Worker safety. The Contractor shall obtain a Safety Data Sheet (SDS) for both the asphalt emulsion product and sand and require workmen to follow the manufacturer's recommended safety precautions.

608-4.2 Weather limitations. The asphalt emulsion shall be applied only when the existing pavement surface is dry and when the weather is not foggy, rainy, or when the wind velocity will prevent the uniform application of the material. No material shall be applied in strong winds that interfere with the uniform application of the material(s), or when dust or sand is blowing or when rain is anticipated within eight (8) hours of application completion. The atmospheric temperature and the pavement surface temperature shall both be at, or above 60°F (16°C) and rising. Seal coat shall not be applied when pavement temperatures are expected to exceed 130ºF within the subsequent 72 hours if traffic will be opened on pavement within those 72 hours. During application, account for wind drift. Cover existing buildings, structures, runway edge lights, taxiway edge lights, informational signs, retro-reflective marking and in-pavement duct markers as necessary to protect against overspray before applying the emulsion. Should emulsion get on any light or marker fixture, promptly clean the fixture. If cleaning is not satisfactory to the RPR, the Contractor shall replace any light, sign or marker with equivalent equipment at no cost to the Owner.

608-4.3 Equipment and tools. The Contractor shall furnish all equipment, tools, and machinery necessary for the performance of the work.

a. Pressure distributor. The emulsion shall be applied with a manufacturer-approved computer rate-controlled asphalt distributor. The equipment shall be in good working order and contain no contaminants or diluents in the tank. Spray bar tips must be clean, free of burrs, and of a size to maintain an even distribution of the emulsion. Any type of tip or pressure source is suitable that will maintain predetermined flow rates and constant pressure during the application process with application speeds under eight (8) miles per hour (13 km per hour) or seven hundred (700) feet per minute (213 m per minute). The equipment will be tested under pressure for leaks and to ensure proper set-up before use. The Contractor will provide verification of truck set-up (via a test-shot area), including but not limited to, nozzle tip size appropriate for application per nozzle manufacturer, spray-bar height and pressure and pump speed appropriate for the viscosity and temperature of sealer material, evidence of triple-overlap spray pattern, lack of leaks, and any other factors relevant to ensure the truck is in good working order before use.

The distributor truck shall be equipped with a 12-foot (3.7-m), minimum, spray bar with individual nozzle control. The distributor truck shall be capable of specific application rates in the range of 0.05 to 0.25 gallons per square yard (0.15 to 0.80 liters per square meter). These rates shall be computer-controlled rather than mechanical. The distributor truck shall have an easily accessible thermometer that constantly monitors the temperature of the emulsion, and have an operable mechanical tank gauge that can be used to cross-check the computer accuracy.

The distributor truck shall effectively heat and mix the material to the required temperature prior to application in accordance with the manufacturer's recommendations.

The distributor shall be equipped with a hand sprayer to spray the emulsion in areas not accessible to the distributor truck.

b. Aggregate spreader. The asphalt distributor truck will be equipped with an aggregate spreader mounted to the distributor truck that can apply sand to the emulsion in a single pass operation without driving through wet emulsion. The aggregate spreader shall be equipped with a variable control system capable of uniformly distributing the sand at the specified rate at varying application widths and speeds. The aggregate spreader must be adjusted to produce an even and accurate application of specified aggregate. Prior to any seal coat application, the aggregate spreader will be calibrated onsite to ensure

acceptable uniformity of spread. The RPR will observe the calibration and verify the results. The aggregate spreader will be re-calibrated each time the aggregate rate is changed either during the application of test strips or production. The Contractor may consult the seal coat manufacturer representative for procedure and guidance. The sander shall have a minimum hopper capacity of 3,000 pounds (1361 kg) of sand. Push-type hand sanders will be allowed for use around lights, signs and other obstructions, if necessary.

c. Power broom/blower. A power broom and/or blower shall be provided for removing loose material from the surface to be treated.

d. Equipment calibration. Asphalt distributors must be calibrated within the same construction season in accordance with ASTM D2995. The Contractor must furnish a current calibration certification for the asphalt distributor truck from any State or other agency as approved by the RPR.

608-4.4 Preparation of asphalt pavement surfaces. Clean pavement surface immediately prior to placing the seal coat so that it is free of dust, dirt, grease, vegetation, oil or any type of objectionable surface film. Remove oil or grease from the asphalt pavement by scrubbing with a detergent, washing thoroughly with clean water, and then treat these areas with a spot primer. Any additional surface preparation, such as crack repair, shall be in accordance with Item P-101, paragraph 101-3.6.

a. New asphalt pavement surfaces. Allow new asphalt pavement surfaces to cure so that there is no concentration of oils on the surface.

Perform a water-break-free test to confirm that the surface oils have degraded and dissipated. (Cast approximately one gallon (4 liters) of clean water out over the surface. The water should sheet out and wet the surface uniformly without crawling or showing oil rings.) If signs of crawling or oil rings are apparent on the pavement surface, additional time must be allowed for additional curing and retesting of the pavement surface prior to treatment.

608-4.5 Emulsion mixing. The application emulsion shall be obtained by blending asphalt material concentrate, water and polymer, if specified. Always add heated water to the asphalt material concentrate, never add asphalt material concentrate to heated water. Mix one part heated water to one part or two parts asphalt material concentrate, by volume.

Add 1% polymer, by volume, to the emulsion mix. If the polymer is added to the emulsion mix at the plant, submit weight scale tickets to the RPR. As an option, the polymer may be added to the emulsion mix at the job site provided the polymer is added slowly while the asphalt distributor truck circulating pump is running. The mix must be agitated for a minimum of 15 minutes or until the polymer is mixed to the satisfaction of the RPR.

608-4.6 Application of asphalt emulsion. The asphalt emulsion shall be applied using a pressure distributor upon the properly prepared, clean and dry surface at the application rate recommended by the manufacturer's representative and approved by the RPR from the test area/sections evaluation for each designated treatment area. The asphalt emulsion should be applied at a temperature between 130°F (54°C) and 160°F (70°C) or in accordance with the manufacturer's recommendation.

If low spots and depressions greater than 1/2 inch (12 mm) in depth in the pavement surface cause ponding or puddling of the applied materials, the pavement surface shall be lightly broomed with a broom or brush type squeegee until the pavement surface is free of any pools of excess material.

During all applications, the surfaces of adjacent structures shall be protected to prevent their being spattered or marred.

608-4.7 Application of aggregate material. Immediately following the application of the asphalt emulsion, friction sand at the rate recommended by the manufacturer's representative and approved by the RPR from the test area/sections evaluation for each designated application area, shall be spread uniformly over the asphalt emulsion in a single-pass operation simultaneous with the sealer application.

The aggregate shall be spread to the same width of application as the asphalt material and shall not be applied in such thickness as to cause blanketing.

Sprinkling of additional aggregate material, and spraying additional asphalt material over areas that show up having insufficient cover or bitumen, shall be done by hand whenever necessary. In areas where hand work is necessitated, the sand shall be applied before the sealant begins to break.

Minimize aggregate from being broadcast and accumulating on the untreated pavement adjacent to an application pass. Prior to the next application pass, the Contractor shall clean areas of excess or loose aggregate and remove from project site.

QUALITY CONTROL (QC)

608-5.1 Manufacturer's representation. The manufacturer's representative knowledgeable of the material, procedures, and equipment described in the specification is responsible to assist the Contractor and RPR in determining the appropriate application rates of the emulsion and aggregate, as well as recommendations for proper preparation and start-up of seal coat application. Documentation of the manufacturer representative's experience and knowledge for applying the seal coat product shall be furnished to the RPR a minimum of 10 work days prior to placement of the control strips. The cost of the manufacturer's representative shall be included in the Contractor's bid price.

608-5.2 Contractor qualifications. The Contractor shall provide documentation to the RPR that the seal coat Contractor is qualified to apply the seal coat, including personnel, and equipment, and has made at least three (3) applications similar to this project in the past two (2) years.

MATERIAL ACCEPTANCE

608-6.1 Application rate. The rate of application of the asphalt emulsion shall be verified at least twice per day.

608-6.2 Friction tests. Friction tests in accordance with AC 150/5320-12, Measurement, Construction, and Maintenance of Skid-Resistant Airport Pavement Surfaces, shall be performed on all runway and high-speed taxiways that received a seal coat. Each test includes performing friction tests at 40 mph and 60 mph (65 or 95 km/h) both wet, 15 feet (4.5 m) to each side of runway centerline with approved continuous friction measuring equipment (CFME). The Contractor shall coordinate testing with the RPR and provide the RPR a written report of friction test results. The RPR shall be present for testing.

METHOD OF MEASUREMENT

608-7.1 Asphalt surface treatment and friction testing. No measurement will be made for direct payment of asphalt surface treatment or friction testing, as the cost of furnishing, installing and testing shall be considered as a subsidiary obligation in the completion of the installation.

BASIS OF PAYMENT

608-8.1 No payment will be made separately or directly for asphalt surface treatment and friction testing on any part of the work. All asphalt surface treatment and friction testing shall be considered a necessary and incidental part of the work and its cost shall be considered by the Contractor and included in the contract unit price for the pay items involved.

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C117	Standard Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C136	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D5	Standard Test Method for Penetration of Asphalt Materials
ASTM D244	Standard Test Methods and Practices for Emulsified Asphalts
ASTM D2007	Standard Test Method for Characteristic Groups in Rubber Extender and Processing Oils and Other Petroleum-Derived Oils by the Clay-Gel Absorption Chromatographic Method
ASTM D2042	Standard Test Method for Solubility of Asphalt Materials in Trichloroethylene
ASTM D2995	Standard Practice for Estimating Application Rate of Bituminous Distributors
ASTM D4402	Standard Test Method for Viscosity Determination of Asphalt at Elevated Temperatures Using a Rotational Viscometer
ASTM D5340	Standard Test Method for Airport Pavement Condition Index Surveys

Advisory Circulars (AC)

AC 150/5320-12	Measurement, Construction, and Maintenance of Skid-Resistant Airport Pavement Surfaces
AC 150/5320-17	Airfield Pavement Surface Evaluation and Rating (PASER) Manuals
AC 150/5380-6	Guidelines and Procedures for Maintenance of Airport Pavements

END OF ITEM P-608

Item P-610 Concrete for Miscellaneous Structures

DESCRIPTION

610-1.1 This item shall consist of concrete and reinforcement, as shown on the plans, prepared and constructed in accordance with these specifications. This specification shall be used for all concrete, including deicing fluid storage facility concrete.

MATERIALS

610-2.1 General. Only approved materials, conforming to the requirements of these specifications, shall be used in the work. Materials may be subject to inspection and tests at any time during their preparation or use. The source of all materials shall be approved by the Resident Project Representative (RPR) before delivery or use in the work. Representative preliminary samples of the materials shall be submitted by the Contractor, when required, for examination and test. Materials shall be stored and handled to ensure preservation of their quality and fitness for use and shall be located to facilitate prompt inspection. All equipment for handling and transporting materials and concrete must be clean before any material or concrete is placed in them.

The use of pit-run aggregates shall not be permitted unless the pit-run aggregate has been screened and washed, and all fine and coarse aggregates stored separately and kept clean. The mixing of different aggregates from different sources in one storage stockpile or alternating batches of different aggregates shall not be permitted.

a. Reactivity. Fine aggregate and coarse aggregates to be used in all concrete shall have been tested separately within six months of the project in accordance with ASTM C1260. Test results shall be submitted to the RPR. The aggregate shall be considered innocuous if the expansion of test specimens, tested in accordance with ASTM C1260, does not exceed 0.08% at 14 days (16 days from casting). If the expansion either or both test specimen is greater than 0.08% at 14 days, but less than 0.20%, a minimum of 25% of Type F fly ash, or between 40% and 55% of slag cement shall be used in the concrete mix.

If the expansion is greater than 0.20%, the aggregates shall not be used, and test results for other aggregates must be submitted for evaluation; or aggregates that meet P-501 reactivity test requirements may be utilized.

610-2.2 Coarse aggregate. The coarse aggregate for concrete shall meet the requirements of ASTM C33 and the requirements of Table 4, Class Designation 5S; and the grading requirements shown below, as required for the project.

Coarse Aggregate Grading Requirements

Maximum Aggregate Size	ASTM C33, Table 3 Grading Requirements (Size No.)
1 1/2 inch (37.5 mm)	467 or 4 and 67
1 inch (25 mm)	57
¾ inch (19 mm)	67
½ inch (12.5 mm)	7

610-2.2.1 Coarse Aggregate susceptibility to durability (D) cracking.

Coarse aggregate may only be accepted from sources that have a 20-year service history for the same gradation to be supplied with no history of D-Cracking. Aggregates that do not have a 20-year record of service free from major repairs (less than 5% of slabs replaced) in similar conditions without D-cracking shall not be used unless the material currently being produced has a durability factor greater than or equal to 95 per ASTM C666. The Contractor shall submit a current certification and test results to verify the aggregate acceptability. Test results will only be accepted from a State Department of Transportation (DOT) materials laboratory or an accredited laboratory. Certification and test results which are not dated or which are over one (1) year old or which are for different gradations will not be accepted.

610-2.3 Fine aggregate. The fine aggregate for concrete shall meet all fine aggregate requirements of ASTM C33.

610-2.4 Cement. Cement shall conform to the requirements of ASTM C150, Types I, II, or V; OR ASTM C595, Types IS, IP, IL, or IT. The chemical requirements for all cement types specified should meet suitable criteria for deleterious activity. Low alkali cements shall be less than 0.6% equivalent alkalis. Total alkalis (Na2O and K2O) of the cement secured for the production of concrete shall be independently verified in accordance with ASTM C114 or ASTM C1365.

610-2.5 Cementitious materials.

a. Fly ash. Fly ash shall meet the requirements of ASTM C618, with the exception of loss of ignition, where the maximum shall be less than 6%. Fly ash shall have a Calcium Oxide (CaO) content of less than 15% and a total available alkali content less than 3% per ASTM C311. Fly ash produced in furnace operations using liming materials or soda ash (sodium carbonate) as an additive shall not be acceptable. The Contractor shall furnish the previous three most recent, consecutive ASTM C618 reports for each source of fly ash proposed in the concrete mix, and shall furnish each additional report as they become available during the project. The reports can be used for acceptance or the material may be tested independently by the RPR.

b. Slag cement (ground granulated blast furnace (GGBF)). Slag cement shall conform to ASTM C989, Grade 100 or Grade 120. Slag cement shall be used only at a rate between 25% and 55% of the total cementitious material by mass.

610-2.6 Water. Water used in mixing or curing shall be from potable water sources. Other sources shall be tested in accordance with ASTM C1602 prior to use.

610-2.7 Admixtures. The Contractor shall submit certificates indicating that the material to be furnished meets all of the requirements indicated below. In addition, the RPR may require the Contractor to submit complete test data from an approved laboratory showing that the material to be furnished meets all of the requirements of the cited specifications. Subsequent tests may be made of samples taken by the RPR from

the supply of the material being furnished or proposed for use on the work to determine whether the admixture is uniform in quality with that approved.

a. Air-entraining admixtures. Air-entraining admixtures shall meet the requirements of ASTM C260 and shall consistently entrain the air content in the specified ranges under field conditions. The air-entrainment agent and any water reducer admixture shall be compatible.

b. Water-reducing admixtures. Water-reducing admixture shall meet the requirements of ASTM C494, Type A, B, or D. ASTM C494, Type F and G high range water reducing admixtures and ASTM C1017 flowable admixtures shall not be used.

c. Other chemical admixtures. The use of set retarding, and set-accelerating admixtures shall be approved by the RPR. Retarding shall meet the requirements of ASTM C494, Type A, B, or D and set-accelerating shall meet the requirements of ASTM C494, Type C. Calcium chloride and admixtures containing calcium chloride shall not be used.

610-2.8 Premolded joint material. Premolded joint material for expansion joints shall meet the requirements of ASTM D1751**.**

610-2.9 Joint filler. The filler for joints shall meet the requirements of Item P-605, unless otherwise specified.

610-2.10 Steel reinforcement. Reinforcing shall consist of reinforcing steel conforming to the requirements of ASTM A615, Grade 60.

610-2.11 Materials for curing concrete. Curing materials shall conform to one of the following:

Materials for Curing

Waterproof paper	ASTM C171
Clear or white Polyethylene Sheeting	ASTM C171
White-pigmented Liquid Membrane-Forming Compound, Type 2, Class B	ASTM C309

610-2.12 Dowels. Dowels shall be provided and installed as shown on the details and plans.

CONSTRUCTION METHODS

610-3.1 General. The Contractor shall furnish all labor, materials, and services necessary for, and incidental to, the completion of all work as shown on the drawings and specified here. All machinery and equipment used by the Contractor on the work, shall be of sufficient size to meet the requirements of the work. All work shall be subject to the inspection and approval of the RPR.

610-3.2 Concrete Mixture. The concrete shall develop a compressive strength of 4000 psi in 28 days as determined by test cylinders made in accordance with ASTM C31 and tested in accordance with ASTM C39. The concrete shall contain not less than 470 pounds of cementitious material per cubic yard (280 kg per cubic meter). The water cementitious ratio shall not exceed 0.45 by weight. The air content of the concrete shall be 5% +/- 1.2% as determined by ASTM C231 and shall have a slump of not more than 4 inches (100 mm) as determined by ASTM C143.

In proportioning aggregates and mixing water, compensation shall be made for the weight of moisture in the aggregates, and shall be determined on a daily basis. The net mixing water shall be adjusted for the moisture contained in the aggregates, and for the moisture which they will absorb, in order to determine the amount of water to be added at the mixer. The absorption of the coarse and fine aggregates shall be determined by ASTM C 127 and ASTM C 128.

610-3.3 Mixing. Concrete may be mixed at the construction site, at a central point, or wholly or in part in truck mixers. The concrete shall be mixed and delivered in accordance with the requirements of ASTM C94 or ASTM C685.

The concrete shall be mixed only in quantities required for immediate use. Concrete shall not be mixed while the air temperature is below 40°F (4°C) without the RPRs approval. If approval is granted for mixing under such conditions, aggregates or water, or both, shall be heated and the concrete shall be placed at a temperature not less than 50°F (10°C) nor more than 100°F (38°C). The Contractor shall be held responsible for any defective work, resulting from freezing or injury in any manner during placing and curing, and shall replace such work at his expense.

Retempering of concrete by adding water or any other material is not permitted.

The rate of delivery of concrete to the job shall be sufficient to allow uninterrupted placement of the concrete.

610-3.4 Forms. Concrete shall not be placed until all the forms and reinforcements have been inspected and approved by the RPR. Forms shall be of suitable material and shall be of the type, size, shape, quality, and strength to build the structure as shown on the plans. The forms shall be true to line and grade and shall be mortar-tight and sufficiently rigid to prevent displacement and sagging between supports. The surfaces of forms shall be smooth and free from irregularities, dents, sags, and holes. The Contractor shall be responsible for their adequacy.

The internal form ties shall be arranged so no metal will show in the concrete surface or discolor the surface when exposed to weathering when the forms are removed. All forms shall be wetted with water or with a non-staining mineral oil, which shall be applied immediately before the concrete is placed. Forms shall be constructed so they can be removed without injuring the concrete or concrete surface.

610-3.5 Placing reinforcement. All reinforcement shall be accurately placed, as shown on the plans, and shall be firmly held in position during concrete placement. Bars shall be fastened together at intersections. The reinforcement shall be supported by approved metal chairs. Shop drawings, lists, and bending details shall be supplied by the Contractor when required.

610-3.6 Embedded items. Before placing concrete, all embedded items shall be firmly and securely fastened in place as indicated. All embedded items shall be clean and free from coating, rust, scale, oil, or any foreign matter. The concrete shall be spaded and consolidated around and against embedded items. The embedding of wood shall not be allowed. Embedded items shall be covered, or otherwise protected during placement of concrete, to prevent concrete from splashing onto the exposed portions. Contractor shall clean the exposed surfaces of embedded items of concrete prior to drying or hardening.

610-3.7 Concrete Consistency. The Contractor shall monitor the consistency of the concrete delivered to the project site; collect each batch ticket; check temperature; and perform slump tests on each truck at the project site in accordance with ASTM C143.

610-3.8 Placing concrete. All concrete shall be placed during daylight hours, unless otherwise approved. The concrete shall not be placed until the depth and condition of foundations, the adequacy of forms and falsework, and the placing of the steel reinforcing have been approved by the RPR. Concrete shall be placed as soon as practical after mixing, but in no case later than one (1) hour after water has been added to the mix. The method and manner of placing shall avoid segregation and displacement of the reinforcement. Troughs, pipes, and chutes shall be used as an aid in placing concrete when necessary. The concrete shall not be dropped from a height of more than 5 feet (1.5 m). Concrete shall be deposited as nearly as practical in its final position to avoid segregation due to rehandling or flowing. Do not subject concrete to procedures which cause segregation. Concrete shall be placed on clean, damp surfaces, free from running water, or on a properly consolidated soil foundation. The maximum interval between successive truckloads of concrete discharged onto previously place fresh concrete shall not exceed 30

minutes at any one location.

610-3.9 Vibration. Vibration shall follow the guidelines in American Concrete Institute (ACI) Committee 309R, Guide for Consolidation of Concrete.

610-3.10 Joints. Joints shall be constructed as indicated on the plans.

610-3.11 Finishing. All exposed concrete surfaces shall be true, smooth, and free from open or rough areas, depressions, or projections. All concrete horizontal plane surfaces shall be brought flush to the proper elevation with the finished top surface struck-off with a straightedge and floated.

610-3.12 Curing and protection. All concrete shall be properly cured in accordance with the recommendations in American Concrete Institute (ACI) 308R, Guide to External Curing of Concrete. The concrete shall be protected from damage until project acceptance. Curing compound, if used, shall not cause discoloration of the concrete and shall be applied in accordance with manufacturer's directions. Curing compounds shall not be used on any surface against which additional concrete or other cementitious finishing materials are to be bonded, or on any surface which a waterproofing membrane is to be applied.

610-3.13 Cold weather placing. When concrete is placed at temperatures below 40°F (4°C), follow the cold weather concreting recommendations found in ACI 306R, Cold Weather Concreting.

610-3.14 Hot weather placing. When concrete is placed in hot weather greater than 85ºF (30 ºC), follow the hot weather concreting recommendations found in ACI 305R, Hot Weather Concreting.

QUALITY ASSURANCE (QA)

610-4.1 Quality Assurance sampling and testing. Concrete for each day's placement will be accepted on the basis of the compressive strength specified in paragraph 610-3.2. The RPR will sample the concrete in accordance with ASTM C172; test the slump in accordance with ASTM C143; test air content in accordance with ASTM C231; make and cure compressive strength specimens in accordance with ASTM C31; and test in accordance with ASTM C39. The QA testing agency will meet the requirements of ASTM C1077.

The Contractor shall provide adequate facilities for the initial curing of cylinders.

610-4.2 Defective work. Any defective work that cannot be satisfactorily repaired as determined by the RPR, shall be removed and replaced at the Contractor's expense. Defective work includes, but is not limited to, uneven dimensions, honeycombing and other voids on the surface or edges of the concrete.

METHOD OF MEASUREMENT

610-5.1 Miscellaneous site concrete shall be considered incidental and no separate measurement shall be made.

610-5.2 Concrete pavement for the deicing fluid storage and the potassium acetate storage facility shall be measured by the number of cubic yards of reinforced pavement as specified in-place, completed and accepted.

BASIS OF PAYMENT

610-6.1.Miscellaneous site concrete shall be considered incidental and no separate payment shall be made.

610-6.2 Payment shall be made for concrete pavement for the deicing fluid storage and potassium acetate facility at the contract unit price per cubic yard, which price and payment shall be full compensation for

furnishing and placing all material and for all labor, equipment, tools, and incidentals necessary to complete the work prescribed in this item.

Payment will be made under:

Item P-610-1 Portland Cement Concrete Pavement - per cubic yard

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM A184	Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement
ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A704	Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement
ASTM A706	Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
ASTM A775	Standard Specification for Epoxy-Coated Steel Reinforcing Bars
ASTM A884	Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement
ASTM A934	Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars
ASTM A1064	Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
ASTM C31	Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C33	Standard Specification for Concrete Aggregates
ASTM C39	Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C94	Standard Specification for Ready-Mixed Concrete
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C114	Standard Test Methods for Chemical Analysis of Hydraulic Cement
ASTM C136	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C143	Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C150	Standard Specification for Portland Cement
ASTM C171	Standard Specification for Sheet Materials for Curing Concrete
ASTM C172	Standard Practice for Sampling Freshly Mixed Concrete

ASTM C231	Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C260	Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C309	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C311	Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use in Portland-Cement Concrete
ASTM C494	Standard Specification for Chemical Admixtures for Concrete
ASTM C618	Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C666	Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing
ASTM C685	Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing
ASTM C989	Standard Specification for Slag Cement for Use in Concrete and Mortars
ASTM C1017	Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete
ASTM C1077	Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
ASTM C1157	Standard Performance Specification for Hydraulic Cement
ASTM C1260	Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
ASTM C1365	Standard Test Method for Determination of the Proportion of Phases in Portland Cement and Portland-Cement Clinker Using X-Ray Powder Diffraction Analysis
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D1751	Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Asphalt Types)
ASTM D1752	Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction

American Concrete Institute (ACI)

ACI 305R	Hot Weather Concreting
ACI 306R	Cold Weather Concreting
ACI 308R	Guide to External Curing of Concrete
ACI 309R	Guide for Consolidation of Concrete

END OF ITEM P-610

Item P-620 Runway and Taxiway Marking

DESCRIPTION

620-1.1 This item shall consist of the preparation and painting of numbers, markings, and stripes on the surface of runways, taxiways, and aprons, in accordance with these specifications and at the locations shown on the plans, or as directed by the Resident Project Representative (RPR). The terms "paint" and "marking material" as well as "painting" and "application of markings" are interchangeable throughout this specification.

620-1.2 Qualifications for airfield marking personnel. Submit documentation of pertinent personnel in resume format a minimum of 30 days before pavement marking work is to be performed showing personnel who will be performing the work. Documentation will demonstrate personnel have completed a training program. Practical testing will be completed to demonstrate a measurable skill level in airfield markings and equipment. Documentation will show qualification of skill, evaluation dates, and reevaluation dates. Evaluations will be completed yearly to stay certified for each skill. Provide documentation for onsite Supervisors will have at minimum 5 years' experience on projects of similar scope and size. Provide documentation for onsite Foreman will have at minimum 3 years' experience on projects of similar scope and size. Provide Documentation for equipment operators will have at minimum 2 years' experience on projects of similar scope and size. Documentation should demonstrate experience on five projects of similar size and scope with references for all personnel.

The Contractor shall provide an experienced technician to supervise the location, alignment, layout dimensions and application of the paint. Certification will be required to show that the Contractor's technician has performed runway and taxiway layout at three (3) airports similar to the ones involved in this project.

MATERIALS

620-2.1 Materials acceptance. The Contractor shall furnish manufacturer's certified test reports for materials shipped to the project. The certified test reports shall include a statement that the materials meet the specification requirements. This certification along with a copy of the paint manufacturer's surface preparation; marking materials, including adhesion, flow promoting and/or floatation additive; and application requirements must be submitted and approved by the Resident Project Representative (RPR) prior to the initial application of markings. The reports can be used for material acceptance or the RPR may perform verification testing. The reports shall not be interpreted as a basis for payment. The Contractor shall notify the RPR upon arrival of a shipment of materials to the site. All material shall arrive in sealed containers that are easily quantifiable for inspection by the RPR.

620-2.2 Marking materials.

a. Paint. Paint shall be waterborne, Type I, II or III and preformed thermoplastic in accordance with the requirements of this paragraph. Paint colors shall comply with Federal Standard No. 595.

Paint Color	Fed Std. No 595 Color Number
White	37925
Red	31136
Yellow	33538 or 33655
Black	37038

Waterborne or solvent base black paint should be used to outline a border at least 6 inches (150 mm) wide around markings on all light-colored pavements. Preformed thermoplastic markings shall have a non-reflectorized black border integral to the marking.

Application Rates for Paint and Glass Beads for Table 1

Paint[2]		Glass Beads[3]		
Type	Application Rate Maximum	Type I, Gradation A[1] Minimum	Type III Minimum	Type IV[1] Minimum
Waterborne Type I or II	115 ft^2/gal (2.8 m^2/l)	7 lb/gal (0.85 kg/l)	10 lb/gal (1.2 kg/l)	--
Waterborne Type III	90 ft^2/gal (2.2 m^2/l)	7 lb/gal (0.85 kg/l)	8 lb/gal (1.0 kg/l)	
Waterborne Type III	55 ft^2/gal (1.4 m^2/l)		6 lb/gal (.8 kg/l)	5 lb/gal (.7 kg/l)
Temporary Marking Waterborne Type I or II	230 ft^2/gal (5.6 m^2/l)	No beads	No beads	No beads

[1]Glass bead application rate for Red and Pink paint shall be reduced by 2 lb/gal (0.24 kg/l) for Type I and Type IV beads.

[2] See paint type(s) specified below.

[3] See paragraph 620-2.2b.

Waterborne paint. Waterborne paint shall meet the requirements of Federal Specification TT-P-1952F, Type I, Type II, or Type III. The non-volatile portion of the vehicle for all paint types shall be composed of a 100% acrylic polymer as determined by infrared spectral analysis. The acrylic resin used for Type III shall be 100% cross linking acrylic as evidenced by infrared peaks at wavelengths 1568, 1624, and 1672 cm-l with intensities equal to those produced by an acrylic resin known to be 100% cross linking.

Preformed Thermoplastic Airport Pavement Markings. Markings must be composed of ester modified resins in conjunction with aggregates, pigments, and binders that have been factory produced as a finished product. The material must be impervious to degradation by aviation fuels, motor fuels, and lubricants.

(1) The markings must be able to be applied in temperatures as low as 35°F without any special storage, preheating, or treatment of the material before application.

(a) The markings must be supplied with an integral, non-reflectorized black border.

(2) Graded glass beads.

(a) The material must contain a minimum of 30% intermixed graded glass beads by weight. The intermixed beads shall conform to Federal Specification TT-B-1325D, Type I, gradation A and Federal Specification TT-B-1325D, Type IV or TT-B-1325D, Type III.

(b) The material must have factory applied coated surface beads in addition to the intermixed beads at a rate of one (1) lb (0.45 kg) (±10%) per 10 square feet (1 sq m). These factory-applied coated surface beads shall have a minimum of 90% true spheres, minimum refractive index of 1.50, and meet the following gradation.

Preformed Thermoplastic Bead Gradation

Size Gradation		Retained, %	Passing, %
U.S. Mesh	µm		
12	1700	0 - 2	98 - 100
14	1400	0 - 3.5	96.5 - 100
16	1180	2 - 25	75 - 98
18	1000	28 - 63	37 - 72
20	850	63 - 72	28 - 37
30	600	67 - 77	23 - 33
50	300	89 - 95	5 - 11
80	200	97 - 100	0 - 3

(3) Heating indicators. The material manufacturer shall provide a method to indicate that the material has achieved satisfactory adhesion and proper bead embedment during application and that the installation procedures have been followed.

(4) Pigments. Percent by weight.

(a) White:

- Titanium Dioxide, ASTM D476, type II shall be 10% minimum.

(b) Yellow and Colors:

- Titanium Dioxide, ASTM D476, type II shall be 1% minimum.
- Organic yellow, other colors, and tinting as required to meet color standard.

(5) Prohibited materials. The manufacturer shall certify that the product does not contain mercury, lead, hexavalent chromium, halogenated solvents, nor any carcinogen as defined in 29 CFR 1910.1200 in amounts exceeding permissible limits as specified in relevant federal regulations.

(6) Daylight directional reflectance.

(a) White: The daylight directional reflectance of the white paint shall not be less than 75% (relative to magnesium oxide), when tested in accordance with ASTM E2302.

(b) Yellow: The daylight directional reflectance of the yellow paint shall not be less than 45% (relative to magnesium oxide), when tested in accordance with ASTM E2302. The x and y values shall be consistent with the federal Hegman yellow color standard chart for traffic yellow standard 33538, or shall be consistent with the tolerance listed below:

x .462	x .470	x .479	x .501
y .438	y .455	y .428	y .452

(7) Skid resistance. The surface, with properly applied and embedded surface beads, must provide a minimum resistance value of 45 BPN when tested according to ASTM E303.

(8) Thickness. The material must be supplied at a nominal thickness of 65 mil (1.7 mm).

(9) Environmental resistance. The material must be resistant to deterioration due to exposure to sunlight, water, salt, or adverse weather conditions and impervious to aviation fuels, gasoline, and oil.

(10) Retroreflectivity. The material, when applied in accordance with manufacturer's guidelines, must demonstrate a uniform level of nighttime retroreflection when tested in accordance to ASTM E1710.

(11) Packaging. Packaging shall protect the material from environmental conditions until installation.

(12) Preformed thermoplastic airport pavement marking requirements.

(a) The markings must be a resilient thermoplastic product with uniformly distributed glass beads throughout the entire cross-sectional area. The markings must be resistant to the detrimental effects of aviation fuels, motor fuels and lubricants, hydraulic fluids, deicers, anti-icers, protective coatings, etc. Lines, legends, and symbols must be capable of being affixed to asphalt and/or Portland cement concrete pavements by the use of a large radiant heater. Colors shall be available as required.

(b) The markings must be capable of conforming to pavement contours, breaks, and faults through the action of airport traffic at normal pavement temperatures. The markings must be capable of fully conforming to grooved pavements, including pavement grooving per advisory circular (AC) 150/5320-12, current version. The markings shall have resealing characteristics, such that it is capable of fusing with itself and previously applied thermoplastics when heated with a heat source per manufacturer's recommendation.

(c) Multicolored markings must consist of interconnected individual pieces of preformed thermoplastic pavement marking material, which through a variety of colors and patterns, make up the desired design. The individual pieces in each large marking segment (typically more than 20 feet (6 m) long) must be factory assembled with a compatible material and interconnected so that in the field it is not necessary to assemble the individual pieces within a marking segment. Obtaining multicolored effect by overlaying materials of different colors is not acceptable due to resulting inconsistent marking thickness and inconsistent application temperature in the marking/substrate interface.

(d) The marking material must set up rapidly, permitting the access route to be re-opened to traffic after application.

(e) The marking material shall have an integral color throughout the thickness of the marking material.

b. Reflective media. Glass beads for white and yellow paint shall meet the requirements for Federal Specification TT-B-1325D, Type III.

Glass beads for red and pink paint shall meet the requirements for Type I, Gradation A.

Glass beads shall be treated with all compatible coupling agents recommended by the manufacturers of the paint and reflective media to ensure adhesion and embedment.

Glass beads shall not be used in black paint.

Type III glass beads shall not be used in red and pink paint.

CONSTRUCTION METHODS

620-3.1 Weather limitations. Painting shall only be performed when the surface is dry, and the ambient temperature and the pavement surface temperature meet the manufacturer's recommendations in accordance with paragraph 620-2.1. Painting operations shall be discontinued when the ambient or surface temperatures does not meet the manufacturer's recommendations. Markings shall not be applied when the wind speed exceeds 10 mph unless windscreens are used to shroud the material guns. Markings shall not be applied when weather conditions are forecasts to not be within the manufacturers' recommendations for application and dry time.

620-3.2 Equipment. Equipment shall include the apparatus necessary to properly clean the existing surface, a mechanical marking machine, a bead dispensing machine, and such auxiliary hand-painting equipment as may be necessary to satisfactorily complete the job.

The mechanical marker shall be an atomizing spray-type or airless type marking machine with automatic glass bead dispensers suitable for application of traffic paint. It shall produce an even and uniform film thickness and appearance of both paint and glass beads at the required coverage and shall apply markings of uniform cross-sections and clear-cut edges without running or spattering and without over spray. The marking equipment for both paint and beads shall be calibrated daily.

620-3.3 Preparation of surfaces. Immediately before application of the paint, the surface shall be dry and free from dirt, grease, oil, laitance, or other contaminates that would reduce the bond between the paint and the pavement. Use of any chemicals or impact abrasives during surface preparation shall be approved in advance by the RPR. After the cleaning operations, sweeping, blowing, or rinsing with pressurized water shall be performed to ensure the surface is clean and free of grit or other debris left from the cleaning process.

Surface preparation shall be paid as a lump sum cost for the items scheduled below, except for areas of permanent marking removal which are not schedule for remarking. Separate payment shall be made for permanent marking removal (without replacement) per square foot.

a. Preparation of new pavement surfaces. The area to be painted shall be cleaned by broom, blower, water blasting, or by other methods approved by the RPR to remove all contaminants, including PCC curing compounds, minimizing damage to the pavement surface.

b. Preparation of pavement to remove existing markings. Existing pavement markings shall be removed by water blasting, or by other methods approved by the RPR minimizing damage to the pavement surface. Sandblasting, grinding, shot blasting are not allowed. Removal operations shall not cause any damage to the pavement surface such as aggregate and/or bitumen stripping. This condition will present the possibility of aggregate separation, creating Foreign Object Debris damage to aircraft. A test section, on a pavement designated by the airport, will be required for approval by the RPR and Airport Operations prior to full production of pavement marking removal. The test section shall include several different passes of varying water pressure to get the best removal results while avoiding pavement damage. Several light passes may be required to carefully remove the pavement markings rather than one powerful pass. The contractor shall account for this in their unit pricing.

Markings which are shown to be removed shall be blocked out into rectangular shapes. The removal area may need to be larger than the area of the markings to eliminate ghost markings. Markings within the rectangular shapes shall be removed such that 90% of all paint is removed to the satisfaction of the RPR. The remaining pavement area within the rectangular shape shall be treated with the same removal process such that the entire rectangular shape is uniform in appearance. After removal of markings on asphalt pavements, apply a surface treatment of seal coat in accordance with Item P-608, Emulsified Asphalt Seal Coat, to the 'blocked out' areas to eliminate 'ghost' markings.

Black paint may be used to temporarily cover existing markings which will be restored upon completion of construction only when approved by the RPR. Prior to repainting the original markings, the Contractor shall remove the black paint and the original markings as described above. The removal area may be limited to the existing markings only if there is no impact to the adjacent pavement surface. If the removal impacts the adjacent surface, the Contractor shall perform the removal process in the rectangular shapes prescribed above. Otherwise, black paint shall not be used to cover markings.

Payment for removal of existing markings will be made at the contract unit price for Area of Treatment for Paint Removal. If the condition of interim markings are flaking or in otherwise poor condition such that the permanent markings won't properly adhere, the contractor shall remove the faulty areas at his own expense. No separate measurement and payment will be made for marking removal for temporary markings associated with construction work phasing.

Quality control during a paint-removal operation must be continuous. The operator and the RPR must monitor the process. This ensures the work is being performed in accordance with the agreed standards that were determined during the test strip stage. It is also important to monitor the scarring and cease operations if damage occurs.

c. Preparation of pavement markings prior to remarking. Prior to remarking existing markings, loose existing markings must be removed minimizing damage to the pavement surface, with a method approved by the RPR. After removal, the surface shall be cleaned of all residue or debris.

Prior to the application of markings, the Contractor shall certify in writing that the surface is dry and free from dirt, grease, oil, laitance, or other foreign material that would prevent the bond of the paint to the pavement or existing markings. This certification along with a copy of the paint manufactures application and surface preparation requirements must be submitted to the RPR prior to the initial application of markings.

d. Preparation of temporary markings prior to marking permanent markings. Prior to applying permanent markings over temporary markings, loose temporary markings must be removed minimizing damage to the pavement surface, with a method approved by the RPR. After removal, the surface shall be cleaned of all residue or debris.

The Contractor shall certify in writing that the surface is dry and free from dirt, grease, oil, laitance, or other foreign material that would prevent the bond of the permanent markings to the existing temporary markings. This certification along with a copy of the paint manufactures application and surface preparation requirements must be submitted to the RPR prior to the initial application of markings.

620-3.4 Layout of markings. The proposed markings shall be laid out in advance of the paint application. The locations of markings to receive glass beads shall be shown on the plans.

620-3.5 Application. A period of 30 days shall elapse between placement of surface course or seal coat and application of the permanent paint markings. Paint shall be applied at the locations and to the dimensions and spacing shown on the plans. Paint shall not be applied until the layout and condition of the surface has been approved by the RPR.

The edges of the markings shall not vary from a straight line more than 1/2 inch (12 mm) in 50 feet (15 m), and marking dimensions and spacing shall be within the following tolerances:

Marking Dimensions and Spacing Tolerance

Dimension and Spacing	Tolerance
36 inch (910 mm) or less	±1/2 inch (12 mm)
greater than 36 inch to 6 feet (910 mm to 1.85 m)	±1 inch (25 mm)
greater than 6 feet to 60 feet (1.85 m to 18.3 m)	±2 inch (50 mm)
greater than 60 feet (18.3 m)	±3 inch (76 mm)

Pavement markings that do not meet the tolerances specified above shall be removed and repainted at the Contractors cost.

The paint shall be mixed in accordance with the manufacturer's instructions and applied to the pavement with a marking machine at the rate shown in Table 1. The addition of thinner will not be permitted. The paint layer shall be uniform in thickness without overlaps and/or blotches and overspray will not be permitted.

Glass beads shall be distributed upon the marked areas at the locations shown on the plans to receive glass beads immediately after application of the paint. A dispenser shall be furnished that is properly designed for attachment to the marking machine and suitable for dispensing glass beads. Glass beads shall be applied at the rate shown in Table 1. Glass beads shall not be applied to black paint or green paint. Glass beads shall adhere to the cured paint or all marking operations shall cease until corrections are made. Different bead types shall not be mixed. Regular monitoring of glass bead embedment and distribution should be performed. The glass bead dispensing system shall be integral to the marking truck and separate walk behind drop spreaders or hand throwing are not allowed.

Markings shall be visually uniform across the width of the marking, straight, smooth and adjacent surfaces shall not receive any overspray. Edges shall be crisp, square and clean. Irregular and wavy lines will not be acceptable.

620-3.6 Application--preformed thermoplastic airport pavement markings.

To ensure minimum single-pass application time and optimum bond in the marking/substrate interface, the materials must be applied using a variable speed self-propelled mobile heater with an effective heating width of no less than 16 feet (5 m) and a free span between supporting wheels of no less than 18 feet (5.5 m). The heater must emit thermal radiation to the marking material in such a manner that the difference in temperature of 2 inches (50 mm) wide linear segments in the direction of heater travel must be within 5% of the overall average temperature of the heated thermoplastic material as it exits the heater. The material must be able to be applied at ambient and pavement temperatures down to 35°F (2°C) without any preheating of the pavement to a specific temperature. The material must be able to be applied without the use of a thermometer. The pavement shall be clean, dry, and free of debris. A non-volatile organic content (non-VOC) sealer with a maximum applied viscosity of 250 centiPoise must be applied to the pavement shortly before the markings are applied. The supplier must enclose application instructions with each box/package. On asphalt pavement where existing markings have been removed, thermoplastic markings shall be applied prior to application of a seal coat, unless there is a 30 day waiting period for the seal coat to cure. Any areas outside of the thermoplastic markings where existing markings have been removed shall be sealed in accordance with Item P-608, Emulsified Asphalt Seal Coat.

620-3.7 Control strip. Prior to the full application of airfield markings, the Contractor shall prepare a control strip in the presence of the RPR. The Contractor shall demonstrate the surface preparation method and all striping equipment to be used on the project. The marking equipment must achieve the prescribed application rate of paint and population of glass beads (per Table 1) that are properly

embedded and evenly distributed across the full width of the marking. Prior to acceptance of the control strip, markings must be evaluated during darkness to ensure a uniform appearance.

620-3.8 Retro-reflectance. Reflectance shall be measured with a portable retro-reflectometer meeting ASTM E1710 (or equivalent). A total of 6 reading shall be taken over a 6 square foot area with 3 readings taken from each direction. The average shall be equal to or above the minimum levels of all readings which are within 30% of each other. Testing for retro-reflectance shall be performed at least twice per day.

Minimum Retro-Reflectance Values

Material	Retro-reflectance mcd/m^2/lux		
	White	**Yellow**	**Red**
Initial Type I	300	175	35
Initial Type III	600	300	35
Initial Thermoplastic	225	100	35
All materials, remark when less than[1]	100	75	10

[1] 'Prior to remarking determine if removal of contaminants on markings will restore retro-reflectance

620-3.9 Protection and cleanup. After application of the markings, all markings shall be protected from damage until dry. All surfaces shall be protected from excess moisture and/or rain and from disfiguration by spatter, splashes, spillage, or drippings. The Contractor shall remove from the work area all debris, waste, loose reflective media, and by-products generated by the surface preparation and application operations to the satisfaction of the RPR. The Contractor shall dispose of these wastes in strict compliance with all applicable state, local, and federal environmental statutes and regulations.

METHOD OF MEASUREMENT

620-4.1 The quantity of surface preparation shall be measured by lump sum of surface preparation specified in paragraph 620-3.3.

620-4.2 The quantity of markings, including glass beads, shall be measured by the number of square feet of painting**.**

620-4.3 The quantity of temporary markings to be paid for shall be the number of square feet of painting performed in accordance with the specifications and accepted by the RPR. Temporary markings are used for the initial markings at the time of pavement opening, while waiting for the minimum 30-day pavement curing period.

NOTE: There is no separate measurement or payment for temporary markings or marking removal associated with construction work phasing. Temporary marking placement and removal are paid for under item C-107, Safety, Security and Maintenance of Traffic, and are generally shown on the Construction Work Phasing Drawings.

620-4.4 The quantity of preformed markings to be paid for shall be the number of square feet of preformed markings.

620-4.5 The quantity of airfield pavement marking removal shall be measured by the number of square feet**.** Payment shall only be made in locations of permanent marking removal, without replacement scheduled at the same locations.

BASIS OF PAYMENT

620-5.1 Payment for surface preparation shall be made at the contract price for of surface preparation specified in paragraph 620-3.3 per lump sum. This price shall be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the item complete in place and accepted by the RPR in accordance with these specifications.

620-5.2 Payment for markings, including glass beads shall be made at the contract price for the number of square feet of painting. These prices shall be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the item complete in place and accepted by the RPR in accordance with these specifications.

620-5.3 Payment for temporary markings shall be made at the contract price for the number of square feet of painting. This price shall be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the item. This price shall be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the item complete in place and accepted by the RPR in accordance with these specifications.

620-5.4 Payment for preformed markings shall be made at the contract price for the number of square feet of preformed markings**.** This price shall be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the item complete in place and accepted by the RPR in accordance with these specifications.

620-5.5 Payment for permanent marking removal (at locations that will not be repainted) shall be made at the contract price for the number of square feet of markings removed and sealed**.** This price shall be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the item complete in place and accepted by the RPR in accordance with these specifications.

Payment will be made under:

Item P-620-1	Surface preparation - per lump sum
Item P-620-2	Permanent pavement markings - per square foot
Item P-620-3	Temporary pavement markings - per square foot
Item P-620-4	Preformed thermoplastic pavement markings - per square foot
Item P-620-5	Pavement marking removal - per square foot

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM D476	Standard Classification for Dry Pigmentary Titanium Dioxide Products
ASTM D968	Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive
ASTM D1652	Standard Test Method for Epoxy Content of Epoxy Resins
ASTM D2074	Standard Test Method for Total, Primary, Secondary, and Tertiary Amine Values of Fatty Amines by Alternative Indicator Method
ASTM D2240	Standard Test Method for Rubber Property - Durometer Hardness
ASTM D7585	Standard Practice for Evaluating Retroreflective Pavement Markings Using Portable Hand-Operated Instruments
ASTM E303	Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester
ASTM E1710	Standard Test Method for Measurement of Retroreflective Pavement Marking Materials with CEN-Prescribed Geometry Using a Portable Retroreflectometer
ASTM E2302	Standard Test Method for Measurement of the Luminance Coefficient Under Diffuse Illumination of Pavement Marking Materials Using a Portable Reflectometer
ASTM G154	Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials

Code of Federal Regulations (CFR)

40 CFR Part 60, Appendix A-7, Method 24	Determination of volatile matter content, water content, density, volume solids, and weight solids of surface coatings
29 CFR Part 1910.1200	Hazard Communication

Federal Specifications (FED SPEC)

FED SPEC TT-B-1325D	Beads (Glass Spheres) Retro-Reflective
FED SPEC TT-P-1952F	Paint, Traffic and Airfield Marking, Waterborne
FED STD 595	Colors used in Government Procurement

Commercial Item Description

A-A-2886B	Paint, Traffic, Solvent Based

Advisory Circulars (AC)

AC 150/5340-1	Standards for Airport Markings
AC 150/5320-12	Measurement, Construction, and Maintenance of Skid Resistant Airport Pavement Surfaces

END OF ITEM P-620

Item P-621 Saw-Cut Grooves

DESCRIPTION

621-1.1 This item consists of constructing saw-cut grooves to minimize hydroplaning during wet weather, providing a skid resistant surface in accordance with these specifications and at the locations shown on the plans, or as directed by the Resident Project Representative (RPR).

A detailed grooving layout plan shall be submitted to the RPR for review prior to commencing work.

CONSTRUCTION METHODS

621-2.1 Procedures. The Contractor shall submit to the RPR the grooving sequence and method of placing guide lines to control grooving operation. Transverse grooves saw-cut in the pavement must form a 1/4 inch (+1/16 inch, -0 inch) wide by 1/4 inch (±1/16 inch) deep by 1-1/2 inch (-1/8 inch, +0 inch) center-to-center configuration. The grooves must be continuous for the entire runway length. They must be saw-cut transversely (perpendicular to centerline) in the runway and high-speed taxiway pavement to not less than 10 feet (3 m) from the runway pavement edge to allow adequate space for equipment operation.

The saw-cut grooves must meet the following tolerances. The tolerances apply to each day's production and to each piece of grooving equipment used for production. The Contractor is responsible for all controls and process adjustments necessary to meet these tolerances. The Contractor shall routinely spot check for compliance each time the equipment aligns for a grooving pass.

a. Alignment tolerance. The grooves shall not vary more than ±1-1/2 inch (38 mm) in alignment for 75 feet (23 m) along the runway length, allowing for realignment every 500 feet (150 m) along the runway length.

b. Groove tolerance.

(1) Depth. The standard depth is 1/4 inch (6 mm). At least 90% of the grooves must be at least 3/16 inch (5 mm), at least 60% of the grooves must be at least 1/4 inch (6 mm), and not more than 10% of the grooves may exceed 5/16 inch (8 mm).

(2) Width. The standard width is 1/4 inch (6 mm). At least 90% of the grooves must be at least 3/16 inch (5 mm), at least 60% of the grooves must be at least 1/4 inch (6 mm), and not more than 10% of the grooves may exceed 5/16 inch (8 mm).

(3) Center-to-center spacing. The standard spacing is 1-1/2 inch (38 mm). Minimum spacing 1-3/8 inch (34 mm). Maximum spacing 1-1/2 inch (38 mm).

Saw-cut grooves must not be closer than 3 inches (8 cm) or more than 9 inches (23 cm) from transverse joints in concrete pavements. Grooves must not be closer than 6 inches (150 mm) and no more than 18 inches (0.5 m) from in-pavement light fixtures. Grooves may be continued through longitudinal construction joints. Where neoprene compression seals have been installed and the compression seals are recessed sufficiently to prevent damage from the grooving operation, grooves may be continued through the longitudinal joints. Where neoprene compression seals have been installed and the compression seals are not recessed sufficiently to prevent damage from the grooving operation, grooves must not be closer than 3 inches (8 cm) or more than 5 inches (125 mm) from the

longitudinal joints. Where lighting cables are installed, grooving through longitudinal or diagonal saw kerfs shall not be allowed.

621-2.2 Environmental requirements. Grooving operations will not be permitted when freezing conditions prevent the immediate removal of debris and/or drainage of water from the grooved area. Discharge and disposal of waste slurry shall be the Contractor's responsibility. Waste material from grooving operations shall not enter the storm drainage system or surface drainage paths. The Contractor shall dispose of waste material in compliance with all applicable state, local and federal environmental statutes and regulations.

621-2.3 Control strip. Groove a control strip in an area of the pavement outside of the trafficked area, as approved by the RPR. The area shall be 75 feet long by two lanes wide. Demonstrate the setup and alignment process, the grooving operation, and the waste slurry disposal.

621-2.4 Existing pavements. Bumps, depressed areas, bad or faulted joints, and badly cracked and/or spalled areas in the pavement shall not be grooved until such areas are adequately repaired or replaced.

621-2.5 New pavements. New asphalt and Portland cement concrete pavements shall be allowed to cure for a minimum of 30 days before grooving, to allow the material to become stable enough to prevent spalling, tearing or raveling. If it can be demonstrated that grooves are stable, and can be installed with no spalling, tearing or raveling of the groove edge, grooving may occur sooner that 30 days with approval of the RPR. All grade corrections must be completed prior to grooving. Spalling along or tearing or raveling of the groove edges shall not be allowed. Should spalling, tearing or raveling occur, the Contractor shall either change the grooving operations or cease operations until the pavement has cured long enough that spalling, tearing or raveling don't occur.

621-2.6 Grooving machine. Provide a grooving machine that is power driven, self-propelled, specifically designed and manufactured for pavement grooving, and has a self-contained and integrated continuous slurry vacuum system as the primary method for removing waste slurry. The grooving machine shall be equipped with diamond-saw cutting blades, and capable of making at least 18 inches (0.5 m) in width of multiple parallel grooves in one pass of the machine. Thickness of the cutting blades shall be capable of making the required width and depth of grooves in one pass of the machine. The cutting head shall not contain a mixture of new and worn blades or blades of unequal wear or diameter. Match the blade type and configuration with the hardness of the existing airfield pavement. The wheels on the grooving machine shall be of a design that will not scar or spall the pavement. Provide the machine with devices to control depth of groove and alignment.

621-2.7 Water supply. Water for the grooving operation shall be provided by the Contractor.

621-2.8 Clean-up. During and after installation of saw-cut grooves, the Contractor must remove from the pavement all debris, waste, and by-products generated by the operations to the satisfaction of the RPR. Cleanup of waste material must be continuous during the grooving operation. Flush debris produced by the machine to the edge of the grooved area or pick it up as it forms. The dust coating remaining shall be picked up or flushed to the edge of the area if the resultant accumulation is not detrimental to the vegetation or storm drainage system. Accomplish all flushing operations in a manner to prevent erosion on the shoulders or damage to vegetation. Waste material must be disposed of in an approved manner. Waste material must not be allowed to enter the airport storm sewer system. The Contractor must dispose of these wastes in strict compliance with all applicable state, local, and federal environmental statutes and regulations

621-2.9 Repair of damaged pavement. Grooving must be stopped and damaged pavement repaired at the Contractor's expense when directed by the RPR. Damaged pavement shall be repaired as directed by the RPR. The cost of repairs shall be borne by the Contractor at no additional cost to the Owner.

ACCEPTANCE

621-3.1 Acceptance testing. Grooves will be accepted based on results of zone testing. All acceptance testing necessary to determine conformance with the groove tolerances specified will be performed by the RPR.

Instruments for measuring groove width and depth must have a range of at least 0.5 inch (12 mm) and a resolution of at least 0.005 inch (0.13 mm). Gauge blocks or gauges machined to standard grooves width, depth, and spacing may be used.

Instruments for measuring center-to-center spacing must have a range of at least 3 inches (8 cm) and a resolution of at least 0.02 inch (0.5 mm).

The RPR will measure grooves in five zones across the pavement width. Measurements will be made at least three times during each day's production. Measurements in all zones will be made for each cutting head on each piece of grooving equipment used for each day's production.

The five zones are as follows:

Zone 1	Centerline to 5 feet (1.5 m) left or right of the centerline.
Zone 2	5 feet (1.5 m) to 25 feet (7.5 m) left of the centerline.
Zone 3	5 feet (1.5 m) 25 feet (7.5 m) right of the centerline.
Zone 4	25 feet (7.5 m) to edge of grooving left of the centerline.
Zone 5	25 feet (7.5 m) to edge of grooving right of the centerline.

At a random location within each zone, five consecutive grooves sawed by each cutting head on each piece of grooving equipment will be measured for width, depth, and spacing. The five consecutive measurements must be located about the middle blade of each cutting head ±4 inches (100 mm). Measurements will be made along a line perpendicular to the grooves.

- Width or depth measurements less than 0.170 inch (4 mm) shall be considered less than 3/16 inch (5 mm).
- Width or depth measurements more than 0.330 inch (8 mm) shall be considered more than 5/16 inch (8 mm).
- Width or depth measurements more than 0.235 inch (6 mm) shall be considered more than 1/4 inch (6 mm).

Production must be adjusted when more than one groove on a cutting head fails to meet the standard depth, width, or spacing in more than one zone.

METHOD OF MEASUREMENT

621-4.1 The quantity of grooving to be paid for shall be the number of square yards of grooving performed in accordance with the specifications and accepted by the RPR per paragraph 621-3.1. No deductions will be made for un-grooved areas adjacent to joints, light fixtures, etc.

BASIS OF PAYMENT

621-5.1 Payment for saw-cut grooving. Payment for saw-cut grooving will be made at the contract unit price per square yard for saw-cut grooving. This price shall be full compensation for furnishing all materials, and for all preparation, delivering, and application of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item P-621-1	Saw-Cut Pavement Grooving - per square yard

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

AC 150/5320-12	Measurement, Construction, and Maintenance of Skid Resistant Airport Pavement Surfaces

END OF ITEM P-621

Item P-640 Building Removal

DESCRIPTION

640-1.1 This item shall consist of demolishing structural elements and appurtenances, site clearing, backfilling with suitable on-site materials, and restoration of surfaces as shown on the Contract Drawings, or as directed by the Engineer. Except for material and equipment to be retained by the Owner, the Contractor shall dispose of all demolition material off-site.

CONSTRUCTION METHODS

640-2.1 PREPARATION. The Contractor shall verify structural and other conditions with the Engineer before proceeding with demolition work. The Contractor shall inspect structures prior to the start of work and notify the Engineer, in writing, of any hazardous conditions.

The Contractor shall protect and safeguard all existing structural systems, equipment and finishes that will remain. The Contractor shall conduct the demolition in a way that will minimize interference with adjacent structures which are not to be demolished. Temporary barriers and security devices must be provided, erected, and manufactured for the protection of all personnel and existing facilities. Movement or settlement of adjacent structures must be prevented by the use of bracing and shoring. The Contractor shall be responsible for any damage to structures, appurtenances or the landscape not scheduled for in the demolition work.

The operations shall be conducted with minimum interference to public or private thoroughfares. Site entrances and exits shall remain accessible and protected by the Contractor at all times. Roadways or sidewalks shall not be closed or obstructed without permits. Plans for prolonged obstruction to pedestrian and/or vehicular access must be cleared with the Owner's site representative prior to implementation.

640-2.2 TIMING. The Contractor shall work to facilitate scheduling of demolition work and to allow for the installation of temporary and permanent services. All work shall be scheduled in advance at a meeting with the Owner, Engineer, and Contractor to coordinate work schedules.

640-2.3 EXECUTION. The Contractor shall demolish the indicated structures and appurtenances in an orderly and careful manner. Operations shall cease and the Engineer shall be notified if adjacent structures appear to be endangered. Operations shall not resume until corrective measures have been taken. Except where notified otherwise, the Contractor shall immediately remove demolished material from the site. Any contaminated, vermin infested, or dangerous materials encountered must be removed and promptly disposed of as well.

The building floor, foundation and footings shall be completely removed. Excavated areas shall be backfilled with suitable on-site material and compacted in accordance with item P-152. The Contractor shall rough grade and compact areas affected by demolition to maintain site grades and contours.

The work shall be kept sprinkled with water to minimize dust. The Contractor shall provide hoses and water main or hydrant connections for this purpose.

- The Contractor shall not burn or bury materials on-site.
- No explosives will be permitted.

640-2.4 SUPPLEMENTAL SPECIFICATIONS. The following supplemental specifications apply to building removal and demolition.

Section 02060	Demolition
Section 028200	Asbestos Abatement
Section 02090	Universal Wastes

102-2.5 MATERIAL SALVAGE AND STOCKPILE. The Owner reserves the right to materials salvaged form the building scheduled to be demolished. The materials shall be transported and stockpiled at a location on the Airport. The exact location will be determined by the Owner during construction. Extreme care shall be taken not to damage the materials removed. All parts shall be organized and labeled for future reinstallation.

102-2.6 HAZARD WASTE PRE DEMOLITION SURVEY. A hazardous material survey was performed by Lu Engineers, dated December 2024. The report indicated some hazardous material exists. A copy of the survey (which details findings of the survey), is included with the contract specifications. The survey is provided to the Contractor for informational purposes only and is not part of the Contract. The Contractor shall be responsible for verifying all existing field conditions including, but not limited to, locations of hazardous materials.

METHOD OF MEASUREMENT

640-3.1 The quantity of building removal to be paid for shall be measured on a lump sum basis. The lump sum shall include all items required to satisfy this specification.

640-3.2 Payment will be made at the lump sum basis for mitigation of hazardous waste as approved by the Engineer. This price shall include the cost of all labor, material, equipment and all incidentals necessary to complete this item.

BASIS OF PAYMENT

640-4.1 The lump sum price shall include the cost of all labor, equipment, materials, and all incidentals necessary to complete this item. Partial payment may be made as the work progresses at the discretion of the Engineer.

Payment will be made under:

Item P-640-1	Abandoned ARFF Building Demolition - per lump sum
Item P-640-2	Mitigation and Removal of Hazardous Building Materials - per lump sum

END OF ITEM P-640

Item P-670 Automated Machine Guidance

DESCRIPTION

670-1.1 The Contractor may elect to utilize automated machine guidance (AMG) to determine three-dimensional locations for earth work activities and material placement. AMG is the process of automatically adjusting the motion of a machine with an onboard computer that obtains its position from global positioning systems, robotic total stations, lasers, or combinations of these methods while referencing the Contractor's model developed for the project. This procedure can be used in operations such as earth excavation, material placement, grading, trimming, and/or paving.

CONSTRUCTION METHODS

670-2.1 Work Plan. Provide a work plan to the Engineer stating whether or not AMG will be used on the project at the preconstruction meeting or prior. Each Contractor using AMG will provide a work plan to indicate the items of work covered within the specifications, type of AMG procedure, anticipated accuracy of each operation, and any areas where AMG operations need to be supplemented with conventional staking. The work plan must identify the Contractor's past experience with AMG operations, description of AMG equipment, equipment calibration procedures, equipment calibration frequency, and a description of the control necessary to support the proposed AMG operation(s). The work plan must designate a primary AMG contact. The Engineer reserves the right to request additional information or clarification prior to review of the work plan.

670-2.2 Survey meeting. A meeting with the Contractor and other involved parties (FAA, State DOT, Owner, Engineer, AMG contact, Contractor's model creator, surveyors, inspectors, etc.) shall be held prior to field operations. The purpose of the meeting is to discuss the implementation of the work plan and exchange of electronic data between both parties. The Contractor must explain the operations and procedures for the AMG technology, discuss the development of the Contractor's model, and present their survey control plan. The meeting attendees would also discuss the workflow for field verification, steps to be taken to resolve concerns with the Contractor's model, and compliance of AMG operations with the contract.

670-2.3 Contractor's model. Contractor shall employ a third party to verify model is accurate. Transmit, to the Engineer a certification statement which states in part the following: "The Contractor's model(s) developed for the project is an accurate representation of the contract, submittal of this certification is in accordance with the Contractor's obligations and requirements within the Contractor Staking Quality Control Plan, AMG Work Plan and applicable statutory requirements for construction layout."

A. Contract and Reference Information Documents (RID). The model must be created based upon the contract. RID reference documents for the project may be used for creation of the model at the Contractor's discretion, provided use is consistent with the terms and conditions of the Owner disclaimer and the use does not form the basis for a claim. Bring any conflicts identified between the contract and RID documents to the attention of the Engineer as soon as possible. If the Contractor determines a need for additional data or requires electronic formatting of files different than provided, it is the responsibility of the Contractor to prepare such files prior to commencement of the AMG operation without additional costs to the Owner.

B. Liability and verification. The contract plans will govern construction activities. The Engineer will not approve the Contractor's model(s). The Contractor accepts all liability associated with the creation and use of the Contractor's model. Field verify existing project features to determine the suitability of any provided contract information. Features to be verified include, but are not limited to, ties at project limits, existing pavement grades and limits, existing turf grades, control points, benchmarks, section corners, monuments, and other critical locations.

670-2.4 Control. The Contractor shall verify horizontal and vertical control points shown on the plans prior to the commencement of any AMG operations. The tolerance for horizontal control points shall be within 0.04 foot (northing and/or easting)of established location. The tolerance for vertical control points shall be within 0.02 foot of established elevation. Notify the Engineer if any control points exceed the established tolerances.

If the Contractor's AMG operation requires a greater density of control than that provided from the Engineer, the Contractor is responsible for densification of the AMG control. The additional AMG control will be established with sufficient frequency and precision to adequately support the AMG operation being performed. Ensure the control points are stable and properly marked to allow verification activities to be performed by the Engineer. Submit initial AMG control information (Point, Northing, Easting, Elevation, and Description) to the Engineer at least 2 calendar days prior to AMG operations. Ensure any subsequent AMG control information is provided in the same format and time consideration.

670-2.5 Contractor responsibility. The Contractor's AMG operation can only eliminate required staking if the Contractor's AMG operation meets the requirements and tolerances defined in these contract documents. The Contractor is responsible for all quality control necessary for their AMG operations to meet the prescribed tolerances for each associated specification. If prescribed tolerances are not met, the Contractor will either proceed with regular operations without the use of AMG or suspend operations to evaluate and address the AMG operations deficiencies. Once the cause of the inaccuracies is determined, the Contractor must provide the Engineer with a written corrective action plan addressing the concerns for the Engineer's approval. The Contractor may only resume AMG operations with the approval of the Engineer. If subsequent failures to meet specifications and accuracies are experienced, the Contractor will be suspended from AMG operations and conventional staking operations must be provided at no cost to the Owner.

Notify the Engineer at least 24 hours prior to commencement of AMG operations.

670-2.6 Quality Assurance. The Engineer will perform continuous and independent quality assurance for AMG operations to ensure compliance of the finished surfaces with corresponding specifications for the material being placed or removed. The Engineer will use equipment and methods that adequately support the precision level of the verification. The Engineer is prohibited from using the Contractor's equipment in the quality assurance verification process. Acceptance of the results of AMG operations will be based upon quality assurance results falling within prescribed tolerances for each associated pay item. If the Engineer determines that the prescribed tolerances are not being met, the Contractor must suspend AMG operations and follow direction specified for corrective action in subsection 670-2.5.

METHOD OF MEASUREMENT

670-3.1 No separate measurement for payment shall be made for automated machine guidance. Automated machine guidance shall be considered necessary and incidental to the work of this Contract.

BASIS OF PAYMENT

670-4.1 No payment will be made separately or directly for automated machine guidance. Automated machine guidance shall be considered necessary and incidental to the work of this Contract and the costs shall be included in the various pay items involved.

END OF ITEM P-670

Item F-170 Guide Railing and Bollards

DESCRIPTION

170-1.1 This item shall consist of providing and installing box beam guide railings and vehicle collision bollards in accordance with these specifications and as indicated on the Contract Drawings.

MATERIALS

170-2.1 Guide railing. Box beam guide railing including shop curved box beam guide railing, end assemblies, end assembly anchors and footings, posts and appurtenances shall be in accordance with the New York State Department of Transportation Standard Specifications, latest issue, plus all revisions and addenda pertaining thereto, Section 606-2 Guide Railings.

170-2.2 Concrete. Concrete shall conform to the requirements of Item P-610, Structural Portland Cement Concrete with the exception that the minimum compressive strength shall be 3000 psi at 28 days.

170-2.3 Collision Protection Bollards. Collision protection bollards shall be provided and installed as shown on the details and plans.

CONSTRUCTION METHODS

170-3.1 Construction methods shall be in accordance with the New York State Department of Transportation Standard Specifications, latest issue, plus all revisions and addenda pertaining thereto, Section 606-3.

METHOD OF MEASUREMENT

170-4.1 The quantity of box beam guide railing, transition box beam guide railing including shop curved box beam guide railing to be paid for under this item shall be the number of linear feet of guide railing installed measured along its axis from end to end, including all appurtenances, installed in accordance with the Contract Drawings and Specifications and accepted by the Engineer.

The quantity of box beam guide railing shall include end assemblies, anchors and footings.

170-4.2 The quantity of collision protection bollards shall be measured per each.

BASIS OF PAYMENT

170-5.1 Payment shall be made at the contract unit price for box beam guide railing including shop curved box beam guide railing installed in place by the Contractor and accepted by the Engineer. This price shall be full compensation for furnishing all materials and for all labor, equipment, tools and incidentals necessary to complete the item.

170-5.2 Payment shall be made at the contract unit price for collision protection bollards installed in place by the Contractor and accepted by the Engineer. This price shall be full compensation for furnishing all materials and for all labor, equipment, tools and incidentals necessary to complete the item.

Payment will be made under:

Item F-170-1	Box Beam Guide Railing – per linear foot
Item F-170-2	Vehicle Collision Protection Bollards – per each

END OF ITEM F-170

Item D-701 Pipe for Storm Drains and Culverts

DESCRIPTION

701-1.1 This item shall consist of the construction or removal of pipe culverts and storm drains in accordance with these specifications and in reasonably close conformity with the lines and grades shown on the plans.

MATERIALS

701-2.1 Materials shall meet the requirements shown on the plans and specified below. Underground piping and components used in drainage systems for terminal and aircraft fueling ramp drainage shall be noncombustible and inert to fuel in accordance with National Fire Protection Association (NFPA) 415.

701-2.2 Pipe. The pipe shall be of the type called for on the plans or in the proposal and shall be in accordance with the following appropriate requirements:

AASHTO M252	Standard Specification for Corrugated Polyethylene Drainage Pipe
AASHTO M294	Standard Specification for Corrugated Polyethylene Pipe, 12-in. to 60-in. Diameter
AASHTO R73	Standard Practice for Evaluation of Precast Concrete Drainage Productions
ASTM A716	Standard Specification for Ductile Iron Pipe
ASTM C76	Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM C507	Standard Specification for Reinforced Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe
ASTM C1479	Standard Practice for Installation of Precast Concrete Sewer, Storm Drain, and Culvert Pipe Using Standard Installations
ASTM C1840	Standard Practice for Inspection and Acceptance of Installed Reinforced Concrete Culvert, Storm Drain, and Storm Sewer Pipe

701-2.3 Concrete. Concrete for cast-in-place trench drains and other miscellaneous structures shall conform to the requirements of Item P-610 – Concrete for Miscellaneous Structures.

701-2.4 Rubber gaskets. Rubber gaskets for rigid pipe shall conform to the requirements of ASTM C443. Rubber gaskets for PVC pipe, polyethylene, and polypropylene pipe shall conform to the requirements of ASTM F477. Rubber gaskets for zinc-coated steel pipe and precoated galvanized pipe shall conform to the requirements of ASTM D1056, for the “RE” closed cell grades. Rubber gaskets for steel reinforced thermoplastic ribbed pipe shall conform to the requirements of ASTM F477.

701-2.5 Joint mortar. Pipe joint mortar shall consist of one part Portland cement and two parts sand. The Portland cement shall conform to the requirements of ASTM C150, Type I. The sand shall conform to the requirements of ASTM C144.

701-2.6 Joint fillers. Not used.

701-2.7 Plastic gaskets. Plastic gaskets shall conform to the requirements of ASTM C990.

701-2.8. Controlled low-strength material (CLSM). Controlled low-strength material shall conform to the requirements of Item P-153. When CLSM is used, all joints shall have gaskets.

701-2.9 Precast box culverts. Not used.

701-2.10 Precast concrete pipe. Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or American Concrete Pipe Association QCast Plant Certification program.

701-2.11 Bedding/special backfill. Bedding or special backfill shall conform to the requirements of Item D-711 - Lining, unless otherwise shown on the plans

701-2.12 Separation Geotextile. Separation geotextile shall be Class 2; 0.02 sec^{-1} permittivity per ASTM D4491; Apparent opening size per ASTM D4751 with 0.60 mm maximum average roll value. The cost of separation fabric used for the placement of structures shall be included in the cost of the concrete structures.

701-2.13 Subsurface Stormwater Management System. Technical specifications have been included on the Contract Drawings.

701-2.14 High Density Polyethylene (HDPE) Glycol Piping. Refer to specification 333123.

CONSTRUCTION METHODS

701-3.1 Excavation. The width of the pipe trench shall be sufficient to permit satisfactory jointing of the pipe and thorough tamping of the bedding material under and around the pipe, but it shall not be less than the external diameter of the pipe plus 12 inches on each side. The trench walls shall be approximately vertical.

The Contractor shall comply with all current federal, state and local rules and regulations governing the safety of men and materials during the excavation, installation and backfilling operations. Specifically, the Contractor shall observe that all requirements of the Occupational Safety and Health Administration (OSHA) relating to excavations, trenching and shoring are strictly adhered to. The width of the trench shall be sufficient to permit satisfactorily jointing of the pipe and thorough compaction of the bedding material under the pipe and backfill material around the pipe, but it shall not be greater than the widths shown on the plans trench detail.

Where rock, hardpan, or other unyielding material is encountered, the Contractor shall remove it from below the foundation grade for a depth of at least 8 inch (200 mm) or 1/2 inch (12 mm) for each foot of fill over the top of the pipe (whichever is greater) but for no more than three-quarters of the nominal diameter of the pipe. The excavation below grade should be filled with granular material to form a uniform foundation.

Where a firm foundation is not encountered at the grade established, due to soft, spongy, or other unstable soil, the unstable soil shall be removed and replaced with approved granular material for the full trench width. The RPR shall determine the depth of removal necessary. The granular material shall be compacted to provide adequate support for the pipe.

The excavation for pipes placed in embankment fill shall not be made until the embankment has been completed to a height above the top of the pipe as shown on the plans.

All required excavation shall be included in the unit price bid per lineal foot for the pipe, including rock excavation, if encountered.

The Contractor shall do such trench bracing, sheeting or shoring necessary to perform and protect the excavation as required for safety and conformance to governing laws. The bracing, sheeting or shoring shall not be removed in one operation, but shall be done in successive stages as determined by the Engineer to prevent overloading of the pipe during backfilling operations. The cost of the bracing, sheeting or shoring and the removal of same shall be considered as a subsidiary obligation of the Contractor and included in the contract price for the pay items of work involved.

The Contractor shall do all bracing, sheathing, or shoring necessary to implement and protect the excavation and the structure as required for safety or conformance to governing laws. The cost of bracing, sheathing, or shoring and the removal of the same shall be included in the unit price bid for the structure.

All bracing, sheathing, or shoring involved in the construction of this item shall be removed by the Contractor. Removal shall not disturb or damage finished masonry. The bracing, sheeting or shoring shall not be removed in one operation, but shall be done in successive stages as determined by the Engineer to prevent overloading of the pipe and structures during backfilling operations. That portion of the sheeting extending below the top of the pipe shall be withdrawn, unless otherwise directed, before more than six inches of backfill material is placed and before any bracing is removed. Voids left by the sheeting shall be carefully refilled with selected material and rammed tight with tools especially adapted for the purpose, or otherwise as may be approved. The Engineer may order the Contractor to delay the removal of sheeting and bracing, if, in his judgement, the installed work has not attained the necessary strength to permit placing of backfill. The cost of removal shall be included in the unit price bid for the structure.

701-3.2 Bedding. The bedding surface for the pipe shall provide a foundation of uniform density to support the pipe throughout its entire length.

a. Rigid pipe. The pipe bedding shall be constructed uniformly for the full length of the pipe barrel, as required on the plans. The maximum aggregate size shall be 1 in when the bedding thickness is less than 6 inches, and 1-1/2 in when the bedding thickness is greater than 6 inches. Bedding shall be loosely placed uncompacted material under the middle third of the pipe prior to placement of the pipe.

b. Flexible pipe. For flexible pipe, the bed shall be roughly shaped to fit the pipe, and a bedding blanket of sand or fine granular material shall be provided as follows:

Flexible Pipe Bedding

Pipe Corrugation Depth		Minimum Bedding Depth	
inch	**mm**	**inch**	**mm**
1/2	12	1	25
1	25	2	50
2	50	3	75
2-1/2	60	3-1/2	90

c. Other pipe materials. For PVC, polyethylene, polypropylene, or fiberglass pipe, the bedding material shall consist of coarse sands and gravels with a maximum particle size of 3/4 inches (19 mm). For pipes installed under paved areas, no more than 12% of the material shall pass the No. 200 (0.075 mm) sieve. For all other areas, no more than 50% of the material shall pass the No. 200 (0.075 mm) sieve. The bedding shall have a thickness of at least 6 inches (150 mm) below the bottom of the pipe and extend up around the pipe for a depth of not less than 50% of the pipe's vertical outside diameter.

701-3.3 Laying pipe. The pipe laying shall begin at the lowest point of the trench and proceed upgrade. The lower segment of the pipe shall be in contact with the bedding throughout its full length. Bell or

groove ends of rigid pipes and outside circumferential laps of flexible pipes shall be placed facing upgrade.

The Contractor's facilities for lowering the pipe into the trench shall be such that neither the pipe nor the trench will be damaged or disturbed. The Engineer shall inspect all pipe before it is laid and reject any section that is damaged by handling or is defective to a degree which will materially affect the function and service of the pipe.

The grade and alignment of each pipe shall be determined and maintained by the use of an approved laser system or approved batter boards (over the trench or parallel lines).

The laser system shall be operated according to the manufacturer's recommendations and safety standards. The line and grade of the laser shall be checked at not more than 50-feet away from the starting point and then periodically throughout the course of the working day. Any variation from the line and grade shall be immediately reported to the Engineer.

When the line parallel to the grade of the sewer is used, this line is to be supported above the ground surface on batter boards spaced not to exceed 40-feet apart and rigidly anchored to and supported by substantial posts driven into the ground on each side of the trench. Not less than 3 batter boards shall be installed and maintained in proper position at all times as a check on the accuracy of the grade lines. The Engineer shall be immediately notified of any misalignment of batter boards set in accordance with established cuts or elevations. The elevations of batter boards and the alignment of the grade line shall be determined from the elevations and alignment of the offset points located alongside the trench except where established directly by means of surveying instruments.

The pipe shall be firmly and accurately set to line and grade so that the invert will be smooth and uniform. The pipe shall be protected from water during placement and until the mortar in the joints has thoroughly set. Contractor shall scoop out areas to accommodate bell ends of pipe. Pipe shall not be laid on frozen ground.

The upgrade end of pipelines not terminating in a structure shall be plugged or capped as approved by the Engineer. Pipe which is not true in alignment or which shows any settlement after laying shall be taken up and relaid without extra compensation.

The Contractor shall provide, as may be necessary, for the temporary diversion of stream flow in order to permit the installation of the pipe under dry conditions.

Paved or partially lined pipe shall be placed so that the longitudinal center line of the paved segment coincides with the flow line.

Elliptical and elliptically reinforced concrete pipes shall be placed with the manufacturer’s reference lines designating the top of the pipe within five degrees of a vertical plane through the longitudinal axis of the pipe.

701-3.4 Joining pipe. Joints shall be made with (1) cement mortar, (2) cement grout, (3) rubber gaskets, (4) plastic gaskets, (5) coupling bands.

Mortar joints shall be made with an excess of mortar to form a continuous bead around the outside of the pipe and shall be finished smooth on the inside. Molds or runners shall be used for grouted joints to retain the poured grout. Rubber ring gaskets shall be installed to form a flexible watertight seal. Pipe joints shall be made with rubber gaskets, elastomeric seals, plastic gaskets or coupling bands. Gaskets and elastomeric seals shall be installed to form a flexible watertight seal.

a. Concrete pipe. Concrete pipe may be either bell and spigot or tongue and groove. Pipe sections at joints shall be fully seated and the inner surfaces flush and even. Concrete pipe joints shall be sealed with rubber gaskets meeting ASTM C443 as leak resistant joints are required.

b. Metal pipe. Note Used.

c. PVC, Polyethylene, or Polypropylene pipe. Joints for PVC, Polyethylene, or Polypropylene pipe shall conform to the requirements of ASTM D3212 as leak resistant joints are required. Joints for PVC and Polyethylene pipe shall conform to the requirements of AASHTO M304 when soil tight joints are required. Fittings for polyethylene pipe shall conform to the requirements of AASHTO M252 or ASTM M294. Fittings for polypropylene pipe shall conform to ASTM F2881, ASTM F2736, or ASTM F2764.

701-3.5 Embedment and Overfill. Pipes shall be inspected before any fill material is placed; any pipes found to be out of alignment, unduly settled, or damaged shall be removed and re-laid or replaced at the Contractor's expense.

701-3.5-1 Embedment Material Requirements

a. Concrete Pipe. Embedment material and compaction requirements shall be in accordance with the applicable Type of Standard Installation (Types 1, 2, 3, or 4) per ASTM C1479. If a concrete cradle or CLSM embedment material is used, it shall conform to the plan details.

b. Plastic and fiberglass Pipe. Embedment material shall meet the requirements of ASTM D3282, A-1, A-2-4, A-2-5, or A-3. Embedment material shall be free of organic material, stones larger than 1.5 inches in the greatest dimension, or frozen lumps. Embedment material shall extend to 12 inches above the top of the pipe.

701-3.5-2 Placement of Embedment Material

The embedment material shall be compacted in layers not exceeding 6 inches (150 mm) on each side of the pipe and shall be brought up one foot (30 cm) above the top of the pipe or to natural ground level, whichever is greater. Thoroughly compact the embedment material under the haunches of the pipe without displacing the pipe. Material shall be brought up evenly on each side of the pipe for the full length of the pipe.

When the top of the pipe is above the top of the trench, the embedment material shall be compacted in layers not exceeding 6 inches (150 mm) and shall be brought up evenly on each side of the pipe to one foot (30 cm) above the top of the pipe. All embedment material shall be compacted to a density required under Item P-152.

Concrete cradles and flowable fills, such as controlled low strength material (CLSM) or controlled density fill (CDF), may be used for embedment provided adequate flotation resistance can be achieved by restraints, weighing, or placement technique.

It shall be the Contractor's responsibility to protect installed pipes and culverts from damage due to construction equipment operations. The Contractor shall be responsible for installation of any extra strutting or backfill required to protect pipes from the construction equipment.

701-3.6 Overfill

Pipes shall be inspected before any overfill is in place. Any pipes found to be out of alignment, unduly settled, or damaged shall be removed and relaid or replaced at the Contractor's expense. Evaluation of any damage to RCP shall be evaluated based on AASHTO R73.

Overfill material shall be place and compacted in layers as required to achieve compaction to at least 95 percent standard proctor per ASTM D1557. The soil shall contain no debris, organic matter, frozen material, or stones with a diameter greater than one half the thickness of the compacted layers being placed.

701-3.7 Inspection Requirements

An initial post installation inspection shall be performed by the RPR no sooner than 30 days after completion of installation and final backfill. Clean or flush all lines prior to inspection.

Use a camera with lighting suitable to allow a clear picture of the entire periphery of the pipe interior. Center the camera in the pipe both vertically and horizontally and be able to pan and tilt to a 90 degree angle with the axis of the pipe rotating 360 degrees. Use equipment to move the camera through the pipe that will not obstruct the camera's view or interfere with proper documentation of the pipe's condition. The video image shall be clear, focused, and relatively free from roll, static, or other image distortion qualities that would prevent the reviewer from evaluating the condition of the pipe.

For pipe sizes larger than 48 inches, a walk-through visual inspection shall be performed.

Incorporate specific inspection requirements for the various types of pipes beneath the general inspection requirements.

Reinforced concrete pipe shall be inspected, evaluated, and reported on in accordance with ASTM C1840, "Standard Practice for Inspection and Acceptance of Installed Reinforced Concrete Culvert, Storm Drain, and Storm Sewer Pipe." Any issues reported shall include still photo and video documentation. The zoom ratio shall be provided for all still or video images that document any issues of concern by the inspection firm.

Flexible pipes shall be inspected for rips, tears, joint separations, soil migration, cracks, localized buckling, settlement, alignment, and deflection. Determine whether the allowable deflection has been exceeded by use of a laser profiler for internal pipe diameters of 48 inches or less, or direct measurement for internal pipe diameters greater than 48 inches. Laser profile equipment shall utilize low barrel distortion video equipment. Deflection of installed pipe shall not exceed the limits provided in the table below, as a percentage of the average inside diameter of the pipe.

Maximum Allowable Pipe Deflection

Type of Pipe	**Maximum Allowable Deflection (%)**
Corrugated Metal Pipe	5
Concrete Lined CMP	3
Thermoplastic Pipe	5
Fiberglass	5

If deflection readings in excess of the allowable deflection are obtained, remove the pipe with excessive deflection and replace with new pipe. Repair or replace any pipe with cracks exhibiting displacement across the crack, bulges, creases, tears, spalls, or delaminations. The report for flexible pipe shall include as a minimum, the deflection results and final post installation inspection report. The inspection report shall include: a copy of all video taken, pipe location identification, equipment used for inspection, inspector name, deviation from design line and grade, and inspector's notes.

701-3.8 Connections. Where the Contract Drawings call for connections to existing or proposed structures, these connections shall be watertight and made so that a smooth uniform flow line will be obtained throughout the drainage system.

701-3.9 Cleaning and restoration of site. After the backfill is completed, the Contractor shall dispose of all surplus material, dirt and rubbish from the site. Suitable material may be deposited in embankment or shoulders areas. Unsuitable material shall be disposed of on airport property or as ordered by the Engineer. Removed pipe shall be disposed of off airport property.

Areas disturbed by the Contractor's operation shall be restored to their original condition. Restoration of surfaces shall be performed in accordance with the details shown on the plans.

Where pipes are installed or removed outside of the general grading limits, or in areas that would not otherwise be disturbed, restoration shall be considered necessary and incidental to the work of this item and the costs shall be included in the associated pay items for pipe installation or pipe removal.

Where pipes are installed or removed within the general grading limits, restoration of the area will not be necessary as payment for establishment of turf or pavement will be included in the various pay items of work involved.

The Contractor shall be responsible for maintaining all disturbed surfaces and restorations until final acceptance.

701-3.10 Removal of Pipe. Remove the types of pipe as indicated on the plans. The pipe material shall be disposed of in accordance with paragraph 701-3.9. Trenches shall be backfilled with material equal to or better in quality than adjacent embankment, unless otherwise indicated on the plans. Trenches must be compacted in accordance with Item P-152, Excavation, Embankment and Subgrade. All spoil material is to be disposed of on-site at the spoil area.

METHOD OF MEASUREMENT

701-4.1 The length of pipe shall be measured in linear feet of pipe in place, completed, and accepted. It shall be measured along the centerline of the pipe from end or inside face of structure to the end or inside face of structure, whichever is applicable. Each class, types and size of pipe shall be measured separately. All fittings shall be included in the footage as typical pipe sections in the pipe being measured.

All trenching, excavation, pipe, structure and trench drain removals in the same trench, backfill, sheeting and bracing, restoration of surfaces, dewatering, structure modifications, connections, fittings and pressure tests shall be included in the footage as typical pipe or trench drain sections in the pipe or trench drain being measured.

701-4.2 The stormwater management system will be paid per lump sum, inclusive of the entire assembly, generally including excavation, aggregates, pipe and pipe chambers, joints and connections, inspection ports and cleanouts, fabric, backfill. Payment limits stop at the adjacent drainage manholes.

701-4.3 No measurement will be made for direct payment of pressure testing of glycol force main pipe as the cost of completing shall be considered as a subsidiary obligation in the completion of the work.

BASIS OF PAYMENT

701-5.1 Payment will be made at the contract unit price per linear foot for each class, type and size of pipe. These prices shall fully compensate the Contractor for furnishing all materials and for all preparation, excavation, and installation of these materials; and for all labor, equipment, tools, and incidentals necessary to complete the item.

701-5.2 Payment will be made per lump sum for the subsurface stormwater management system.

701-5.3 No payment will be made for direct payment of pressure testing of glycol force main pipe as the cost of completing shall be considered as a subsidiary obligation in the completion of the work.

Payment will be made under:

Item D-701-1	12-Inch Dia. Reinforced Concrete Pipe (RCP), Class V - per linear foot
Item D-701-2	18-Inch Dia. Reinforced Concrete Pipe (RCP), Class V - per linear foot

Item D-701-3	24-Inch Dia. Reinforced Concrete Pipe (RCP), Class V - per linear foot
Item D-701-4	36-Inch Dia. Reinforced Concrete Pipe (RCP), Class V - per linear foot
Item D-701-5	30-Inch Elliptical Reinforced Concrete Pipe (RCP), Class V - per linear foot
Item D-701-6	36-Inch Elliptical Reinforced Concrete Pipe (RCP), Class V - per linear foot
Item D-701-7	12-Inch Dia. HDPE Glycol Force Main Pipe - per linear foot
Item D-701-8	14-Inch Dia. HDPE Glycol Force Main Pipe - per linear foot
Item D-701-9	12-Inch Dia. Smooth Interior Corrugated Polyethylene Pipe (SICPP) - per linear foot
Item D-701-10	15-Inch Dia. Smooth Interior Corrugated Polyethylene Pipe (SICPP) - per linear foot
Item D-701-11	18-Inch Dia. Smooth Interior Corrugated Polyethylene Pipe (SICPP) - per linear foot
Item D-701-12	24-Inch Dia. Smooth Interior Corrugated Polyethylene Pipe (SICPP) - per linear foot
Item D-701-13	36-Inch Dia. Smooth Interior Corrugated Polyethylene Pipe (SICPP) - per linear foot
Item D-701-14	18-Inch Dia. Ductile Iron Pipe (DIP) - per linear foot
Item D-701-15	24-Inch Dia. Ductile Iron Pipe (DIP) - per linear foot
Item D-701-16	Subsurface Stormwater Management System UG SWD #1 - per lump sum
Item D-701-17	Subsurface Stormwater Management System UG SWD #1A - per lump sum
Item D-701-18	Subsurface Stormwater Management System UG SWD #2 - per lump sum
Item D-701-19	Subsurface Stormwater Management System UG SWD #3 - per lump sum

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO M252	Standard Specification for Corrugated Polyethylene Drainage Pipe
AASHTO M294	Standard Specification for Corrugated Polyethylene Pipe, 12- to 60-in. Diameter
AASHTO M306	Standard Specification for Drainage, Sewer, Utility, and Related Castings

ASTM International (ASTM)

ASTM A36	Standard Specification for Structural Steel
ASTM A536	Standard Specification for Ductile Iron Castings
ASTM A123	Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A716	Standard Specification for Ductile Iron Pipe
ASTM C76	Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM C94	Standard Specification for Ready Mixed Concrete
ASTM C144	Standard Specification for Aggregate for Masonry Mortar
ASTM C150	Standard Specification for Portland Cement
ASTM C443	Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
ASTM C507	Standard Specification for Reinforced Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe
ASTM C990	Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
ASTM D3212	Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
ASTM D3282	Standard Practice for Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes
ASTM F477	Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe

National Fire Protection Association (NFPA)

NFPA 415	Standard on Airport Terminal Buildings, Fueling Ramp Drainage, and Loading Walkways

END ITEM D-701

Item D-705 Pipe Underdrains for Airports

DESCRIPTION

705-1.1 This item shall consist of the construction of pipe drains in accordance with these specifications and in reasonably close conformity with the lines and grades shown on the plans. Cleanouts shall be installed where called out on the plans. The work of this item shall include excavation, backfill, special porous backfill, filter fabric, restoration of surfaces, the cost of furnishing and installing all trench bracing, removal of water, all pipe, fittings and rodent screens required to complete the underdrain as shown on the plans, and the material for the making of all joints including all connections to existing drainage pipes and structures.

MATERIALS

705-2.1 General. Materials shall meet the requirements shown on the plans and specified below.

705-2.2 Pipe. The pipe shall be of the type called for on the plans or in the proposal and shall be in accordance with the following appropriate requirements.

AASHTO M252 Standard Specification for Corrugated Polyethylene Drainage Pipe

All pipe exterior shall be corrugated; pipe under pavement shall have a smooth interior (straight segments), pipe in turf may have corrugated interior (coiled).

705-2.3 Joint mortar. Pipe joint mortar shall consist of one part by volume of Portland cement and two parts sand. The Portland cement shall conform to the requirements of ASTM C150, Type I. The sand shall conform to the requirements of ASTM C144. Hydrated lime may be added to the mixture of sand and cement in an amount not to exceed 15% of the weight of cement used. The hydrated lime shall meet the requirements of ASTM C-206. The water shall be clean and free of deleterious amounts of acid, alkalies, or organic material. If the water is of questionable quality, it shall be tested in accordance with AASHTO T-26.

705-2.4 Elastomeric seals. Elastomeric seals shall conform to the requirements of ASTM F477.

705-2.5 Porous backfill. Porous backfill shall be free of clay, humus, or other objectionable matter, and shall conform to the gradation in Table 1 when tested in accordance with ASTM C136. Porous backfill shall be open graded crushed stone, washed of all fines, silt and dirt. Pea stone and crushed stone are not acceptable.

Table 1. Gradation of Porous Backfill

Sieve Designation (square openings)	Percentage by Weight Passing Sieves	
		Porous Material No. 2
1-1/2 inch (37.5 mm)		100
1 inch (25.0 mm)		90 - 100
3/8 inch (9.5 mm)		25 - 60
No. 4 (4.75 mm)		5 - 40

Sieve Designation (square openings)	Percentage by Weight Passing Sieves	
		Porous Material No. 2
No. 8 (2.36 mm)		0 - 20

When two courses of porous backfill are specified in the plans, the finer of the materials shall conform to particle size tabulated herein for porous material No. 1. The coarser granular material shall meet the gradation given in the tabulation for porous material No. 2.

705-2.6 Granular material. Granular material used for backfilling shall conform to the requirements of ASTM D2321 for Class IA, IB, or II materials.

705-2.7 Filter fabric. The filter fabric shall conform to the requirements of AASHTO M288 Class 2 or equivalent.

Table 2. Fabric Properties

Fabric Property	Test Method	Test Requirement
Grab Tensile Strength, lbs	ASTM D4632	125 min
Grab Tensile Elongation %	ASTM D4632	50 min
Burst Strength, psi	ASTM D3785	125 min
Trapezoid Tear Strength, lbs	ASTM D4533	55 min
Puncture Strength, lbs	ASTM D4833	40 min
Abrasion, lbs	ASTM D4886	15 max loss
Equivalent Opening Size	ASTM D4751	60
Permittivity sec^{-1}	ASTM D4491	0.20
Accelerated Weathering (UV Stability) (Strength Retained - %)	ASTM D4355 *(500 hrs exposure)	70

705-2.8 Controlled low-strength material (CLSM). CLSM is not used.

705-2.9 Cleanouts. Cleanouts shall be installed at the locations shown and in accordance with the details shown on the Contract Drawings.

705-2.10 Concrete. Concrete shall conform to the requirements of Item P-610, Structural Portland Cement Concrete.

705-2.11 Reinforcing steel. Reinforcing steel shall be deformed bars of new billet steel meeting the requirements of ASTM A 615, Grade 60. Reinforcing steel shall be hot dipped galvanized in accordance with ASTM A-123, or epoxy coated.

CONSTRUCTION METHODS

705-3.1 Equipment. All equipment required for the construction of pipe underdrains shall be on the project, in good working condition, and approved by the RPR before construction is permitted to start.

705-3.2 Excavation. Underdrains shall be installed after excavation to subgrade. Porous backfill around the underdrains shall be placed in lifts prior to placing the adjacent subbase and base materials. The Contractor is responsible for removal of water regardless of its source. Measures shall be taken to protect

the excavation from surface water runoff as well as for dewatering the excavation from any water which has entered the excavation. The cost of the removal of water shall be considered as a subsidiary obligation of the Contractor and included in the contract price for the pay items of work involved.

The Contractor shall do all necessary excavation to the depth shown on the Contract Drawings. The excavation shall be unclassified and shall be performed regardless of the material encountered. The cost of all excavation shall be included under the unit price bid per foot for the pipe.

The width of the pipe trench shall be sufficient to permit satisfactory jointing of the pipe and thorough tamping of the bedding material under and around the pipe, but shall not be less than the external diameter of the pipe plus 6 inches (150 mm) on each side of the pipe. The trench walls shall be approximately vertical.

Where rock, hardpan, or other unyielding material is encountered, it shall be removed below the foundation grade for a depth of at least 4 inches (100 mm). The excavation below grade shall be backfilled with selected fine compressible material, such as silty clay or loam, and lightly compacted in layers not over 6 inches (150 mm) in uncompacted depth to form a uniform but yielding foundation. The cost of furnishing and placing this material shall be included in the bid price per linear foot of pipe.

Where a firm foundation is not encountered at the grade established, due to soft, spongy, or other unstable soil, the unstable soil shall be removed and replaced with approved granular material for the full trench width. The RPR shall determine the depth of removal necessary. The granular material shall be compacted to provide adequate support for the pipe.

Excavated material not required or acceptable for backfill shall be disposed of by the Contractor as directed by the RPR. The excavation shall not be carried below the required depth; if this occurs, the trench shall be backfilled at the Contractor's expense with material approved by the RPR and compacted to the density of the surrounding material.

The pipe bedding shall be constructed uniformly over the full length of the pipe barrel, as required on the plans. The maximum aggregate size shall be 1 inch when the bedding thickness is less than 6 inches, and 1-1/2 inch when the bedding thickness is greater than 6 inches. Bedding shall be loosely placed, uncompacted material under the middle third of the pipe prior to placement of the pipe.

The Contractor shall do trench bracing, sheathing, or shoring necessary to perform and protect the excavation as required for safety and conformance to federal, state and local laws. Unless otherwise provided, the bracing, sheathing, or shoring shall be removed by the Contractor after the backfill has reached at least 12 inches (300 mm) over the top of the pipe. The sheathing or shoring shall be pulled as the granular backfill is placed and compacted to avoid any unfilled spaces between the trench wall and the backfill material. The cost of bracing, sheathing, or shoring, and the removal of same, shall be included in the unit price bid per foot (meter) for the pipe.

705-3.3 Laying and installing pipe.

a. Concrete pipe. Not used.

b. Metal pipe. Not used.

c. PVC, fiberglass, or polyethylene pipe. PVC or polyethylene pipe shall be installed in accordance with the requirements of ASTM D2321. Perforations shall meet the requirements of AASHTO M252 or AASHTO M294 Class 2, unless otherwise indicated on the plans. The pipe shall be laid accurately to line and grade. Fiberglass per ASTM D3839 Standard Guide for Underground Installation of "Fiberglass" (Glass-Fiber Reinforced Thermosetting-Resin) Pipe.

d. All types of pipe. The upgrade end of pipelines, not terminating in a structure, shall be plugged or capped as approved by the RPR.

Unless otherwise shown on the plans, a 4-inch (100 mm) bed of granular backfill material shall be spread in the bottom of the trench throughout the entire length under all perforated pipe underdrains.

Pipe outlets for the underdrains shall be constructed when required or shown on the plans. The pipe shall be laid with tight-fitting joints. Porous backfill is not required around or over pipe outlets for underdrains. All connections to other drainage pipes or structures shall be made as required and in a satisfactory manner. If connections are not made to other pipes or structures, the outlets shall be protected and constructed as shown on the plans.

e. Filter fabric. The filter fabric shall be installed in accordance with the manufacturer's recommendations, or in accordance with the AASHTO M288 Appendix, unless otherwise shown on the plans.

705-3.4 Mortar. The mortar shall be of the desired consistency for caulking and filling the joints of the pipe and for making connections to other pipes or to structures. Mortar that is not used within 45 minutes after water has been added shall be discarded. Retempering of mortar shall not be permitted.

705-3.5 Joints in concrete pipe. Not used.

705-3.6 Embedment and Backfill

a. Earth. All trenches and excavations shall be backfilled soon after the pipes are installed, unless additional protection of the pipe is directed. The embedment material shall be select material from excavation or borrow and shall be approved by the RPR. The select material shall be placed on each side of the pipe out to a distance of the nominal pipe diameter and one foot (30 cm) over the top of the pipe and shall be readily compacted. It shall not contain stones 3 inches (75 mm) or larger in size, frozen lumps, chunks of highly plastic clay, or any other material that is objectionable to the RPR. The material shall be moistened or dried, as required to aid compaction. Placement of the embedment material shall not cause displacement of the pipe. Thorough compaction under the haunches and along the sides to the top of the pipe shall be obtained.

The embedment material shall be placed in loose layers not exceeding 6 inches (150 mm) in depth under and around the pipe. Backfill material over the pipe shall be placed in lifts not exceeding 8 inches (200 mm). Successive layers shall be added and thoroughly compacted by hand and pneumatic tampers, approved by the RPR, until the trench is completely filled and brought to the planned elevation. Embedment and backfilling shall be done to avoid damaging top or side of the pipe.

In embankments and other unpaved areas, the backfill shall be compacted per Item P-152 to the density required for embankments in unpaved areas. Under paved areas, the subgrade and any backfill shall be compacted per Item P-152 to the density required for embankments for paved areas.

b. Granular backfill. When granular backfill is required, placement in the trench and about the pipe shall be as shown on the plans. The granular backfill shall not contain an excessive amount of foreign matter, nor shall soil from the sides of the trench or from the soil excavated from the trench be allowed to filter into the granular backfill. When required by the RPR, a template shall be used to properly place and separate the two sizes of backfill. The backfill shall be placed in loose layers not exceeding 6 inches (150 mm) in depth. The granular backfill shall be compacted by hand and pneumatic tampers to the requirements as given for embankment. Backfilling shall be done to avoid damaging top or side pressure on the pipe. The granular backfill shall extend to the elevation of the trench or as shown on the plans.

When perforated pipe is specified, granular backfill material shall be placed along the full length of the pipe. The position of the granular material shall be as shown on the plans. If the original material excavated from the trench is pervious and suitable, it shall be used in lieu of porous backfill No. 1.

If porous backfill is placed in paved or adjacent to paved areas before grading or subgrade operations is completed, the backfill material shall be placed immediately after laying the pipe. The depth of the granular backfill shall be not less than 12 inches (300 mm), measured from the top of the underdrain.

During subsequent construction operations, a minimum depth of 12 inches (300 mm) of backfill shall be maintained over the underdrains. When the underdrains are to be completed, any unsuitable material shall be removed exposing the porous backfill. Porous backfill containing objectionable material shall be removed and replaced with suitable material. The cost of removing and replacing any unsuitable material shall be at the Contractor's expense.

If a granular subbase blanket course is used which extends several feet beyond the edge of paving to the outside edge of the underdrain trench, the granular backfill material over the underdrains shall be placed in the trench up to an elevation of 2 inches (50 mm) above the bottom surface of the granular subbase blanket course. Immediately prior to the placing of the granular subbase blanket course, the Contractor shall blade this excess trench backfill from the top of the trench onto the adjacent subgrade where it can be incorporated into the granular subbase blanket course. Any unsuitable material that remains over the underdrain trench shall be removed and replaced. The subbase material shall be placed to provide clean contact between the subbase material and the underdrain granular backfill material for the full width of the underdrain trench.

c. Controlled low-strength material (CLSM). CLSM is not used.

705-3.7 Flexible Pipe Ring Deflection. The flexible pipe shall be inspected by the Contractor during and after installation to ensure that the internal diameter of the pipe barrel has not been reduced by more than 5 percent. For guidance on properly sizing mandrels, refer to ASTM D3034 and ASTM F679 appendices.

705-3.8 Connections. When the plans call for connections to existing or proposed pipe or structures, these connections shall be watertight and made to obtain a smooth uniform flow line throughout the drainage system.

705-3.9 Cleaning and restoration of site. After the backfill is completed, the Contractor shall dispose of all surplus material, soil, and rubbish from the site. Surplus soil may be deposited in embankments, shoulders, or as directed by the RPR. The Unsuitable material shall be disposed of off airport property, or as ordered by the Engineer.

Areas disturbed by the Contractor's operation shall be restored to their original condition. Restoration of surfaces shall be performed in accordance with the details of the Contract Drawings.

Where pipes are installed or removed outside of the general grading limits, or in areas that would not otherwise be disturbed, restoration shall be considered necessary and incidental to the work of this item and the costs shall be included in the associated pay items for pipe installation or pipe removal.

Where pipes are installed or removed within the general limits of excavation and embankment, restoration of the area will not be necessary as payment for turf or pavement will be included in the various pay items of work involved.

The Contractor shall be responsible for maintaining all disturbed surfaces and restorations until final acceptance.

705-3.10 Concrete underdrain outlet headwalls and terminations. Underdrain terminations shall be installed at the locations shown on the plans. Terminations shall be cast in place in accordance with the details shown on the plans.

705-3.11 Weeps. Weeps shall be constructed at locations determined by the Engineer during construction. Weeps shall consist of a trench, 12 inches wide by 12 inches deep, excavated in the subgrade for the purpose of draining undercut areas. The bottom of the trench shall be at the bottom of the undercut, and shall be excavated at a location that will allow the undercut area to drain. The weep shall extend from the undercut area to an underdrain. If there is no underdrain located adjacent to the edge of pavement, the weep shall be extended to daylight in a ditch or swale. The weep shall be lined with filter

fabric and filled with porous backfill No. 2. The weep shall be continuously sloped from the undercut area to its termination.

METHOD OF MEASUREMENT

705-4.1. The quantity of pipe underdrains shall be made at the contract unit price per linear foot completed, and approved; measured along the centerline of the pipe from end or inside face of structure to the end or inside face of structure, whichever is applicable, including porous backfill and filter fabric. The several classes, types, and sizes shall be measured separately. All fittings and structure connections shall be included in the footage as typical pipe sections in the pipeline being measured.

705-4.2 The number of cleanouts and headwalls shall be measured by each unit, complete and in place, in accordance with the plans.

BASIS OF PAYMENT

705-5.1 Payment for pipe underdrains shall be made at the contract unit price per linear foot complete (including porous backfill, filter fabric, fittings and connections).

705-5.2 Payment will be made at the contract unit price per each cleanout or headwall furnished and installed in place.

These prices shall be full compensation for furnishing all materials and for all preparation, excavation, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item D-705-1	6-inch Perforated Corrugated Polyethylene Drainage Pipe Underdrain, Smooth Interior, Under Pavement - per linear foot
Item D-705-2	6-inch Perforated Corrugated Polyethylene Drainage Pipe Underdrain, Smooth Interior, In Turf - per linear foot
Item D-705-3	Underdrain Cleanout or Headwall – per each
Item D-705-4	Removal of Underdrain Cleanout or Headwall - per each

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C144	Standard Specification for Aggregate for Masonry Mortar
ASTM C150	Standard Specification for Portland Cement
ASTM F477	Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
ASTM F758	Standard Specification for Smooth Wall Poly (Vinyl Chloride) (PVC) Plastic Underdrain Systems for Highway, Airport, and Similar Drainage

ASTM F794	Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe & Fittings Based on Controlled Inside Diameter
ASTM F949	Standard Specification for Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO M252	Standard Specification for Corrugated Polyethylene Drainage Pipe
AASHTO M288	Standard Specification for Geotextile Specification for Highway Applications
AASHTO M304	Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Wall Drain Pipe and Fittings Based on Controlled Inside Diameter
AASHTO	Standard Specifications for Highway Bridges

END OF ITEM D-705

Item D-707 Water Main (Ductile Iron Pipe)

DESCRIPTION

707-1.1 This item shall consist of ductile iron pipe, gate valves and hydrants of the class and size as shown on the Contract Drawings and installed in accordance with the details as shown on the Contract Drawings and as directed by the RPR. This item shall also include all associated excavation, backfilling, sheeting and bracing, concrete, reinforcing steel, testing, dewatering and restoration of surfaces to the satisfaction of the RPR. Unless otherwise provided for elsewhere, this item shall also include the removal, disposal, cutting, capping and sealing of waterline encountered on this project.

Prior to ordering any fittings which will be used on the existing water mains, the Contractor shall excavate the existing water main to determine the outside diameter of the pipe in order to determine the proper size couplings to be used.

The waterline shall be installed in accordance with these Specifications and with the lines and grades given.

MATERIALS

707-2.1 Ductile iron pipe. Refer to specification 331000.

707-2.2 Resilient seated gate valves. Refer to specification 331000.

707-2.3 Cast iron fittings. Refer to specification 331000.

707-2.4 Fire hydrants. Refer to specification 331000.

707-2.5 Concrete. Concrete shall conform to the requirements of Item P-610, Structural Portland Cement Concrete with the exception that the minimum compressive strength shall be 3000 psi at 28 days.

707-2.6 Reinforcing steel. Refer to specification 331000.

707-2.7 Heated water pipe RPZ and meter enclosure. Refer to specification 221119.

CONSTRUCTION METHODS

707-3.1 General. Refer to specifications 221119 and 331000.

707-3.2 Excavation. Refer to specification 331000.

707-3.3 Handling and installation. Refer to specifications 221119 and 331000.

707-3.4 Anchors and tie rods. Refer to specification 331000.

707-3.5 Sheeting and bracing. Refer to specification 331000.

707-3.6 Backfilling. Refer to specification 331000.

707-3.7 Pressure leakage test. Refer to specification 331000.

707-3.8 Chlorination. Refer to specification 331000.

707-3.9 Removal of water. Refer to specification 331000.

METHOD OF MEASUREMENT

707-4.1 Method of measurement shall be on a per linear foot basis for each size and type of pipe in place completed and approved. It shall be measured along the centerline of the pipe from end to face of valve or from end to face of hydrant valve. Measurement shall include the length of reducers, tapping sleeves and valves. Measurement for reducers shall be included in the length of the larger size pipe. Measurement of couplings and tees shall be included in the length of the associated pipe.

707-4.2 Gate valves will be measured as complete units for each size gate valve, complete and in place, including all piping, excavation, fittings, valves, bracing, tests, chlorination, backfill and appurtenances.

707-4.3 Fire hydrants will be measured as complete units for each hydrant and piping necessary to make the connection to its associated hydrant valve, complete and in place, including all excavation, fittings, bracing, tests, chlorination, backfill and appurtenances.

707-4.4 Heated water pipe RPZ and meter enclosures will be measured per each.

707-4.5 No measurement will be made for direct payment of sampling, disinfection and pressure testing of water pipe as the cost of completing shall be considered as a subsidiary obligation in the completion of the work.

BASIS OF PAYMENT

707-5.1 Payment will be made at the contract unit price per linear foot for each type, size and class of pipe installed. This price shall be full compensation for furnishing all materials and for all preparation excavation and installation of these materials and for all labor, equipment, tools and incidentals necessary to complete these items.

707-5.2 Payment will be made at the contract unit price for each size gate valve complete and in place. The price shall be full compensation for furnishing all materials and for all preparation and installation of these materials and for all labor, equipment, tools and incidentals necessary to complete the item.

707-5.3 Payment will be made at the contract unit price for each hydrant complete and in place. The price shall be full compensation for furnishing all materials and for all preparation and installation of these materials and for all labor, equipment, tools and incidentals necessary to complete the item.

707-5.4 Payment will be made at the contract unit price for each heater water pipe RPZ and meter enclosure complete and in place. The price shall be full compensation for furnishing all materials and for all preparation and installation of these materials and for all labor, equipment, tools and incidentals necessary to complete the item.

707-5.5 No payment will be made for direct payment of sampling, disinfection and pressure testing of water pipe as the cost of completing shall be considered as a subsidiary obligation in the completion of the work.

Payment will be made under:

Item D-707-1	8-inch Dia. Ductile Iron Water Pipe or Force Main, Class 52, - per linear foot
Item D-707-2	4-inch Dia. Ductile Iron Water Pipe, Class 52, - per linear foot
Item D-707-3	4 or 8-inch Dia. Ductile Iron Gate Valve - per each
Item D-707-4	Fire Hydrant - per each

Item D-707-5 Water Pipe RPZ and Meter in Heated Enclosure - per each

END OF ITEM D-707

Item D 711 Lining

DESCRIPTION

711-1.1 This item shall consist of a graded aggregate material to be used as a foundation under structures and for special backfill around structures, pipes and duct banks. Lining shall be placed in accordance with these Specifications and shall conform to the dimensions shown on the Contract Drawings and as established by the RPR.

MATERIALS

711-2.1 Lining material shall consist of clean, sound, durable particles of crushed ledgerock meeting the requirements of New York State Department of Transportation Standard Specifications, latest issue plus all revisions and addenda pertaining thereto, Section 304-2 Type 2 subbase course. P-209 Crushed Aggregate Base Course can be used as Lining.

CONSTRUCTION METHODS

711-3.1 Placing. Lining shall be placed in layers of uniform thickness. The maximum depth of a compacted layer shall be 6 inches unless otherwise directed by the RPR. In multi-layer construction, lining shall be placed in approximately equal-depth layers. The previously constructed layer should be cleaned of loose and foreign material prior to placing the next layer. The surface of the compacted material shall be kept moist until covered with the next layer.

711-3.2 Compaction. Immediately upon completion of the spreading operations, lining shall be thoroughly compacted to a density of 95% in accordance with ASTM D 1557, unless otherwise specified. The moisture content of the material during placing operations shall not be below nor more than 2 percentage points above the optimum moisture. The number, type, and weight of rollers shall be sufficient to compact the material to the required density.

METHOD OF MEASUREMENT

711-4.1 No measurement will be made for direct payment of lining as the cost of furnishing and installing shall be considered as a subsidiary obligation in the completion of the work.

BASIS OF PAYMENT

711-5.1 No payment will be made separately or directly for this item on any part of the work unless otherwise listed in the various pay items. All lining shall be considered a necessary and incidental part of the work and its cost shall be considered by the Contractor and included in the Contract price for the pay items of work involved.

END OF ITEM D-711

Item D-751 Manholes, Catch Basins, Inlets and Inspection Holes

DESCRIPTION

751-1.1 This item shall consist of construction of manholes, catch basins, inlets, and inspection holes, in accordance with these specifications, at the specified locations and conforming to the lines, grades, and dimensions shown on the plans or required by the RPR.

MATERIALS

751-2.1 Brick. The brick shall conform to the requirements of ASTM C32, Grade MS.

751-2.2 Mortar. Mortar shall consist of one-part Portland cement and two parts sand. The cement shall conform to the requirements of ASTM C150, Type I. The sand shall conform to the requirements of ASTM C144.

751-2.3 Concrete. Plain and reinforced concrete used in structures, connections of pipes with structures, and the support of structures or frames shall conform to the requirements of Item P-610.

751-2.4 Precast concrete pipe manhole rings. Precast concrete pipe manhole rings shall conform to the requirements of ASTM C478. Unless otherwise specified, the risers and offset cone sections shall have an inside diameter of not less than 36 inches (90 cm) nor more than 48 inches (120 cm). There shall be a gasket between individual sections and sections cemented together with mortar on the inside of the manhole. Gaskets shall conform to the requirements of ASTM C443.

751-2.5 Corrugated metal. Not used.

751-2.6 Frames, covers, and grates. Frame and covers shall be airport extra heavy duty rated. The castings shall conform to one of the following requirements:

a. ASTM A48, Class 35B: Gray iron castings

b. ASTM A47: Malleable iron castings

c. ASTM A27: Steel castings

d. ASTM A283, Grade D: Structural steel for grates and frames

e. ASTM A536, Grade 65-45-12: Ductile iron castings

f. ASTM A897: Austempered ductile iron castings

All castings or structural steel units shall conform to the dimensions shown on the plans and shall be designed to support the loadings, aircraft gear configuration and/or direct loading, specified.

Each frame and cover or grate unit shall be provided with fastening members to prevent it from being dislodged by traffic but which will allow easy removal for access to the structure.

All castings shall be thoroughly cleaned. After fabrication, structural steel units shall be galvanized to meet the requirements of ASTM A123.

751-2.7 Steps. The steps or ladder bars shall be gray or malleable cast iron or galvanized steel. The steps shall be the size, length, and shape shown on the plans and those steps that are not galvanized shall be given a coat of asphalt paint, when directed.

751-2.8 Precast concrete structures. Provide precast concrete structures where shown on the plans. Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another engineer approved third party certification program and shall be manufactured in accordance with and conforming to ASTM C913 and ASTM C478. Structures shall be pre-cast and designed to withstand aircraft loads as shown on the plans. The shop drawings shall have all reinforcement shown and must be accompanied by strength design calculations prepared and stamped by a Licensed Professional Engineer in NYS. Signed and sealed shop drawings, design calculations, and other information requested by the RPR shall be submitted by the Contractor to allow for a full evaluation by the RPR. The RPR shall review per the process defined in the General Provisions.

Precast structures shall have bitumastic sealer placed between all joints to make them watertight. Openings or knockouts shall be provided in the structure as detailed on the plans. Precast structures with multiple sections shall have bitumastic sealer placed between all joints to make them watertight. Threaded inserts and pulling eyes shall be cast in as shown on the plans.

751-2.9 Cast-in-place concrete structures. Provide cast-in-place concrete structures where shown on the plans. Cast-in-place concrete structures shall conform to the details and dimensions shown on the plans. Openings or knockouts shall be provided in the structure as detailed on the plans. Reinforcing steel shall be deformed bars of new billet steel meeting the requirements of ASTM A 615, Grade 60. Reinforcing steel shall be hot dipped galvanized in accordance with ASTM A-123, or epoxy coated.

751-2.10 Glycol Pipe Air Release Valve. Refer to specification 333123.

751-2.11 Pump Station Pumps, Controls and all Appurtenances. Refer to specification 333211.

751-2.12 Valve Pit Valves and all Appurtenances. Refer to specification 331419.

CONSTRUCTION METHODS

751-3.1 Unclassified excavation.

a. The Contractor shall excavate for structures and footings to the lines and grades or elevations, shown on the plans, or as staked by the RPR. The excavation shall be of sufficient size to permit the placing of the full width and length of the structure or structure footings shown. The elevations of the bottoms of footings, as shown on the plans, shall be considered as approximately only; and the RPR may direct, in writing, changes in dimensions or elevations of footings necessary for a satisfactory foundation.

b. Boulders, logs, or any other objectionable material encountered in excavation shall be removed. All rock or other hard foundation material shall be cleaned of all loose material and cut to a firm surface either level, stepped, or serrated, as directed by the RPR. All seams or crevices shall be cleaned out and grouted. All loose and disintegrated rock and thin strata shall be removed. Where concrete will rest on a surface other than rock, the bottom of the excavation shall not be disturbed and excavation to final grade shall not be made until immediately before the concrete or reinforcing is placed.

c. The Contractor shall do all bracing, sheathing, or shoring necessary to implement and protect the excavation and the structure as required for safety or conformance to governing laws. The cost of bracing, sheathing, or shoring shall be included in the unit price bid for the structure.

d. All bracing, sheathing, or shoring involved in the construction of this item shall be removed by the Contractor after the completion of the structure. Removal shall not disturb or damage finished masonry. The bracing, sheeting or shoring shall not be removed in one operation, but shall be done in successive stages as determined by the RPR to prevent overloading of the structure during backfilling operations. That portion of the sheeting extending below the top of the structure bed shall be withdrawn, unless otherwise directed, before more than six inches of backfill material is placed and before any bracing is removed. Voids left by the sheeting shall be carefully refilled with selected material and rammed tight

with tools especially adapted for the purpose, or otherwise as may be approved. The RPR may order the Contractor to delay the removal of sheeting and bracing, if, in his judgement, the installed work has not attained the necessary strength to permit placing of backfill. The cost of removal shall be included in the unit price bid for the structure.

e. After excavation is completed for each structure, the Contractor shall notify the RPR. No concrete or reinforcing steel shall be placed until the RPR has approved the depth of the excavation and the character of the foundation material.

f. Where structures are to be connected to existing pipes, Contractor shall maintain flow in the sewer system. This work shall be accomplished by pumping around the structure, pumping aboveground from upstream structure to downstream structure, or by other methods acceptable to the Engineer. Contractor shall make pipe connections using materials matching the existing pipes. Connections to existing pipes shall be watertight and made so that a smooth uniform flow line will be obtained throughout the drainage system.

g. The Contractor is responsible for removal of water regardless of its source. Measures shall be taken to protect the excavation from surface water runoff as well as for dewatering the excavation from any water which has entered the excavation. The cost for removal of water shall be considered a subsidiary obligation of the Contractor and included in the contract price for the pay items of work involved.

751-3.2 Brick structures. Section not used.

751-3.3 Concrete structures. Concrete structures which are to be cast-in-place within the project boundaries shall be built on prepared foundations, conforming to the dimensions and shape indicated on the plans. Bedding below the concrete structure shall be compacted to 95% maximum density for non-cohesive soils and 90% maximum density for cohesive soils in accordance with ASTM D 1557. The construction shall conform to the requirements specified in Item P-610. Any reinforcement required shall be placed as indicated on the plans and shall be approved by the RPR before the concrete is placed.

All invert channels shall be constructed and shaped accurately to be smooth, uniform, and cause minimum resistance to flowing water. The interior bottom shall be sloped to the outlet.

751-3.4 Precast concrete structures. Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another RPR approved third party certification program.

Precast concrete structures shall conform to ASTM C478. Precast concrete structures shall be constructed on prepared or previously placed slab foundations conforming to the dimensions and locations shown on the plans. All precast concrete sections necessary to build a completed structure shall be furnished. The different sections shall fit together readily. Joints between precast concrete risers and tops shall be full-bedded in cement mortar and shall: (1) be smoothed to a uniform surface on both interior and exterior of the structure or (2) utilize a rubber gasket per ASTM C443. The top of the upper precast concrete section shall be suitably formed and dimensioned to receive the metal frame and cover or grate, or other cap, as required. Provision shall be made for any connections for lateral pipe, including drops and leads that may be installed in the structure. The flow lines shall be smooth, uniform, and cause minimum resistance to flow. The metal or metal encapsulated steps that are embedded or built into the side walls shall be aligned and placed in accordance to ASTM C478. When a metal ladder replaces the steps, it shall be securely fastened into position.

751-3.5 Corrugated metal structures. Not used.

751-3.6 Inlet and outlet pipes. Inlet and outlet pipes shall extend through the walls of the structures a sufficient distance beyond the outside surface to allow for connections. They shall be cut off flush with the wall on the inside surface of the structure, unless otherwise directed. For concrete or brick structures, mortar shall be placed around these pipes to form a tight, neat connection.

751-3.7 Placement and treatment of castings, frames, and fittings. All castings, frames, and fittings shall be placed in the positions indicated on the plans or as directed by the RPR, and shall be set true to line and elevation. If frames or fittings are to be set in concrete or cement mortar, all anchors or bolts shall be in place before the concrete or mortar is placed. The unit shall not be disturbed until the mortar or concrete has set.

When frames or fittings are placed on previously constructed masonry, the bearing surface of the masonry shall be brought true to line and grade and shall present an even bearing surface so the entire face or back of the unit will come in contact with the masonry. The unit shall be set in mortar beds and anchored to the masonry as indicated on the plans or as directed by the RPR. All units shall set firm and secure.

After the frames or fittings have been set in final position, the concrete or mortar shall be allowed to harden for seven (7) days before the grates or covers are placed and fastened down.

751-3.8 Installation of steps. The steps shall be installed as indicated on the plans or as directed by the RPR. When the steps are to be set in concrete, they shall be placed and secured in position before the concrete is placed. When the steps are installed in brick masonry, they shall be placed as the masonry is being built. The steps shall not be disturbed or used until the concrete or mortar has hardened for at least seven (7) days. After seven (7) days, the steps shall be cleaned and painted, unless they have been galvanized. When steps are required with precast concrete structures they shall meet the requirements of ASTM C478. The steps shall be cast into the side of the sections at the time the sections are manufactured or set in place after the structure is erected by drilling holes in the concrete and cementing the steps in place.

When steps are required with corrugated metal structures, they shall be welded into aligned position at a vertical spacing of 12 inches (300 mm).

Instead of steps, prefabricated ladders may be installed. For brick or concrete structures, the ladder shall be held in place by grouting the supports in drilled holes. For metal structures, the ladder shall be secured by welding the top support to the structure and grouting the bottom support into drilled holes in the foundation or as directed by the RPR.

751-3.9 Backfilling.

a. After a structure has been completed, the area around it shall be backfilled with approved material, in horizontal layers not to exceed 8 inches (200 mm) in loose depth, and compacted to the density required in Item P-152. Each layer shall be deposited evenly around the structure to approximately the same elevation. The top of the fill shall meet the elevation shown on the plans or as directed by the RPR.

b. Backfill shall not be placed against any structure until approved by the RPR. For concrete structures, approval shall not be given until the concrete has been in place seven (7) days, or until tests establish that the concrete has attained sufficient strength to withstand any pressure created by the backfill and placing methods.

c. Backfill shall not be measured for direct payment. Performance of this work shall be considered an obligation of the Contractor covered under the contract unit price for the structure involved.

751-3.10 Cleaning and restoration of site. After the backfill is completed, the Contractor shall dispose of all surplus material, dirt, and rubbish from the site. Surplus dirt may be deposited in embankments, shoulders, or as approved by the RPR. The Contractor shall restore all disturbed areas to their original condition. The Contractor shall remove all tools and equipment, leaving the entire site free, clear, and in good condition. Where no other work or soil disturbance is required, restoration shall be considered incidental to the respective D-751 pay item.

Manholes and catch basins in proposed turf areas shall be restored in accordance with the topsoil, seeding and mulching specifications of this contract. Topsoil, seeding and mulching will be paid for at the contract unit price for the pay items involved. All other work associated with restoration shall be

considered a subsidiary and incidental part of the completion of this item and as such, the Contractor shall include the costs associated with restoration in the various pay items involved.

Manholes and catch basins in areas of proposed pavement such as aprons, taxiways, runways, shoulders, roads, sidewalks, or other similar stabilized surfaces shall be restored using the materials specified or as shown on the plans. Payment for restoration up to the bottom of the proposed pavement section shall be considered a subsidiary and incidental part of the completion of this item and as such, the Contractor shall include all costs associated with restoration in the various pay items involved.

After all work is completed, the Contractor shall remove all tools and equipment, leaving the entire site free, clear, and in good condition.

751-3.11 Inspection. Prior to final approval, each structure shall be thoroughly inspected for conformance with the plans and this specification. Any indication of defects in materials or workmanship or obstruction to flow in the structure or pipe system shall be further investigated and corrected. Defects shall be corrected by the Contractor as directed by the Engineer, and without additional compensation.

751-3.12 Modification of existing structures. The Contractor shall modify structures at locations designated on the plans to the new elevations shown. The Contractor shall be responsible for determining the exact height adjustment required to raise the top of each structure to the new elevations. The existing top elevation of each structure to be adjusted shall be determined in the field and subtracted/added from the proposed top elevation. Extensions provided for structure modification shall meet the strength requirements of Section 2.8 above. Modification of existing structures shall be performed in accordance with details shown on the plans.

751-3.13 Removal of existing structures and septic tanks. Existing structures shall be removed at the locations shown on the plans and as directed by the Engineer. The cost of such removal shall include excavation, removal, backfilling, disposal of existing structures and restoration. Backfill shall be with suitable on-site material unless otherwise shown or specified. Backfill under paved areas shall be as shown on the plans. Excess material is to be disposed of on site at the spoil area.

METHOD OF MEASUREMENT

751-4.1 Manholes, catch basins, inlets, inspection holes, drywells, modification of structures, removal of existing structures and removal of sanitary sewer septic tanks, leach field and all appurtenances shall be measured by each unit completed and accepted including all required excavation, dewatering, sheeting & bracing, backfill, restoration, and connections.

751.4.2 Stormwater channel drains shall be measured by linear foot.

BASIS OF PAYMENT

751-5.1 The accepted quantities of manholes, catch basins, inlets, inspection holes, drywells, modification of structures, removal of existing structures and removal of sanitary sewer septic tanks, leach field and all appurtenances will be paid for at the contract unit price per each in place when completed. This price shall be full compensation for furnishing all materials and for all preparation, excavation, backfilling and placing of the materials; furnishing and installation of such specials and connections to pipes and other structures as may be required to complete the item as shown on the plans; and for all labor equipment, tools and incidentals necessary to complete the structure.

751-5.2 Stormwater channel drains will be paid for at the contract unit price per linear foot. This price shall be full compensation for furnishing all materials and for all labor equipment, tools and incidentals necessary to complete.

Payment will be made under:

Item D-751-1	Stormwater Catch Basin or Manhole - per each
Item D-751-2	Stormwater Valve Pit Structure, Valves and all Appurtenances - per each
Item D-751-3	Stormwater Pump Station Structure, Pumps, Controls and all Appurtenances - per each
Item D-751-4	Drainage Manhole with Glycol Pipe Air Release Valve, Check Valve and All Appurtenances – per each
Item D-751-5	Drainage Manhole with Two (2) Check Valves and All Appurtenances – per each
Item D-751-6	Stormwater Channel Drain - per linear foot
Item D-751-7	Modification of Stormwater Drainage Structure - per each
Item D-751-8	Removal of Sanitary Sewer Septic Tank, Leach Field and all Appurtenances - per each
Item D-751-9	Removal of Existing Drainage Structure, all Types and Sizes - per each

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM A27	Standard Specification for Steel Castings, Carbon, for General Application
ASTM A47	Standard Specification for Ferritic Malleable Iron Castings
ASTM A48	Standard Specification for Gray Iron Castings
ASTM A123	Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A283	Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates
ASTM A536	Standard Specification for Ductile Iron Castings
ASTM A897	Standard Specification for Austempered Ductile Iron Castings
ASTM C32	Standard Specification for Sewer and Manhole Brick (Made from Clay or Shale)
ASTM C144	Standard Specification for Aggregate for Masonry Mortar
ASTM C150	Standard Specification for Portland Cement
ASTM C443	Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
ASTM C478	Standard Specification for Precast Reinforced Concrete Manhole Sections

ASTM C913	Standard Specification for Precast Concrete Water and Wastewater Structures.

END OF ITEM D-751

Item T-901 Seeding

DESCRIPTION

901-1.1 This item shall consist of soil preparation, seeding, fertilizing and liming the areas shown on the plans or as directed by the RPR in accordance with these specifications.

MATERIALS

901-2.1 Seed. The species and application rates of grass, legume, and cover-crop seed furnished shall be those stipulated herein. Seed shall conform to the requirements of Federal Specification JJJ-S-181, Federal Specification, Seeds, Agricultural.

Seed shall be furnished separately or in mixtures in standard containers labeled in conformance with the Agricultural Marketing Service (AMS) Seed Act and applicable state seed laws with the seed name, lot number, net weight, percentages of purity and of germination and hard seed, and percentage of maximum weed seed content clearly marked for each kind of seed. The Contractor shall furnish the RPR duplicate signed copies of a statement by the vendor certifying that each lot of seed has been tested by a recognized laboratory for seed testing within six (6) months of date of delivery. This statement shall include: name and address of laboratory, date of test, lot number for each kind of seed, and the results of tests as to name, percentages of purity and of germination, and percentage of weed content for each kind of seed furnished, and, in case of a mixture, the proportions of each kind of seed. Wet, moldy, or otherwise damaged seed will be rejected.

Seeds shall be applied as follows:

Seed Properties and Rate of Application

Percent By Weight	Variety	Percent Purity	Percent Germination
45	Kentucky Blue Grass	90	80
15	Perennial Rye Grass	95	85
20	Tall Fescue	95	80
20	Fine Fescues[1]	95	80

[1] Fine fescues include creeping red fescue, chewings fescue, hard fescue, and sheep fescue.

NOTE: Alternative seed mixtures will be considered if they have proven growth success in the airport's climate.

Seeding shall be performed during the period between May and September inclusive, unless otherwise approved by the RPR.

901-2.2 Lime. Lime shall be ground limestone containing not less than 85% of total carbonates, and shall be ground to such fineness that 90% will pass through a No. 20 (850 µm) mesh sieve and 50% will pass through a No. 100 (150 µm) mesh sieve. Coarser material will be acceptable, providing the rates of application are increased to provide not less than the minimum quantities and depth specified in the special provisions on the basis of the two sieve requirements above. Dolomitic lime or a high magnesium lime shall contain at least 10% of magnesium oxide. Lime shall be applied at the rate necessary to obtain

the soil pH range specified in Item T-905. All liming materials shall conform to the requirements of ASTM C602.

901-2.3 Fertilizer. Fertilizer shall be standard commercial fertilizers supplied separately or in mixtures containing the percentages of total nitrogen, available phosphoric acid, and water-soluble potash. They shall be applied at the rate and to the depth specified, and shall meet the requirements of applicable state laws. They shall be furnished in standard containers with name, weight, and guaranteed analysis of contents clearly marked thereon. No cyanamide compounds or hydrated lime shall be permitted in mixed fertilizers.

The fertilizers may be supplied in one of the following forms:

a. A dry, free-flowing fertilizer suitable for application by a common fertilizer spreader;

b. A finely-ground fertilizer soluble in water, suitable for application by power sprayers; or

c. A granular or pellet form suitable for application by blower equipment.

Fertilizers shall be commercial fertilizer and shall be spread at the rate of 20 pounds per 1,000 square feet. Fertilizers shall contain the following compounds by weight:

Nitrogen	10%
Phosphorous	0%[1]
Potash	4%

[1] Fertilizers which contain up to 0.67% phosphorous are allowed

901-2.4 Soil for repairs. The soil for fill and topsoiling of areas to be repaired shall be at least of equal quality to that which exists in areas adjacent to the area to be repaired. The soil shall be relatively free from large stones, roots, stumps, or other materials that will interfere with subsequent sowing of seed, compacting, and establishing turf, and shall be approved by the RPR before being placed.

CONSTRUCTION METHODS

901-3.1 Advance preparation and cleanup. After grading of areas has been completed and before applying fertilizer and ground limestone, areas to be seeded shall be raked or otherwise cleared of stones larger than 2 inches in any diameter, sticks, stumps, and other debris that might interfere with sowing of seed, growth of grasses, or subsequent maintenance of grass-covered areas. If any damage by erosion or other causes has occurred after the completion of grading and before beginning the application of fertilizer and ground limestone, the Contractor shall repair such damage include filling gullies, smoothing irregularities, and repairing other incidental damage.

An area to be seeded shall be considered a satisfactory seedbed without additional treatment if it has recently been thoroughly loosened and worked to a depth of not less than 5 inches (125 mm) as a result of grading operations and, if immediately prior to seeding, the top 3 inches (75 mm) of soil is loose, friable, reasonably free from large clods, rocks, large roots, or other undesirable matter, and if shaped to the required grade.

When the area to be seeded is sparsely sodded, weedy, barren and unworked, or packed and hard, any grass and weeds shall first be cut or otherwise satisfactorily disposed of, and the soil then scarified or otherwise loosened to a depth not less than 5 inches (125 mm). Clods shall be broken and the top 3 inches (75 mm) of soil shall be worked into a satisfactory seedbed by discing, or by use of cultipackers, rollers, drags, harrows, or other appropriate means.

901-3.2 Dry application method. Not used.

901-3.3 Wet application method.

a. General. The Contractor may elect to apply seed and fertilizer (and lime, if required) by spraying them on the previously prepared seedbed in the form of an aqueous mixture and by using the methods and equipment described herein. The rates of application shall be as specified in the special provisions.

b. Spraying equipment. The spraying equipment shall have a container or water tank equipped with a liquid level gauge calibrated to read in increments not larger than 50 gallons (190 liters) over the entire range of the tank capacity, mounted so as to be visible to the nozzle operator. The container or tank shall also be equipped with a mechanical power-driven agitator capable of keeping all the solids in the mixture in complete suspension at all times until used.

The unit shall also be equipped with a pressure pump capable of delivering 100 gallons (380 liters) per minute at a pressure of 100 lb / sq inches (690 kPa). The pump shall be mounted in a line that will recirculate the mixture through the tank whenever it is not being sprayed from the nozzle. All pump passages and pipe lines shall be capable of providing clearance for 5/8 inch (16 mm) solids. The power unit for the pump and agitator shall have controls mounted so as to be accessible to the nozzle operator. There shall be an indicating pressure gauge connected and mounted immediately at the back of the nozzle.

The nozzle pipe shall be mounted on an elevated supporting stand in such a manner that it can be rotated through 360 degrees horizontally and inclined vertically from at least 20 degrees below to at least 60 degrees above the horizontal. There shall be a quick-acting, three-way control valve connecting the recirculating line to the nozzle pipe and mounted so that the nozzle operator can control and regulate the amount of flow of mixture delivered to the nozzle. At least three different types of nozzles shall be supplied so that mixtures may be properly sprayed over distance varying from 20 to 100 feet (6 to 30 m). One shall be a close-range ribbon nozzle, one a medium-range ribbon nozzle, and one a long-range jet nozzle. For case of removal and cleaning, all nozzles shall be connected to the nozzle pipe by means of quick-release couplings.

In order to reach areas inaccessible to the regular equipment, an extension hose at least 50 feet (15 m) in length shall be provided to which the nozzles may be connected.

c. Mixtures. Lime, if required, shall be applied separately, in the quantity specified, prior to the fertilizing and seeding operations. Not more than 220 pounds (100 kg) of lime shall be added to and mixed with each 100 gallons (380 liters) of water. Seed and fertilizer shall be mixed together in the relative proportions specified, but not more than a total of 220 pounds (100 kg) of these combined solids shall be added to and mixed with each 100 gallons (380 liters) of water.

All water used shall be obtained from fresh water sources and shall be free from injurious chemicals and other toxic substances harmful to plant life. The Contractor shall identify to the RPR all sources of water at least two (2) weeks prior to use. The RPR may take samples of the water at the source or from the tank at any time and have a laboratory test the samples for chemical and saline content. The Contractor shall not use any water from any source that is disapproved by the RPR following such tests.

All mixtures shall be constantly agitated from the time they are mixed until they are finally applied to the seedbed. All such mixtures shall be used within two (2) hours from the time they were mixed or they shall be wasted and disposed of at approved locations.

d. Spraying. Lime, if required, shall be sprayed only upon previously prepared seedbeds. After the applied lime mixture has dried, the lime shall be worked into the top 3 inches (75 mm), after which the seedbed shall again be properly graded and dressed to a smooth finish.

Mixtures of seed and fertilizer shall only be sprayed upon previously prepared seedbeds on which the lime, if required, shall already have been worked in. The mixtures shall be applied by means of a high-

pressure spray that shall always be directed upward into the air so that the mixtures will fall to the ground like rain in a uniform spray. Nozzles or sprays shall never be directed toward the ground in such a manner as might produce erosion or runoff.

Particular care shall be exercised to ensure that the application is made uniformly and at the prescribed rate and to guard against misses and overlapped areas. Proper predetermined quantities of the mixture in accordance with specifications shall be used to cover specified sections of known area.

Checks on the rate and uniformity of application may be made by observing the degree of wetting of the ground or by distributing test sheets of paper or pans over the area at intervals and observing the quantity of material deposited thereon.

On surfaces that are to be mulched as indicated by the plans or designated by the RPR, seed and fertilizer applied by the spray method need not be raked into the soil or rolled. However, on surfaces on which mulch is not to be used, the raking and rolling operations will be required after the soil has dried.

901-3.4 Maintenance of seeded areas. The Contractor shall protect seeded areas against traffic or other use by warning signs or barricades, as approved by the RPR. Surfaces gullied or otherwise damaged following seeding shall be repaired by regrading and reseeding as directed. The Contractor shall mow, water as directed, and otherwise maintain seeded areas in a satisfactory condition until final inspection and acceptance of the work.

When either the dry or wet application method outlined above is used for work done out of season, it will be required that the Contractor establish a good stand of grass of uniform color and density to the satisfaction of the RPR. A grass stand shall be considered adequate when bare spots are one square foot (0.01 sq m) or less, randomly dispersed, and do not exceed 3% of the area seeded.

METHOD OF MEASUREMENT

901-4.1 The quantity of seeding to be paid for shall be the number of units of square yards measured on the ground surface, completed and accepted.

BASIS OF PAYMENT

901-5.1 Payment shall be made at the contract unit price per square yards or fraction thereof, which price and payment shall be full compensation for furnishing and placing all material and for all labor, equipment, tools, and incidentals necessary to complete the work prescribed in this item.

Payment will be made under:

Item 901-1	Seeding, Wet Applied - per square yard

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C602	Standard Specification for Agricultural Liming Materials

Federal Specifications (FED SPEC)

FED SPEC	JJJ-S-181, Federal Specification, Seeds, Agricultural

Advisory Circulars (AC)

AC 150/5200-33 Hazardous Wildlife Attractants on or Near Airports

FAA/United States Department of Agriculture

Wildlife Hazard Management at Airports, A Manual for Airport Personnel

END OF ITEM T-901

Item T-905 Topsoil

DESCRIPTION

905-1.1 This item shall consist of preparing the ground surface for topsoil application, removing topsoil from designated stockpiles or areas to be stripped on the site or from approved sources off the site, and placing and spreading the topsoil on prepared areas in accordance with this specification at the locations shown on the plans or as directed by the RPR.

MATERIALS

905-2.1 Topsoil. Topsoil shall be the surface layer of soil with no admixture of refuse or any material toxic to plant growth, and it shall be reasonably free from subsoil and stumps, roots, brush, stones 1 inch or more in diameter), and clay lumps or similar objects. **Topsoil shall be screened prior to placement.** Brush and other vegetation that will not be incorporated with the soil during handling operations shall be cut and removed. Ordinary sod and herbaceous growth such as grass and weeds are not to be removed, but shall be thoroughly broken up and intermixed with the soil during handling operations. Heavy sod or other cover, which cannot be incorporated into the topsoil by discing or other means, shall be removed.

The topsoil or soil mixture, unless otherwise specified or approved, shall have a pH range of approximately 5.5 pH to 7.6 pH, when tested in accordance with the methods of testing of the Association of Official Agricultural Chemists in effect on the date of invitation of bids. The organic content shall be not less than 3% nor more than 20% as determined by the loss on ignition or dry combustion method in accordance with ASTM D2974. There shall be not less than 20% nor more than 80% of the material passing the 200 mesh (75 μm) sieve as determined by the wash test in accordance with ASTM C117.

Natural topsoil may be amended by the Contractor with approved materials and methods to meet the above specifications.

905-2.2 Inspection and tests. Within 10 days following acceptance of the bid, the RPR shall be notified of the source of topsoil to be furnished by the Contractor. The topsoil shall be inspected to determine if the selected soil meets the requirements specified and to determine the depth to which stripping will be permitted. At this time, the Contractor may be required to take representative soil samples from several locations within the area under consideration and to the proposed stripping depths, for testing purposes as specified in paragraph 905-2.1.

CONSTRUCTION METHODS

905-3.1 General. Areas to be topsoiled shall be shown on the plans. If topsoil is available on the site, the location of the existing stockpiles or areas to be stripped of topsoil and the stripping depths shall be shown on the plans.

Suitable equipment necessary for proper preparation and treatment of the ground surface, stripping of topsoil, and for the handling and placing of all required materials shall be on hand, in good condition, and approved by the RPR before the various operations are started.

905-3.2 Preparing the ground surface. Immediately prior to dumping and spreading the topsoil on any area, the surface shall be loosened by discs or spike-tooth harrows, or by other means approved by the

RPR, to a minimum depth of 2 inches (50 mm) to facilitate bonding of the topsoil to the covered subgrade soil. The surface of the area to be topsoiled shall be cleared of all stones larger than 2 inches (50 mm) in any diameter and all litter or other material which may be detrimental to proper bonding, the rise of capillary moisture, or the proper growth of the desired planting. Limited areas, as shown on the plans, which are too compact to respond to these operations shall receive special scarification.

Grades on the area to be topsoiled, which have been established by others as shown on the plans, shall be maintained in a true and even condition. Where grades have not been established, the areas shall be smooth-graded and the surface left at the prescribed grades in an even and compacted condition to prevent the formation of low places or pockets where water will stand.

905-3.3 Obtaining topsoil. Prior to the stripping of topsoil from designated areas, any vegetation, briars, stumps and large roots, rubbish or stones found on such areas, which may interfere with subsequent operations, shall be removed using methods approved by the RPR. Heavy sod or other cover, which cannot be incorporated into the topsoil by discing or other means shall be removed.

When suitable topsoil is available on the site, the Contractor shall remove this material from the designated areas and to the depth as directed by the RPR. The topsoil shall be spread on areas already tilled and smooth-graded, or stockpiled in areas approved by the RPR. Any topsoil stockpiled by the Contractor shall be rehandled and placed without additional compensation. Any topsoil stockpiled by the Contractor that is required for topsoil purposes, shall be removed from the stockpile and placed by the Contractor. The sites of all stockpiles and areas adjacent thereto which have been disturbed by the Contractor shall be graded if required and put into a condition acceptable for seeding.

After all topsoil operations are complete, excess topsoil which has been stockpiled by the Contractor shall be spoiled on-site at a location selected by the Owner. No direct payment will be made for spoiling operations. The cost of spoiling material on-site shall be considered incidental to this Contract and the costs shall be included in the various pay items involved.

905-3.4 Placing topsoil. The topsoil shall be evenly spread on the prepared areas to the uniform depth shown on the plans or stated in the special provisions after compaction. Spreading shall not be done when the ground or topsoil is frozen, excessively wet, or otherwise in a condition detrimental to the work. Spreading shall be carried on so that turfing operations can proceed with a minimum of soil preparation or tilling.

After spreading, any large, stiff clods and hard lumps shall be broken with a pulverizer or by other effective means, and all stones or rocks 1 inch or more in diameter), roots, litter, or any foreign matter shall be raked up and disposed of by the Contractor. after spreading is completed, the topsoil shall be satisfactorily compacted by rolling with a cultipacker or by other means approved by the RPR. The compacted topsoil surface shall conform to the required lines, grades, and cross-sections. Any topsoil or other dirt falling upon pavements as a result of hauling or handling of topsoil shall be promptly removed.

905-3.5 Spoil. All excess topsoil material shall be disposed of on airport property, and shall be stockpiled at the locations shown on the plans.

No direct payment will be made for spoiling operations. The cost of spoiling material shall be considered incidental to this Contract and the costs shall be included in the various pay items involved. Refer to specification C-106 Safety, Security and Maintenance of Traffic for additional information.

METHOD OF MEASUREMENT

905-4.1 Topsoil obtained on the site shall be measured by the number of cubic yards of topsoil measured in its final position. Topsoil shall be measured by volume in cubic yards computed by the method of end areas.

BASIS OF PAYMENT

905-5.1 Payment will be made at the contract unit price per cubic yard for topsoil (Furnished from on site, stripping operations). This price shall be full compensation for furnishing all materials and for all preparation, placing, and spreading of the materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item T-905-1	Topsoil (Furnished from on site stripping operations) - per cubic yard

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C117	Materials Finer than 75 μm (No. 200) Sieve in Mineral Aggregates by Washing

Advisory Circulars (AC)

AC 150/5200-33	Hazardous Wildlife Attractants on or Near Airports

FAA/United States Department of Agriculture

Wildlife Hazard Management at Airports, A Manual for Airport Personnel

END OF ITEM T-905

Item T-908 Mulching

DESCRIPTION

908-1.1 This item shall consist of furnishing, hauling, placing, and securing mulch on surfaces indicated on the plans or designated by the RPR. Hydro-seeding and related operations, including liming and fertilizing, shall be performed in all areas outside the limits of the pavement where existing growth has been covered or removed or disturbed by stripping, grading, ditching or other construction operations as shown on the Plans or as directed by the Engineer in accordance with these Specifications.

MATERIALS

908-2.1 Mulch material. Mulching shall be wood fiber processed so that the fibers will remain in uniform suspension in water under agitation and will blend with grass seed, fertilizer and other additives to form a homogenous slurry. It shall have the characteristics which, upon hydraulic application, shall form a blotter-like ground coating with moisture absorption and percolation properties and the ability to cover and hold grass seed in intimate contact with the soil.

Wood fiber shall contain no growth or germination inhibiting factors, and shall be dyed green. Wood fibers shall be supplied in the manufacturer's standard containers weighing not over 100 pounds each, with the name of the material, net weight of contents, the manufacturer's name and the air dry weight of fiber (equivalent to 10% moisture) appearing on each container.

Mulching shall have the following properties:

1.	Percent Moisture Content:	10%
2.	Percent Organic Matter (Wood Fiber):	99.2%
3.	Percent Ash Content:	0.8%
4.	pH:	4.8
5.	Water Holding Capacity:	2.2 lbs. water (min.)/0.22 lbs. fiber

Hay and other loose materials are not allowed as they become dislodged and create FOD for aircraft.

908-2.2 Inspection. The RPR shall be notified of sources and quantities of mulch materials available and the Contractor shall furnish him with representative samples of the materials to be used 30 days before delivery to the project. These samples may be used as standards with the approval of the RPR and any materials brought on the site that do not meet these standards shall be rejected.

CONSTRUCTION METHODS

908-3.1 Mulching. Before spreading mulch, all large clods, stumps, stones, brush, roots, and other foreign material shall be removed from the area to be mulched. Mulch shall be applied immediately after seeding. The spreading of the mulch shall be by mechanical spraying wet applied methods, provided a uniform covering is obtained.

Mulch material shall be furnished, hauled, and evenly applied on the area shown on the plans or designated by the RPR. Organic material shall be spread at the rate directed by the manufacturer and approved by the RPR.

908-3.2 Application Method. Particular care shall be exercised to insure that the application is made uniformly and at the prescribed rate and to guard against misses and overlapped areas. Proper predetermined quantities of the mixture in accordance with specifications shall be used to cover specified sections of known area. Checks on the rate and uniformity of application may be made by observing the degree of wetting of the ground or by distributing test sheets of paper or pans over the area at intervals and observing the quantity of material deposited thereon.

908-3.3 Care and repair.

a. The Contractor shall care for the mulched areas until final acceptance of the project. Care shall consist of providing protection against traffic or other use by placing warning signs, as approved by the RPR, and erecting any barricades that may be shown on the plans before or immediately after mulching has been completed on the designated areas.

b. The Contractor shall be required to repair or replace any mulch that is defective or becomes damaged until the project is finally accepted. When, in the judgment of the RPR, such defects or damages are the result of poor workmanship or failure to meet the requirements of the specifications, the cost of the necessary repairs or replacement shall be borne by the Contractor.

METHOD OF MEASUREMENT

908-4.1 Mulching shall be measured in square yards on the basis of the actual surface area acceptably mulched.

BASIS OF PAYMENT

908-5.1 Payment will be made at the contract unit price per square yard for mulching. The price shall be full compensation for furnishing all materials and for placing and anchoring the materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item T-908-1	Mulching - per square yard

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

AC 150/5200-33 Hazardous Wildlife Attractants on or Near Airports

FAA/United States Department of Agriculture

Wildlife Hazard Management at Airports, A Manual for Airport Personnel

END OF ITEM T-908

Item L-100 Apron Area Lighting

DESCRIPTION

100-1.1 This item shall consist of the furnishing and installing of all new apron lighting, lighting controls, and distribution equipment, as well as associated materials such as wiring, cable, conduit, ductwork, poles, foundations, above-ground pull boxes and grounding systems, as shown on the Contract Drawings or specified herein. This item shall also include marking and labeling of equipment, labeling or tagging of wire, the testing of the installations and furnishing all incidentals necessary to place all equipment in operating condition as a completed unit to the satisfaction of the Engineer.

EQUIPMENT AND MATERIALS

100-2.1 Lighting equipment (poles and fixtures). Lighting equipment shall be as scheduled and shown on the Contract Drawings.

100-2.2 Obstruction lights. Obstruction lights shall be in accordance with Item L-119, Airport Obstruction Lights.

100-2.3 Conduit. Conduit shall be in accordance with Item L-110, Airport Underground Electrical Duct Banks and Conduits.

100-2.4 Pull boxes. Pull boxes shall be NEMA 1 where shown or required, size shall be per NEC requirements and as manufactured by Hoffman or an approved equal.

100-2.5 Apron lighting feeder breaker. Apron lighting feeder breaker shall have the ratings as shown on the Contract Drawings, be a thermal magnetic molded case, bolt-on type as manufactured by Square D Company or an approved equal.

100-2.6 Apron lighting and contactor. Apron lighting controls and contactors shall be as shown or required on Contract Drawings.

100-2.7 Wire. Wire shall be in accordance with Item L-108, Underground Cable for Airports. For ratings up to 600 volts, thermoplastic wire conforming to Fed. Spec. J-C-30, Types TW, THW, and THWN, shall be used. Multiple conductor cable shall have an overall jacket. The wires shall be of the type, size, number of conductors, and voltage shown in the plans or in the proposal.

100-2.8 Control wire. Wire shall be not less than No. 12 AWG stranded copper THWN or THHN and shall be insulated for 600 volts unless otherwise on the Contract Drawings.

100-2.9 Other electrical equipment. Switches, cutouts, relays, terminal blocks, circuit breakers and all other regularly used commercial items of electrical equipment not covered by Federal Aviation Administration equipment specifications shall conform to the applicable rulings and standards of the Institute of Electrical and Electronic Engineers or the National Electrical Manufacturers Association. When specified, test reports from a testing laboratory indicating that the equipment meets the specifications shall be supplied. In all cases, equipment shall be new and a first-grade product. This equipment shall be supplied in the quantities required for the specific project and shall incorporate the electrical and mechanical characteristics specified in the Proposal and Plans.

100-2.10 Concrete. Refer to specification P-610.

INSTALLATION OF APRON LIGHTING EQUIPMENT

100-3.1 General. The Contractor shall furnish, install and connect all new equipment, poles, lights, conduit, cables, wires, buses, grounds, control devices and supports necessary to insure a complete and operable apron lighting system as specified herein and as shown on the Contract Drawings.

Equipment installation and mounting shall comply with the requirements of the National Electrical Code and local code agency having jurisdiction.

100-3.2 Lighting equipment (poles and fixtures). All fixture aiming points and mounting heights shall be as shown on the Contract Drawings. Any field aiming that is not specified or shown shall be as directed by the Engineer. All poles shall be installed at locations shown on the Contract Drawings. However, drawing locations are approximate and shall be field verified. Obstruction lights shall be installed on the highest point of each pole.

100-3.3 Conduit. Conduit types, sizes and locations shall be as shown on the Contract Drawings and details.

Corrosion resistant steel or malleable iron shall be used to support conduit.

Installation of direct buried conduit shall be in accordance with Item L-110, Airport Underground Electrical Duct Banks and Conduits.

100-3.4 Wiring and connections. The Contractor shall make all necessary electrical connections in accordance with the wiring diagrams furnished and as directed by the Engineer. In wiring to the terminal blocks, the Contractor shall leave sufficient extra length on each control lead to make future changes in connections at the terminal block. This shall be accomplished by running each control lead the longest way around the box to the proper terminal. Leads shall be neatly laced in place.

Where multiple light fixtures are placed on the same pole, the Contractor shall color code wires to light fixtures based on the position of the light fixture on the pole. The color of wires used shall be consistent from pole to pole.

100-3.5 Marking and labeling. All equipment, control wires, terminal blocks, etc., shall be tagged, marked or labeled as specified below:

A. Wire Identification. The Contractor shall furnish and install wire labels or identifying tags on all control wires at the point where they connect to the control equipment or to the terminal blocks. Wire labels, if used, shall be of the self-sticking, preprinted type and of the manufacturer's recommended size for the wire involved. Identification markings designated on the Plans shall be followed. Tags, if used, shall be of fiber not less than 3/4-inch in diameter and not less than 1/32-inch thick. Identification markings designated on the Plans shall be stamped on tags by means of small tool dies. Each tag shall be securely tied to the proper wire by a non-metallic cord.

B. Labels. The Contractor shall stencil identifying labels on the cases of breakers and distribution and control relay cases with white oil paint as designated by the Engineer. The letters and numerals shall be not less than 1-inch in height and shall be of proportionate width. The Contractor shall also mark the correct circuit designations in accordance with the wiring diagram on the terminal marking strips which are a part of each terminal block.

C. Apron Lighting Identification. Contractor shall furnish and install plastic wire labels or identifying tags on all wires in the hand hole at the base of the light pole. Labels shall be numbered based on the position of the light fixture on the pole.

100-3.6 Concrete. Concrete handling and placement shall be in accordance with P-610.

100-3.7 Aiming and Re-aiming. Initial aiming of lights shall be as shown on the Contract Drawings. After initial operation, the Contractor shall re-aim the lights when requested by the Owner.

100-3.8 Removal of Light Poles and Foundations. Existing light poles including foundations shall be removed at the locations shown on the plans and as directed by the Engineer. The cost of such removal shall include excavation, removal, backfilling, disposal of existing structures and restoration. Backfill shall be with suitable on-site material unless otherwise shown or specified. Backfill under paved areas shall be as shown on the plans.

METHOD OF MEASUREMENT

100-4.1 Measurement for payment will be made for each new apron area lighting unit installed or removed. Each apron area light unit installation shall include construction of the light pole foundation, installation of the pole and fixture mounting bar, installation of light fixtures, all conduit, wiring, connections and aiming required to complete the unit.

BASIS OF PAYMENT

100-5.1 Payment will be made at the contract unit price per each for installation or removal of apron area lighting units. The unit prices provided shall be full compensation for furnishing all materials and for all preparation and installation of these materials and for all labor, equipment, tools and incidentals necessary to provide a complete and fully operational system.

Payment will be made under:

Item L-100-1 - 35-Foot High Apron Area Flood Light, Pole and Foundation - per each

Item L-100-2 - 22-Foot High Area Flood Light, Pole and Foundation - per each

Item L-100-3 - Removal of Light Pole and Foundation - per each

SUBMITTALS AND CERTIFICATIONS

100-6.1 The following "Shop and Setting Drawings", "Working Drawings", Catalogue Data" and "Certifications" shall be submitted for review:

- Catalogue Data and Certification showing that lighting equipment (poles and fixtures) meets the requirements specified.
- Catalogue Data and Certification show that obstruction lights meet the requirements specified.
- Submittal for conduit per Item L-110.
- Catalogue Data and Certification showing that pull boxes meet the requirements specified.
- Catalogue Data and Certification showing that apron lighting feeder breaker meets the requirements specified.
- Catalogue Data and Certification showing that apron lighting controls and contactor meet the requirements specified.
- Catalogue Data and Certification showing that wire meets the requirements specified.

- Catalogue Data and Certification showing that control wire meets the requirements specified.
- Catalogue Data and Certification showing that switches, cutouts, relays, terminal blocks, circuit breakers and other regularly used items meet the requirements specified.
- Concrete Mix Design per P-610.
- Catalog Data showing that the locking device meets the requirements specified.

END OF ITEM L-100

Item L-108 Underground Power Cable for Airports

DESCRIPTION

108-1.1 This item shall consist of furnishing and installing power cables within conduit or duct banks per these specifications at the locations shown on the plans. It includes excavation and backfill of trench for direct-buried counterpoise cables only. Also included are the installation of counterpoise wires, ground wires, ground rods and connections, cable splicing, cable marking, cable testing, and all incidentals necessary to place the cable in operating condition as a completed unit to the satisfaction of the RPR. This item shall not include the installation of duct banks or conduit, trenching and backfilling for duct banks or conduit, or furnishing or installation of cable for FAA owned/operated facilities.

EQUIPMENT AND MATERIALS

108-2.1 General.

a. Airport lighting equipment and materials covered by advisory circulars (AC) shall be approved under the Airport Lighting Equipment Certification Program per AC 150/5345-53, current version.

b. All other equipment and materials covered by other referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification, when requested by the RPR.

c. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications. Materials supplied and/or installed that do not comply with these specifications shall be removed (when directed by the RPR) and replaced with materials that comply with these specifications at the Contractor's cost.

d. All materials and equipment used to construct this item shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete any non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment to which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in the project that may accrue directly or indirectly from late submissions or resubmissions of submittals.

e. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be neatly bound in a properly sized 3-ring binder, tabbed by specification section. The RPR reserves the right to reject any and all equipment, materials, or procedures that do not meet the system design and the standards and codes, specified in this document.

f. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for at least twelve (12) months from the date of final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner. The Contractor shall maintain a minimum insulation resistance in accordance with paragraph 108-3.10e with isolation transformers connected in new circuits

and new segments of existing circuits through the end of the contract warranty period when tested in accordance with AC 150/5340-26, *Maintenance Airport Visual Aid Facilities*, paragraph 5.1.3.1, Insulation Resistance Test.

108-2.2 Cable. Underground cable for airfield lighting facilities (runway and taxiway lights and signs) shall conform to the requirements of AC 150/5345-7, Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits latest edition. Conductors for use on 6.6 ampere primary airfield lighting series circuits shall be single conductor, seven strand, #8 American wire gauge (AWG), L-824 Type C, 5,000 volts, non-shielded, with cross-linked polyethylene insulation. L-824 conductors for use on the L-830 secondary of airfield lighting series circuits shall be sized in accordance with the manufacturer's recommendations. All other conductors shall comply with FAA and National Electric Code (NEC) requirements. Conductor sizes noted above shall not apply to leads furnished by manufacturers on airfield lighting transformers and fixtures.

Wire for electrical circuits up to 600 volts shall comply with Specification L-824 and/or Commercial Item Description A-A-59544A and shall be type XHHW-2, 75°C. Conductors for parallel (voltage) circuits shall be type and size and installed in accordance with NFPA-70, National Electrical Code.

Unless noted otherwise, all 600-volt and less non-airfield lighting conductor sizes are based on a 75°C, XHHW-2, 600-volt insulation, copper conductors, not more than three single insulated conductors, in raceway, in free air. The conduit/duct sizes are based on the use of XHHW-2, 600-volt insulated conductors. The Contractor shall make the necessary increase in conduit/duct sizes for other types of wire insulation. In no case shall the conduit/duct size be reduced. The minimum power circuit wire size shall be #12 AWG.

Unless noted otherwise, all 15-kilovolt conductor sizes are based on Type MV-105 100% insulation, copper conductors, 1/3 neutral, not more than three single insulated conductors, in raceway. In no case shall the conduit/duct size be reduced. The minimum power circuit wire size shall be #4/0 AWG.

Conductor sizes may have been adjusted due to voltage drop or other engineering considerations. Equipment provided by the Contractor shall be capable of accepting the quantity and sizes of conductors shown in the Contract Documents. All conductors, pigtails, cable step-down adapters, cable step-up adapters, terminal blocks and splicing materials necessary to complete the cable termination/splice shall be considered incidental to the respective pay items provided.

Cable type, size, number of conductors, strand and service voltage shall be as specified in the Contract Document.

108-2.3 Bare copper wire (counterpoise, bare copper wire ground and ground rods). Wire for counterpoise installations and external grounding bond wire for airfield lighting systems shall be No. 6 AWG bare solid copper wire per ASTM B3.

Wire for internal grounding bond wire for airfield lighting systems shall be green insulated No. 6 AWG stranded copper wire per ASTM B8.

For voltage powered circuits, the equipment grounding conductor shall comply with NEC Article 250.

Ground rods shall be copper-clad steel. The ground rods shall be of the length and diameter specified on the plans, but in no case be less than 8 feet (2.4 m) long and 5/8 inch (16 mm) in diameter.

108-2.4 Cable connections. In-line connections or splices of underground primary cables shall be of the type called for on the plans, and shall be one of the types listed below. No separate payment will be made for cable connections.

a. The cast splice. A cast splice, employing a plastic mold and using epoxy resin equivalent to that manufactured by 3M™ Company, "Scotchcast" Kit No. 82-B, or an approved equivalent, used for potting the splice is acceptable.

b. The field-attached plug-in splice. Field attached plug-in splices shall be installed as shown on the plans. The Contractor shall determine the outside diameter of the cable to be spliced and furnish appropriately sized connector kits and/or adapters. Tape or heat shrink tubing with integral sealant shall be in accordance with the manufacturer's requirements. Primary Connector Kits manufactured by Amerace, "Super Kit", Integro "Complete Kit", or approved equal is acceptable. Heat-shrink tubing shall be used where the field attached plug-in splice is connected to the cable insulation jacket.

c. The factory-molded plug-in splice. Specification for L-823 Connectors, Factory-Molded to Individual Conductors, is acceptable.

d. The taped or heat-shrink splice. Not used.

108-2.5 Splicer qualifications. Every airfield lighting cable splicer shall be qualified in making airport cable splices and terminations on cables rated at or above 5,000 volts AC. The Contractor shall submit to the RPR proof of the qualifications of each proposed cable splicer for the airport cable type and voltage level to be worked on. Cable splicing/terminating personnel shall have a minimum of three (3) years continuous experience in terminating/splicing medium voltage cable.

108-2.6 Concrete. Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures.

108-2.7 Flowable backfill. Flowable material used to backfill trenches for power cable trenches shall conform to the requirements of Item P-153, Controlled Low Strength Material.

108-2.8 Cable identification tags. Cable identification tags shall be made from a non-corrosive material with the circuit identification stamped or etched onto the tag. The tags shall be of the type as detailed on the plans.

108-2.9 Tape. Electrical tapes shall be Scotch™ Electrical Tapes –Scotch™ 88 (1-1/2 inch (38 mm) wide) and Scotch™ 130C® linerless rubber splicing tape (2-inch (50 mm) wide), as manufactured by the Minnesota Mining and Manufacturing Company (3M™), or an approved equivalent.

108-2.10 Electrical coating. Electrical coating shall be Scotchkote™ as manufactured by 3M™, or an approved equivalent.

108-2.11 Existing circuits. Whenever the scope of work requires connection to an existing circuit, the existing circuit's insulation resistance shall be tested, in the presence of the RPR. The test shall be performed per this item and prior to any activity that will affect the respective circuit. The Contractor shall record the results on forms acceptable to the RPR. When the work affecting the circuit is complete, the circuit's insulation resistance shall be checked again, in the presence of the RPR. The Contractor shall record the results on forms acceptable to the RPR. The second reading shall be equal to or greater than the first reading or the Contractor shall make the necessary repairs to the existing circuit to bring the second reading above the first reading. All repair costs including a complete replacement of the L-823 connectors, L-830 transformers and L-824 cable, if necessary, shall be borne by the Contractor. All test results shall be submitted in the Operation and Maintenance (O&M) Manual.

108-2.12 Detectable warning tape. Plastic, detectable, American Public Works Association (APWA) Red (electrical power lines, cables, conduit and lighting cable) with continuous legend tape shall be polyethylene film with a metalized foil core and shall be 3-6 inches (75-150 mm) wide. Detectable tape is incidental to the respective bid item. Detectable warning tape for communication cables shall be orange. Detectable warning tape color code shall comply with the APWA Uniform Color Code.

CONSTRUCTION METHODS

108-3.1 General. The Contractor shall install the specified cable at the approximate locations indicated on the plans. Unless otherwise shown on the plans, all cable required to cross under pavements expected to carry aircraft loads shall be installed in concrete encased duct banks. Cable shall be run without splices, from fixture to fixture.

Cable connections between lights will be permitted only at the light locations for connecting the underground cable to the primary leads of the individual isolation transformers. The Contractor shall be responsible for providing cable in continuous lengths for home runs or other long cable runs without connections unless otherwise authorized in writing by the RPR or shown on the plans.

In addition to connectors being installed at individual isolation transformers, L-823 cable connectors for maintenance and test points shall be installed at locations shown on the plans, but in no case shall they be further apart than 1,000 feet of cable run. Cable circuit identification markers shall be installed on both sides of the L-823 connectors installed and on both sides of slack loops where a future connector would be installed.

Provide not less than 3 feet (1 m) of cable slack on each side of all connections, isolation transformers, light units, and at points where cable is connected to field equipment. Where provisions must be made for testing or for future above grade connections, provide enough slack to allow the cable to be extended at least three feet vertically above the top of the access structure. This requirement also applies where primary cable passes through empty light bases, junction boxes, and access structures to allow for future connections, or as designated by the RPR.

Primary airfield lighting cables installed shall have cable circuit identification markers attached on both sides of each L-823 connector and on each airport lighting cable entering or leaving cable access points, such as manholes, hand holes, pull boxes, junction boxes, etc. Markers shall be of sufficient length for imprinting the cable circuit identification legend on one line, using letters not less than 1/4 inch (6 mm) in size. The cable circuit identification shall match the circuits noted on the construction plans.

108-3.2 Installation in duct banks or conduits. This item includes the installation of the cable in duct banks or conduit per the following paragraphs. The maximum number and voltage ratings of cables installed in each single duct or conduit, and the current-carrying capacity of each cable shall be per the latest version of the National Electric Code, or the code of the local agency or authority having jurisdiction.

The Contractor shall make no connections or splices of any kind in cables installed in conduits or duct banks.

Unless otherwise designated in the plans, where ducts are in tiers, use the lowest ducts to receive the cable first, with spare ducts left in the upper levels. Check duct routes prior to construction to obtain assurance that the shortest routes are selected and that any potential interference is avoided.

Duct banks or conduits shall be installed as a separate item per Item L-110, Airport Underground Electrical Duct Banks and Conduit. The Contractor shall run a mandrel through duct banks or conduit prior to installation of cable to ensure that the duct bank or conduit is open, continuous and clear of debris. The mandrel size shall be compatible with the conduit size. The Contractor shall swab out all conduits/ducts and clean light bases, manholes, etc., interiors immediately prior to pulling cable. Once cleaned and swabbed, the light bases and all accessible points of entry to the duct/conduit system shall be kept closed except when installing cables. Cleaning of ducts, light bases, manholes, etc., is incidental to the pay item of the item being cleaned. All raceway systems left open, after initial cleaning, for any reason shall be re-cleaned at the Contractor's expense. The Contractor shall verify existing ducts proposed for use in this project as clear and open. The Contractor shall notify the RPR of any blockage in the existing ducts.

The cable shall be installed in a manner that prevents harmful stretching of the conductor, damage to the insulation, or damage to the outer protective covering. The ends of all cables shall be sealed with moisture-

seal tape providing moisture-tight mechanical protection with minimum bulk, or alternately, heat shrinkable tubing before pulling into the conduit and it shall be left sealed until connections are made. Where more than one cable is to be installed in a conduit, all cable shall be pulled in the conduit at the same time. The pulling of a cable through duct banks or conduits may be accomplished by hand winch or power winch with the use of cable grips or pulling eyes. Maximum pulling tensions shall not exceed the cable manufacturer's recommendations. A non-hardening cable-pulling lubricant recommended for the type of cable being installed shall be used where required.

The Contractor shall submit the recommended pulling tension values to the RPR prior to any cable installation. If required by the RPR, pulling tension values for cable pulls shall be monitored by a dynamometer in the presence of the RPR. Cable pull tensions shall be recorded by the Contractor and reviewed by the RPR. Cables exceeding the maximum allowable pulling tension values shall be removed and replaced by the Contractor at the Contractor's expense.

The manufacturer's minimum bend radius or NEC requirements (whichever is more restrictive) shall apply. Cable installation, handling and storage shall be per manufacturer's recommendations. During cold weather, particular attention shall be paid to the manufacturer's minimum installation temperature. Cable shall not be installed when the temperature is at or below the manufacturer's minimum installation temperature. At the Contractor's option, the Contractor may submit a plan, for review by the RPR, for heated storage of the cable and maintenance of an acceptable cable temperature during installation when temperatures are below the manufacturer's minimum cable installation temperature.

Cable shall not be dragged across base can or manhole edges, pavement or earth. When cable must be coiled, lay cable out on a canvas tarp or use other appropriate means to prevent abrasion to the cable jacket.

108-3.3 Installation of direct-buried cable in trenches. Unless otherwise specified, the Contractor shall not use a cable plow for installing the cable. Cable shall be unreeled uniformly in place alongside or in the trench and shall be carefully placed along the bottom of the trench. The cable shall not be unreeled and pulled into the trench from one end. Slack cable sufficient to provide strain relief shall be placed in the trench in a series of S curves. Sharp bends or kinks in the cable shall not be permitted.

Where cables must cross over each other, a minimum of 3 inches (75 mm) vertical displacement shall be provided with the topmost cable depth at or below the minimum required depth below finished grade.

a. Trenching. Where turf is well established and the sod can be removed, it shall be carefully stripped and properly stored. Trenches for cables may be excavated manually or with mechanical trenching equipment. Walls of trenches shall be essentially vertical so that a minimum of surface is disturbed. Graders shall not be used to excavate the trench with their blades. The bottom surface of trenches shall be essentially smooth and free from coarse aggregate. Unless otherwise specified, cable trenches shall be excavated to a minimum depth of 18 inches (0.5 m) below finished grade per NEC Table 300.5, except as follows:

- When off the airport or crossing under a roadway or driveway, the minimum depth shall be 36 inches (91 cm) unless otherwise specified.
- Minimum cable depth when crossing under a railroad track, shall be 42 inches (1 m) unless otherwise specified.
- Low voltage cables shall be placed a minimum of 12 inches from high voltage cables.

Dewatering necessary for cable installation, is incidental to its respective pay items as part of Item L-108. The cost of all excavation regardless of type of material encountered, shall be included in the unit price bid for the L-108 Item.

The Contractor shall excavate all cable trenches to a width not less than 6 inches (150 mm). Unless otherwise specified on the plans, all cables in the same location and running in the same general direction shall be installed in the same trench.

When rock is encountered, the rock shall be removed to a depth of at least 3 inches (75 mm) below the required cable depth and it shall be replaced with bedding material of earth or sand containing no mineral aggregate particles that would be retained on a 1/4-inch (6.3 mm) sieve. Flowable backfill material may alternatively be used.

Duct bank or conduit markers temporarily removed for trench excavations shall be replaced as required.

It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Where existing active cables cross proposed installations, the Contractor shall ensure that these cables are adequately protected. Where crossings are unavoidable, no splices will be allowed in the existing cables, except as specified on the plans. Installation of new cable where such crossings must occur shall proceed as follows:

(1) Existing cables shall be located manually. Unearthed cables shall be inspected to ensure absolutely no damage has occurred.

(2) Trenching, etc., in cable areas shall then proceed, with approval of the RPR, with care taken to minimize possible damage or disruption of existing cable, including careful backfilling in area of cable.

In the event that any previously identified cable is damaged during the course of construction, the Contractor shall be responsible for the complete repair or replacement.

b. Backfilling. After the cable has been installed, the trench shall be backfilled. The first layer of backfill in the trench shall encompass all cables; be 3 inches (75 mm) deep, loose measurement; and shall be either earth or sand containing no mineral aggregate particles that would be retained on a 1/4-inch (6.3 mm) sieve. This layer shall not be compacted. The second layer shall be 5 inches (125 mm) deep, loose measurement, and shall contain no particles that would be retained on a one inch (25.0 mm) sieve. The remaining third and subsequent layers of backfill shall not exceed 8 inches (20 cm) of loose measurement and be excavated or imported material and shall not contain stone or aggregate larger than 4 inches (100 mm) maximum diameter.

The second and subsequent layers shall be thoroughly tamped and compacted to at least the density of the adjacent material. If the cable is to be installed in locations or areas where other compaction requirements are specified (under pavements, embankments, etc.) the backfill compaction shall be to a minimum of 100 percent of ASTM D1557 or backfill with controlled low strength material (CLSM) in accordance with P-153.

Trenches shall not contain pools of water during backfilling operations. The trench shall be completely backfilled and tamped level with the adjacent surface, except that when turf is to be established over the trench, the backfilling shall be stopped at an appropriate depth consistent with the type of turfing operation to be accommodated. A proper allowance for settlement shall also be provided. Any excess excavated material shall be removed and disposed of per the plans and specifications.

Underground electrical warning (caution) tape shall be installed in the trench above all direct-buried cable. Contractor shall submit a sample of the proposed warning tape for acceptance by the RPR. If not shown on the plans, the warning tape shall be located 6 inches (150 mm) above the direct-buried cable or the counterpoise wire if present. A 3-6 inch (75 - 150 mm) wide polyethylene film detectable tape, with a metalized foil core, shall be installed above all direct buried cable or counterpoise. The tape shall be of the color and have a continuous legend as indicated on the plans. The tape shall be installed 8 inches (200 mm) minimum below finished grade.

c. Restoration. Following restoration of all trenching near airport movement surfaces, the Contractor shall visually inspect the area for foreign object debris (FOD) and remove any that is found. Where soil and sod has been removed, it shall be replaced as soon as possible after the backfilling is completed. All areas disturbed by work shall be restored to its original condition. The restoration shall include the topsoiling, seeding, and mulching, as shown on the plans. The Contractor shall be held responsible for

maintaining all disturbed surfaces and replacements until final acceptance. When trenching is through paved areas, restoration shall be equal to existing conditions. If the cable is to be installed in locations or areas where other compaction requirements are specified (under pavements, embankments, etc.) the backfill compaction shall be to a minimum of 100 percent of ASTM D1557 or backfill with controlled low strength material (CLSM) in accordance with P-153. Restoration shall be considered incidental to the pay item of which it is a component part.

Where cables are installed in trenches outside of the general grading limits, or in areas that would not otherwise be disturbed, restoration shall be considered necessary and incidental to the work of this item and the costs shall be included in the associated pay items of work involved.

Where cables are installed within the general grading limits, restoration of the area will not be necessary as payment for establishment of turf will be included in the various pay items of work involved.

After the backfill is completed, the Contractor shall dispose of all surplus material, dirt and rubbish from the site. Suitable material may be deposited in embankment or shoulders areas. Unsuitable material shall be disposed of on airport property at the spoil area or as ordered by the Engineer.

No direct payment will be made for spoiling operations. The cost of spoiling material off-site shall be considered incidental to this Contract and the costs shall be included in the various pay items involved.

108-3.4 Cable markers for direct-buried cable. Not used.

108-3.5 Splicing. Connections of the type shown on the plans shall be made by experienced personnel regularly engaged in this type of work and shall be made as follows:

a. Cast splices. These shall be made by using crimp connectors for jointing conductors. Molds shall be assembled, and the compound shall be mixed and poured per the manufacturer's instructions and to the satisfaction of the RPR.

b. Field-attached plug-in splices. These shall be assembled per the manufacturer's instructions. These splices shall be made by plugging directly into mating connectors. The joint where the connectors come together shall be finished by one of the following methods: (1) wrapped with at least one layer of rubber or synthetic rubber tape and one layer of plastic tape, one-half lapped, extending at least 1-1/2 inches (38 mm) on each side of the joint (2) Covered with heat shrinkable tubing with integral sealant extending at least 1-1/2 inches (38 mm) on each side of the joint or (3) On connector kits equipped with water seal flap; roll-over water seal flap to sealing position on mating connector. Heat-shrink tubing shall be used where the field attached plug-in splice is connected to the cable insulation jacket.

c. Factory-molded plug-in splices. These shall be made by plugging directly into mating connectors. The joint where the connectors come together shall be finished by one of the following methods: (1) Wrapped with at least one layer of rubber or synthetic rubber tape and one layer of plastic tape, one-half lapped, extending at least 1-1/2 inches (38 mm) on each side of the joint. (2) Covered with heat shrinkable tubing with integral sealant extending at least 1-1/2 inches (38 mm) on each side of the joint. or (3) On connector kits so equipped with water seal flap; roll-over water seal flap to sealing position on mating connector.

d. Taped or heat-shrink splices. Not used.

e. Assembly. Surfaces of equipment or conductors being terminated or connected shall be prepared in accordance with industry standard practice and manufacturer's recommendations. All surfaces to be connected shall be thoroughly cleaned to remove all dirt, grease, oxides, nonconductive films, or other foreign material. Paints and other nonconductive coatings shall be removed to expose base metal. Clean all surfaces at least 1/4 inch (6.4 mm) beyond all sides of the larger bonded area on all mating surfaces. Use a joint compound suitable for the materials used in the connection. Repair painted/coated surface to original condition after completing the connection.

108-3.6 Bare counterpoise wire installation for lightning protection and grounding. If shown on the plans or included in the job specifications, bare solid #6 AWG copper counterpoise wire shall be installed for lightning protection of the underground cables.

a. Equipotential. The counterpoise size is as shown on the plans. The equipotential method is applicable to all airfield lighting systems; i.e. runway, taxiway, apron – touchdown zone, centerline, edge, threshold and approach lighting systems. The equipotential method is also successfully applied to provide lightning protection for power, signal and communication systems. The light bases, counterpoise, etc – all components - are bonded together and bonded to the vault power system ground loop/electrode.

Counterpoise wire shall be installed in the same trench for the entire length of buried cable, conduits and duct banks that are installed to contain airfield cables. The counterpoise is centered over the cable/conduit/duct to be protected.

The counterpoise conductor shall be installed no less than 8 inches (200 mm) minimum or 12 inches (300 mm) maximum above the raceway or cable to be protected, except as permitted below:

(1) The minimum counterpoise conductor height above the raceway or cable to be protected shall be permitted to be adjusted subject to coordination with the airfield lighting and pavement designs.

(2) The counterpoise conductor height above the protected raceway(s) or cable(s) shall be calculated to ensure that the raceway or cable is within a 45-degree area of protection, (45 degrees on each side of vertical creating a 90 degree angle).

The counterpoise conductor shall be bonded to each metallic light base, mounting stake, and metallic airfield lighting component.

All metallic airfield lighting components in the field circuit on the output side of the constant current regulator (CCR) or other power source shall be bonded to the airfield lighting counterpoise system.

All components rise and fall at the same potential; with no potential difference, no damaging arcing and no damaging current flow.

See AC 150/5340-30, Design and Installation Details for Airport Visual Aids and NFPA 780, Standard for the Installation of Lightning Protection Systems, Chapter 11, for a detailed description of the Equipotential Method of lightning protection.

Reference FAA STD-019E, Lightning and Surge Protection, Grounding Bonding and Shielding Requirements for Facilities and Electronic Equipment, Part 4.1.1.7.

b. Isolation. Not used.

c. Common Installation requirements. When a metallic light base is used, the grounding electrode shall be bonded to the metallic light base or mounting stake with a No. 6 AWG bare, annealed or soft drawn, solid copper conductor. A green insulated No. 6 AWG stranded copper grounding wire shall be installed connecting the internal grounding lug to the metallic light fixture or metallic base plate.

When a nonmetallic light base is used, the grounding electrode shall be bonded to the external grounding lug with a No. 6 AWG bare, annealed or soft drawn, solid copper conductor. A green insulated No. 6 AWG stranded copper grounding wire shall be installed connecting the internal grounding lug to the metallic light fixture or metallic base plate.

Grounding electrodes may be rods, ground dissipation plates, radials, or other electrodes listed in the NFPA 70 (NEC) or NFPA 780.

Where raceway is installed by the directional bore, jack and bore, or other drilling method, the counterpoise conductor shall be permitted to be installed concurrently with the directional bore, jack and bore, or other drilling method raceway, external to the raceway or sleeve.

The counterpoise wire shall also be exothermically welded to ground rods installed as shown on the plans but not more than 500 feet (150 m) apart around the entire circuit. The counterpoise system shall be continuous and terminate at the transformer vault or at the power source. It shall be securely attached to the vault or equipment external ground ring or other made electrode-grounding system. The connections shall be made as shown on the plans and in the specifications.

Where an existing airfield lighting system is being extended or modified, the new counterpoise conductors shall be interconnected to existing counterpoise conductors at each intersection of the new and existing airfield lighting counterpoise systems.

At access structures, the safety ground shall be connected to all metal surfaces within the structure and attached to a ground rod. Ground wires and ground rods for equipment safety ground systems shall be considered necessary and incidental to the work of this contract and the costs shall be included in the associated pay items of work involved.

d. Parallel Voltage Systems. Provide grounding and bonding in accordance with NFPA 70, National Electrical Code.

108-3.7 Counterpoise installation above multiple conduits and duct banks. Counterpoise wires shall be installed above multiple conduits/duct banks for airfield lighting cables, with the intent being to provide a complete area of protection over the airfield lighting cables. When multiple conduits and/or duct banks for airfield cable are installed in the same trench, the number and location of counterpoise wires above the conduits shall be adequate to provide a complete area of protection measured 45 degrees each side of vertical.

Where duct banks pass under pavement to be constructed in the project, the counterpoise shall be placed above the duct bank. Reference details on the construction plans.

When multiple conduits or airfield cable are installed in the same trench, the number and location of counterpoise wires above the conduits or wires shall be adequate to provide a complete cone of protection measured 22-1/2 degrees each side of vertical. One counterpoise wire shall be installed for every 3 cables, or increment thereof, installed in a common trench. One counterpoise wire shall be installed for every 2 conduits, or increment thereof, installed in a common trench.

The Contractor may choose to install cables and/or conduits in multiple trenches however; additional counterpoise wire will be required to protect the cables and/or conduits. The cost of installing additional counterpoise wire shall be borne by the Contractor.

108-3.8 Counterpoise installation at existing duct banks. When airfield lighting cables are indicated on the plans to be routed through existing duct banks, the new counterpoise wiring shall be terminated at ground rods at each end of the existing duct bank where the cables being protected enter and exit the duct bank. The new counterpoise conductor shall be bonded to the existing counterpoise system.

108-3.9 Exothermic bonding. Bonding of counterpoise wire shall be by the exothermic welding process or equivalent method accepted by the RPR. Only personnel experienced in and regularly engaged in this type of work shall make these connections.

Contractor shall demonstrate to the satisfaction of the RPR, the welding kits, materials and procedures to be used for welded connections prior to any installations in the field. The installations shall comply with the manufacturer's recommendations and the following:

a. All slag shall be removed from welds.

b. Using an exothermic weld to bond the counterpoise to a lug on a galvanized light base is not recommended unless the base has been specially modified. Consult the manufacturer's installation directions for proper methods of bonding copper wire to the light base. See AC 150/5340-30 for galvanized light base exception.

c. If called for in the plans, all buried copper and weld material at weld connections shall be thoroughly coated with 6 mm of 3M™ Scotchkote™, or approved equivalent, or coated with coal tar Bitumastic® material to prevent surface exposure to corrosive soil or moisture.

108-3.10 Testing. The Contractor shall furnish all necessary equipment and appliances for testing the airport electrical systems and underground cable circuits before and after installation. The Contractor shall perform all tests in the presence of the RPR. The Contractor shall demonstrate the electrical characteristics to the satisfaction of the RPR. All costs for testing are incidental to the respective item being tested. For phased projects, the tests must be completed by phase. The Contractor shall provide such temporary lights and cables as required to maintain use of existing airfield lighting circuits. Temporary above ground lighting cables, if approved, shall be installed in conduit, and delineated with stakes and flagging. The test equipment for insulation resistance shall be an insulation resistance tester (1,000V megger) with a digital readout. The instrument shall provide a 500 volt test for insulation resistance with a meter range of 0 to 500 megohms.

Earth resistance testing methods shall be submitted to the RPR for approval. Earth resistance testing results shall be recorded on an approved form and testing shall be performed in the presence of the RPR. All such testing shall be at the sole expense of the Contractor.

Should the counterpoise or ground grid conductors be damaged or suspected of being damaged by construction activities the Contractor shall test the conductors for continuity with a low resistance ohmmeter. The conductors shall be isolated such that no parallel path exists and tested for continuity. The RPR shall approve of the test method selected. All such testing shall be at the sole expense of the Contractor.

Test Requirements Prior to Construction.

i. Test all circuits within the work area for continuity and insulation resistance to ground, at the electrical building, in the presence of the RPR.

ii. Provide a copy of the test results to the RPR.

iii. Check that all circuits are properly connected in accordance with applicable wiring diagrams.

Test Requirements During Construction. Circuit testing during construction shall be as directed and witnessed by the RPR when the Contractor is working on existing circuitry or excavating adjacent to or near existing circuitry. Circuit testing during construction will not be required during the times when the Contractor's operations do not effect existing airfield lighting circuitry. It is the intent of this section to ensure that airfield lighting circuitry remains operational throughout the duration of the Contract.

i. Test all circuits within the work area for continuity and insulation resistance to ground at the electrical building, prior to energizing any circuit.

ii. Insure that all circuits within the work area are operational, prior to the Contractor leaving the project at the end of the work day. Specific times for circuit checks will be determined by the RPR relative to the Contractor's work hours each day.

iii. Segment test new non-grounded series circuits during installation. Length of cable segment tested shall not have more than five (5) splices, light units and/or electrical equipment between the ends being tested. Insulation resistance to ground shall be not less than 500 megohms.

iv. Insure that the insulation resistance to ground of each segment of new non-grounded conductors of multiple conductor circuits is not less than 500 megohms.

v. That the impedance to ground of each ground rod does not exceed 25 ohms prior to establishing connections to other ground electrodes or equipment. The fall-of-potential ground impedance test shall be utilized, as described by ANSI/IEEE Standard 81, to verify this requirement. Ground rods testing higher than 25 ohms shall have a minimum extension of two feet of ground rod added, driven to the proper elevation and re-tested. Extensions shall be attached by exothermic methods

and re-testing performed until the tests show 25 ohms resistance or less. Tests shall not be performed within 72 hours after a rain storm has ended or when standing water is present around the ground rod.

vi. Insure that all circuits are properly connected in accordance with applicable wiring diagrams.

vii. The Contractor shall test all circuits within the work area for continuity after backfilling cable trenches. The reading shall be logged and provided to the Engineer prior to payment of cable items.

viii. Provide a copy of all test results to the RPR on a daily basis.

After installation, the Contractor shall test and demonstrate to the satisfaction of the RPR the following:

i. That all affected lighting power and control circuits (existing and new) are continuous and free from short circuits.

ii. That all affected circuits (existing and new) are free from unspecified grounds.

iii. That the insulation resistance to ground of all new non-grounded high voltage series circuits or cable segments is not less than 50 megohms. Verify continuity of all series airfield lighting circuits prior to energization. The Contractor shall be responsible for maintaining an insulation resistance of 50 megohms minimum, with isolation transformers connected, in new circuits and new segments of existing circuits through the end of the contract warranty period.

iv. That the insulation resistance to ground of all new non-grounded conductors of new multiple circuits or circuit segments is not less than 100 megohms.

v. That all affected circuits (existing and new) are properly connected per applicable wiring diagrams.

vi. That all affected circuits (existing and new) are operable. Tests shall be conducted that include operating each control not less than 10 times and the continuous operation of each lighting and power circuit for not less than 1/2 hour.

vii. That all original lighting power and control circuits are continuous and insulation resistance to ground is not lower than before construction.

vii. That the impedance to ground of each ground rod does not exceed 25 ohms prior to establishing connections to other ground electrodes. The fall-of-potential ground impedance test shall be used, as described by American National Standards Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE) Standard 81, to verify this requirement. As an alternate, clamp-on style ground impedance test meters may be used to satisfy the impedance testing requirement. Test equipment and its calibration sheets shall be submitted for review and approval by the RPR prior to performing the testing.

Two copies of tabulated results of all cable tests performed shall be supplied by the Contractor to the RPR. Where connecting new cable to existing cable, insulation resistance tests shall be performed on the new cable prior to connection to the existing circuit.

There are no approved “repair” procedures for items that have failed testing other than complete replacement.

108-3.11 Electrical Jumpers. Temporary 5kv airfield lighting jumpers will be required to accommodate construction work phasing while maintaining airfield circuits associated with pavements that are open to aircraft. The exact position and connectivity will be determined by the Contractor and shall be based order of construction operations as well as means and methods. The position of all temporary electrical jumpers shall be reviewed with the RPR and airport electrician. Temporary jumpers shall be placed strategically per work area to minimize the extent of repositioning during work within the respective work area. No cables shall be left exposed on the surface nor shall pose any risk for persons or equipment. All temporary cables on the surface shall be clearly marked with red flags and the conduit shall be painted red. Cables in conduit

on gravel and paved areas shall be protected the full length with airfield barricades. Lighting protection and counterpoise wire is not required over temporary electrical jumpers. Multiple cables may be placed in the same conduit subject to the maximum conduit in-fill requirements per the NEC. The options for temporary electrical cable placement are as follows:

1. Installed in existing conduits or duct banks.
2. Installed in schedule 40 PVC, in trench.
3. Installed in schedule 40 PVC conduit in turf areas on grade.
4. Installed in RGS conduit and secured with sandbags on pavement areas that could be subjected to vehicle traffic.
5. Installed in a sawcut kerf with epoxy in existing pavements that will be later demolished.

Existing cables that have been removed as part of the project work may be used for temporary electrical jumpers if they do not have visible signs of damage and meet the testing requirements of this specification. The contractor shall maintain and repair electrical jumpers throughout the contract duction and additional payment shall not be made for repairs. If new cable is used for temporary electrical jumpers, it may not be repurposed as final electrical cable. Temporary cables shall be removed and disposed of off site upon completion of the project. No separate payment shall be made for temporary electrical jumpers and the cost shall be included in Maintenance and protection of traffic, LS.

METHOD OF MEASUREMENT

108-4.1 Cable or counterpoise wire installed in trench, duct bank or conduit shall be measured by the number of linear feet installed and grounding connectors, and trench marking tape ready for operation, and accepted as satisfactory. Separate measurement shall be made for each cable or counterpoise wire installed in trench, duct bank or conduit. The measurement for this item shall include additional quantities required for slack. No separate payment will be made for ground rods. The cost of all excavation, backfill, dewatering and restoration regardless of the type of material encountered shall be included in the unit price bid for the work.

BASIS OF PAYMENT

108-5.1 Payment will be made at the contract unit price for trenching, cable and bare counterpoise wire installed in trench (direct-buried), or cable and equipment ground installed in duct bank or conduit, in place by the Contractor and accepted by the RPR. This price shall be full compensation for furnishing all materials and for all preparation and installation of these materials, and for all labor, equipment, tools, and incidentals, including ground rods and ground connectors and trench marking tape, necessary to complete this item.

Payment will be made under:

Item L-108-1	No. 8 AWG, 5 KV, L-824, Type C Airfield Lighting Cable - per linear foot
Item L-108-2	No. 6 AWG, 5 KV, L-824, Type C Airfield Lighting Cable - per linear foot
Item L-108-3	No. 6 AWG, Solid, Bare Copper Counterpoise Wire - per linear foot
Item L-108-4	No. 12 AWG, 600V, 1/C, Type XLP USE-2, 1/C Cable - per linear foot
Item L-108-5	No. 10 AWG, 600V, 1/C, Type XLP USE-2, 1/C Cable - per linear foot
Item L-108-6	No. 8 AWG, 600V, 1/C, Type XLP USE-2, 1/C Cable - per linear foot
Item L-108-7	No. 6 AWG, 600V, 1/C, Type XLP USE-2, 1/C Cable - per linear foot
Item L-108-8	No. 4 AWG, 600V, 1/C, Type XLP USE-2, 1/C Cable - per linear foot

Item L-108-9	No. 3 AWG, 600V, 1/C, Type XLP USE-2, 1/C Cable - per linear foot
Item L-108-10	No. 1 AWG, 600V, 1/C, Type XLP USE-2, 1/C Cable - per linear foot
Item L-108-11	No. 2/0 AWG, 600V, 1/C, Type XLP USE-2, 1/C Cable - per linear foot
Item L-108-12	No. 3/0 AWG, 600V, 1/C, Type XLP USE-2, 1/C Cable - per linear foot
Item L-108-13	No. 300 KCMIL AWG, 600V, 1/C, Type XLP USE-2, 1/C Cable - per linear foot
Item L-108-14	No. 350 KCMIL AWG, 600V, 1/C, Type XLP USE-2, 1/C Cable - per linear foot
Item L-108-15	12 Strand Single Mode Armored Jacket Duct Rated Fiber Optic Cable with Innerduct – per linear foot

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

AC 150/5340-26	Maintenance of Airport Visual Aid Facilities
AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-26	Specification for L-823 Plug and Receptacle, Cable Connectors
AC 150/5345-53	Airport Lighting Equipment Certification Program

Commercial Item Description

A-A-59544A	Cable and Wire, Electrical (Power, Fixed Installation)
A-A-55809	Insulation Tape, Electrical, Pressure-Sensitive Adhesive, Plastic

ASTM International (ASTM)

ASTM B3	Standard Specification for Soft or Annealed Copper Wire
ASTM B8	Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
ASTM B33	Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes
ASTM D4388	Standard Specification for Nonmetallic Semi-Conducting and Electrically Insulating Rubber Tapes

Mil Spec

MIL-PRF-23586F	Performance Specification: Sealing Compound (with Accelerator), Silicone Rubber, Electrical
MIL-I-24391	Insulation Tape, Electrical, Plastic, Pressure Sensitive

National Fire Protection Association (NFPA)

NFPA-70	National Electrical Code (NEC)
NFPA-780	Standard for the Installation of Lightning Protection Systems

American National Standards Institute (ANSI)/Institute of Electrical and Electronics Engineers (IEEE)

ANSI/IEEE STD 81	IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System

Federal Aviation Administration Standard

FAA STD-019E	Lightning and Surge Protection, Grounding Bonding and Shielding Requirements for Facilities and Electronic Equipment

END OF ITEM L-108

Item L-109 Airport Electric Building Equipment

DESCRIPTION

109-1.1 This item shall consist of the furnishing and installation of all electric building equipment, wiring, cable, conduit, and grounding systems as shown on the plans or specified herein. This work shall also include the painting of equipment and conduit; the marking and labeling of equipment and the labeling or tagging of wires; the testing of the installation; and the furnishing of all incidentals necessary to place it in operating condition as a completed unit to the satisfaction of the RPR. Also included is the removal of existing airport electric building equipment, including the repair of conduit terminations, and the patching and painting of walls where equipment and hangers, studs, etc. are removed.

EQUIPMENT AND MATERIALS

109-2.1 General.

a. Airport lighting equipment and materials covered by advisory circulars (AC) shall be certified in AC 150/5345-53, Airport Lighting Equipment Certification Program (ALECP) and listed in the ALECP Addendum.

b. All other equipment and materials covered by other referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when requested by the RPR.

c. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications. Materials supplied and/or installed that do not comply with these specifications shall be removed (when directed by the RPR) and replaced with materials that comply with these specifications at the Contractor's cost.

d. All materials and equipment used to construct this item shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete any non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment to which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in the project that may accrue directly or indirectly from late submissions or resubmissions of submittals.

e. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be neatly bound in a properly sized 3-ring binder, tabbed by specification section. The RPR reserves the right to reject any and all equipment, materials or procedures that do not meet the system design and the standards and codes, specified in this document.

f. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by

the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

109-2.2 Liquid-tight flexible metal conduit. See item L-110.

109-2.3 Electrical metallic tubing (EMT). Conduits shall conform to ANSI Standard C80.3. Fittings, connections and couplings shall be specifically approved for use with EMT.

109-2.4 Grounding System. The system neutral shall be bonded as per the National Electrical Code, latest edition. A complete "green wire" ground system shall be installed bonding all cabinets, enclosures and raceways to the same. Conductor size shall be in accordance with the National Electrical Code.

All constant current regulators shall be grounded to the building grounding bus with a green insulated #6 awg minimum ground cable with UL approved hydraulically crimped connections.

109-2.5 Rigid steel conduit. See item L-110.

109-2.6 Circuit breakers. Circuit breakers shall be of the bolt-on type, molded case, thermal magnetic indicating handle operated of common trip type. Rating shall be visible from front of the circuit breaker, either on the handle or trip unit. All branch circuit breakers shall have a minimum 10,000 Amps RMS Symmetrical Interrupting Capacity short circuit rating with Amp ratings as shown on the plans. Circuit breakers shall be UL listed.

109-2.7 Square duct. Duct shall be square similar to that manufactured by the Square D Company (or equivalent), or the Trumbull Electric Manufacturing Company (or equivalent). The entire front of the duct on each section shall consist of hinged or removable cover for ready access to the interior. The cross-section of the duct shall be not less than 4 × 4 inch (100 × 100 mm) except where otherwise shown in the plans.

109-2.8 FAA-approved equipment. Certain items of airport lighting equipment installed in electric buildings are covered by individual ACs listed below:

AC 150/5345-10 Specification for Constant Current Regulators and Regulator Monitors

109-2.9 Other electrical equipment. Distribution transformers, cutouts, relays, terminal blocks, circuit breakers, and all other regularly used commercial items of electrical equipment not covered by FAA equipment specifications and ACs shall conform to the applicable rulings and standards of the Institute of Electrical and Electronic Engineers (IEEE) or the National Electrical Manufacturers Association (NEMA). When specified, test reports from a testing laboratory indicating that the equipment meets the specifications shall be supplied. In all cases, equipment shall be new and a first-grade product. This equipment shall be supplied in the quantities required for the specific project and shall incorporate the electrical and mechanical characteristics specified in the proposal and plans. Equipment selected and installed by the Contractor shall maintain the interrupting current rating of the existing systems or specified rating whichever is greater.

109-2.10 Wire. Wire (in conduit) rated up to 5,000 volts shall be per AC 150/5345-7, Specification for L-824 Underground Electrical Cables for Airport Lighting Circuits.

For ratings up to 600 volts, moisture and heat resistant thermoplastic wire conforming to Commercial Item Description A-A-59544A Type XHHW-2 copper shall be used. The wires shall be of the type, size, number of conductors, and voltage shown in the plans or in the proposal.

a. Control circuits. Unless otherwise indicated on the plans, wire shall be not less than No. 12 American wire gauge (AWG) and shall be insulated for 600 volts. If telephone control cable is specified, No. 19 AWG telephone cable per ANSI/Insulated Cable Engineers Association (ICEA) S-85-625 specifications shall be used.

109-2.11 Short circuit / coordination / device evaluation / arc flash analysis. The Contractor shall, based upon the equipment provided, include as a part of the submittal process the electrical system "Short Circuit / Coordination / Device evaluation / Arc Flash Analysis". The analysis shall be performed by the equipment manufacturer and submitted in a written report. The analysis shall be signed and sealed by a registered professional Engineer from the state in which the project is located. The analysis shall comply with NFPA-70E and IEEE 1584.

The analysis will include: one line diagrams, short circuit analysis, coordination analysis, equipment evaluation, arc flash analysis and arc flash labels containing at a minimum, equipment name, voltage/current rating, available incident energy and flash protection boundary.

The selected firms field service Engineer shall perform data gathering for analysis completion and device settings, perform device setting as recommended by the analysis and will furnish and install the arc flash labels. The components worst case incident energy will be considered the available arc flash energy at that specific point in the system. Submit three written copies and one electronic copy of the report.

CONSTRUCTION OF VAULT AND PREFABRICATED METAL HOUSING

109-3.1 Electrical Equipment Shelter The shelter building must comply with NEC Article 110.31, Enclosure for Electrical Installations, Item (A) Electrical Vaults. Construct the building of materials having adequate structural strength for the conditions and installed location, has a minimum fire rating of two or three hours as determined by the authority having jurisdiction (AHJ), and is bullet resistant to minimum UL 752 Level 4.

109-3.2 Concrete. Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures.

109-3.3 Precast concrete structures. Not used.

109-3.4 Reinforcing steel. Reinforcing steel bars shall be intermediate or structural grade deformed-type bars and shall be per ASTM A615.

109-3.5 Brick. Not used.

109-3.6 Rigid steel conduit. Rigid steel conduit and fittings shall be per Underwriters Laboratories Standards 6 and 514B.

109-3.7 Plastic Conduit and fittings. Plastic Conduit and fittings shall conform to the requirements of UL-651 and UL-654 schedule 40 polyvinyl chloride (PVC) suitable for use above or below ground.

109-3.8 Lighting. Vault or metal-housing light fixtures shall be of a vapor-proof type.

109-3.9 Outlets. Convenience outlets shall be heavy-duty duplex units designed for industrial service.

109-3.10 Switches. Vault or metal-housing light switches shall be single-pole switches.

109-3.11 Paint.

a. Priming paint for non-galvanized metal surfaces shall be a high solids alkyd primer compatible with the manufacturer's recommendations for the intermediate or topcoat.

b. White paint for body and finish coats on metal and wood surfaces shall be ready-mixed paint conforming to the Master Painter's Institute (MPI), Reference #9, Exterior Alkyd, Gloss.

c. Priming paint for wood surfaces shall be mixed on the job by thinning the specified white paint by adding 1/2 pint (0.24 liter) of raw linseed oil to each gallon (liter).

d. Paint for the floor, ceiling, and inside walls shall be per Porter Paint Company 69, 71, and 79 or equivalent. Walls and ceiling shall be light gray and the floor shall be medium gray.

e. The roof coating shall be hot asphalt material per ASTM D2823. Asbestos-free roof coating per ASTM D4479 may be substituted if required by local codes.

109-3.12 Ground bus. Ground bus shall be 1/8 × 3/4 inch (3 × 19 mm) minimum copper bus bar.

109-3.13 Square duct. Duct shall be square similar to that manufactured by the Square D Company (or equivalent), or the Trumbull Electric Manufacturing Company (or equivalent). The entire front of the duct on each section shall consist of hinged or removable cover for ready access to the interior. The cross-section of the duct shall be not less than 4 × 4 inch (100 × 100 mm) except where otherwise shown in the plans.

109-3.14 Ground rods. Ground rods shall be in accordance with Item L-108.

109-3.15 Vault prefabricated metal housing. The prefabricated metal housing shall be a commercially available unit.

109-3.16 FAA-approved equipment. Certain items of airport lighting equipment installed in vaults are covered by individual ACs listed below:

AC 150/5345-3	Specification for L-821, Panels for Remote Control of Airport Lighting
AC 150/5345-5	Circuit Selector Switch
AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-10	Specification for Constant Current Regulators and Regulator Monitors
AC 150/5345-13	Specification for L-841 Auxiliary Relay Cabinet Assembly for Pilot Control of Airport Lighting Circuits.
AC 150/5345-49	Specification for L-854, Radio Control Equipment
AC 150/5345-56	Specification for L-890 Airport Lighting Control and Monitoring System (ALCMS)

109-3.17 Other electrical equipment. Distribution transformers, oil switches, cutouts, relays, terminal blocks, transfer relays, circuit breakers, and all other regularly used commercial items of electrical equipment not covered by FAA equipment specifications and ACs shall conform to the applicable rulings and standards of the Institute of Electrical and Electronic Engineers (IEEE) or the National Electrical Manufacturers Association (NEMA). When specified, test reports from a testing laboratory indicating that the equipment meets the specifications shall be supplied. In all cases, equipment shall be new and a first-grade product. This equipment shall be supplied in the quantities required for the specific project and shall incorporate the electrical and mechanical characteristics specified in the proposal and plans. Equipment selected and installed by the Contractor shall maintain the interrupting current rating of the existing systems or specified rating whichever is greater.

109-3.18 Wire. Wire (in conduit) rated up to 5,000 volts shall be per AC 150/5345-7, Specification for L-824 Underground Electrical Cables for Airport Lighting Circuits. For ratings up to 600 volts, moisture and heat resistant thermoplastic wire conforming to Commercial Item Description A-A-59544A Type THWN-2 shall be used. The wires shall be of the type, size, number of conductors, and voltage shown in the plans or in the proposal.

a. Control circuits. Unless otherwise indicated on the plans, wire shall be not less than No. 12 American wire gauge (AWG) and shall be insulated for 600 volts. If telephone control cable is specified, No. 19 AWG telephone cable per ANSI/Insulated Cable Engineers Association (ICEA) S-85-625 specifications shall be used.

b. Power circuits.

(1) 600 volts maximum – Wire shall be No. 6 AWG or larger and insulated for at least 600 volts.

(2) 3,000 volts maximum – Wire shall be No. 6 AWG or larger and insulated for at least 3,000 volts.

(3) Over 3,000 volts-Wire shall be No. 6 AWG or larger and insulated for at least the circuit voltage.

109-3.19 Short circuit / coordination / device evaluation / arc flash analysis. The Contractor shall, based upon the equipment provided, include as a part of the submittal process the electrical system "Short Circuit / Coordination / Device evaluation / Arc Flash Analysis". The analysis shall be performed by the equipment manufacturer and submitted in a written report. The analysis shall be signed and sealed by a registered professional Engineer from the state in which the project is located. The analysis shall comply with NFPA-70E and IEEE 1584.

The analysis will include: one line diagrams, short circuit analysis, coordination analysis, equipment evaluation, arc flash analysis and arc flash labels containing at a minimum, equipment name, voltage/current rating, available incident energy and flash protection boundary.

The selected firms field service Engineer shall perform data gathering for analysis completion and device settings, perform device setting as recommended by the analysis and will furnish and install the arc flash labels. The components worst case incident energy will be considered the available arc flash energy at that specific point in the system. Submit three written copies and one electronic copy of the report.

CONSTRUCTION METHODS

CONSTRUCTION OF VAULT AND PREFABRICATED METAL HOUSING

109-4.1 General. The Contractor shall construct the prefabricated metal housing at the location indicated in the plans. The metal housing shall be prefabricated equipment enclosure to be supplied in the size specified. The mounting pad or floor details, installation methods, and equipment placement are shown in the plans. Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another engineer approved third party certification program.

The Contractor shall clear, grade, and seed the area around the vault or metal housing for a minimum distance of 10 feet (3 m) on all sides. The slope shall be not less than 1/2 inch per foot (12 mm per 0.3 m) away from the vault or metal housing in all directions.

The vault shall provide adequate protection against weather elements, including rain, wind-driven dust, snow, ice and excessive heat. The vault shall have sufficient filtered ventilation, to assure that the interior room temperatures and conditions do not exceed the recommended limits of the electrical equipment to be installed in the vault. The Contractor is responsible for contacting the manufacturer of the equipment to be installed to obtain environmental limitations of the equipment to be installed.

109-4.2 Foundation and walls.

a. Reinforced concrete construction. The Contractor shall construct the foundation per the details shown in the plans. Unless otherwise specified, internal ties shall be of the mechanical type so that when the forms are removed the ends of the ties shall be at least one inch (25 mm) beneath the concrete surface; the holes shall be plugged and finished to prevent discoloration. Reinforcing steel shall be placed, as shown in the drawings, and secured in position to prevent displacement during the concrete placement.

The external surfaces of the concrete shall be thoroughly worked during the placing operation to force all coarse aggregate from the surface. Thoroughly work the mortar against the forms to produce a smooth finish free from air pockets and honeycomb.

The surface film of all pointed surfaces shall be removed before setting occurs. As soon as the pointing has set sufficiently, the entire surface inside and outside of the vault shall be thoroughly wet with water and rubbed with a No. 16 carborundum stone, or equivalent quality abrasive, bringing the surface to a paste. All form marks and projections shall be removed. The surface produced shall be smooth and dense without pits or irregularities. The materials which have been ground into a paste during the rubbing process shall be spread or brushed uniformly over the entire surface (except the interior surfaces that are to be painted shall have all paste removed by washing before painting) and permitted to reset. Final exterior finish shall be obtained by rubbing with No. 30 carborundum stone, or an equivalent quality abrasive. The surface shall be rubbed until the entire surface is smooth and uniform in color.

b. Brick and concrete construction. When this type of construction is specified, the foundation shall be concrete conforming to the details shown in the plans. The outer edge of the foundation at the floor level shall be beveled 1-1/2 inches (38 mm) at 45 degrees. Brick walls shall be 8 inches (200 mm) thick, laid in running bond with every sixth course a header course. Brick shall be laid in cement mortar (one part masonry cement and 3 parts sand) with full mortar bed and shoved joints. All joints shall be completely filled with mortar, and facing brick shall be back-parged with mortar as work progresses. All joints shall be 3/8 inch (9 mm) thick, exterior joints tooled concave, and interior joints struck flush. Both interior and exterior brick surfaces shall be cleaned and nail holes, cracks and other defects filled with mortar. When specified, a nonfading mineral pigment mortar coloring shall be added to the mortar. Steel reinforcing bars, 3/8 inch (9 mm) in diameter and 12 inches (300 mm) long, shall be set vertically in the center of the brick wall on not more than 2 feet (60 cm) centers to project 2-1/2 inches (60 mm) into the concrete roof slab. Lintels for supporting the brickwork over doors, windows, and louvers shall consist of two 4 × 3 × 3/8 inch (100 × 75 × 9 mm) steel angles. Lintels shall be painted with one coat of corrosion-inhibiting primer before installation, and all exposed parts shall be painted similar to doors and window sash after installation.

Window sills may be concrete poured in place or precast concrete as indicated in the plans. All exposed surfaces shall have a rubbed finish as specified under reinforced concrete construction. After completion, all interior and exterior faces of walls shall be scrubbed with a solution of muriatic acid and water in the proportions of not less than one part acid to 10 parts of water. All traces of efflorescence, loose mortar, and mortar stain shall be removed, and the walls washed down with clear water.

c. Concrete masonry construction. When this type of construction is specified, the foundation shall be concrete conforming to the details shown in the plans. The concrete masonry units shall be standard sizes and shapes and shall conform to ASTM C90 and shall include the closures, jambs, and other shapes required by the construction as shown in the plans. Standard construction practice shall be followed for this type of work including mortar, joints, reinforcing steel for extensions into roof slab, etc. Plaster for interior walls, if specified, shall be Portland cement plaster.

109-4.3 Roof. The roof shall be as shown in the plans. Reinforcing steel shall be placed as shown in the drawing and secured in position to prevent displacement during the pouring of the concrete. The concrete shall be poured monolithically and shall be free of honeycombs and voids. The surface shall have a steel-troweled finish and shall be sloped as shown in the drawing. The underside of the roof slab shall be finished in the same manner as specified for walls.

One brush or mop coat of hot asphalt roof coating shall be applied to the top surface of the roof slab. The asphalt material shall be heated to within the range specified by the manufacturer and immediately applied to the roof. The finished coat shall be continuous over the roof surface and free from holidays and blisters. Smears and dribbles of asphalt on the roof edges and building walls shall be removed.

109-4.4 Floor. Construct building foundation in accordance with the details shown in the plans. The floor shall be reinforced concrete as shown in the drawings. When present, all sod, roots, refuse, and other perishable material shall be removed from the area under the floor to a depth of 8 inches (200 mm), unless a greater depth is specified in the invitation for bids. This area shall be backfilled with materials consisting of sand, cinders, gravel, or stone. Fill shall be placed in layers not to exceed 4 inches (100 mm) and shall be thoroughly compacted by tamping or rolling. A layer of building paper shall be placed over the fill prior to placing concrete. The floor surfaces shall have a steel-troweled finish. The floor shall be level unless a drain is specified, in which case the floor shall be pitched 1/4 inch (6 mm) per foot downward toward the drain. A 1/4-inch (6-mm) asphalt felt expansion joint shall be placed between floor and foundation walls. The floor shall be poured monolithically and shall be free of honeycombs and voids.

109-4.5 Floor drain. If shown in the plans, a floor drain and dry well shall be installed in the center of the floor of the equipment room. The dry well shall be excavated 4 × 4 feet (1.2 × 1.2 m) square and to a depth of 4 feet (1.2 m) below the finished floor elevation and shall be backfilled to the elevation of the underside of the floor with gravel - which shall all pass a 2-inch (50 mm) mesh sieve and shall all be retained on a 1/4-inch (6.3 mm) mesh sieve. The gravel backfill shall be placed in 6 inch (150 mm) maximum layers, and the entire surface of each layer shall be tamped either with a mechanical tamper or with a hand tamper weighing not less than 25 pounds (11 kg) and having a face area of not more than 36 square inches (232 square cm) nor less than 16 square inches (103 square cm). The drain inlet shall be set flush in the concrete floor. The drain shall have a clear opening of not less than 8 inches (200 mm) in diameter.

109-4.6 Conduits in floor and foundation. Conduits shall be installed in the floor and through the foundation walls per the details shown in the plans. All underground conduit shall be painted with an asphalt compound. Conduit shall be installed with a coupling or metal conduit adapter flush with the top of the floor. All incoming conduit shall be closed with a pipe plug to prevent the entrance of foreign material during construction. Space conduit entrances shall be left closed.

109-4.7 Doors. Doors shall be metal-clad fireproof Class A (three (3) hour rated) doors conforming to requirements of the National Electrical Code (NEC) and local electrical codes. Panic bar exit hardware shall be installed per NEC requirements. Refer to the new electrical vault detail plan sheets for construction requirements.

109-4.8 Painting. The floor, ceiling, and inside walls of concrete construction shall first be given a hardening treatment, after which the Contractor shall apply two coats of paint as specified below, except that interior face brick walls need not be painted. The hardening treatment shall consist of applying two coats of either a commercial floor hardener or a solution made by dissolving 2 pounds (0.9 kg) of magnesium fluorosilicate or zinc sulfate crystals in one gallon (liter) of water. Each coat shall be allowed to dry at least 48 hours before the next application. After the second treating coat has dried, the surfaces shall be brushed clean of all crystals and thoroughly washed with clear water. Paint for walls and ceiling shall be a light gray color approved by the RPR. The floor paint shall be a medium gray color approved by the RPR. Before painting, the surfaces shall be dry and clean. The first coat shall be thinned by adding 2/3-quart (0.63 liters) of spar varnish and 1/3-quart (0.31 liters) of turpentine to each gallon (liter) of paint. The second coat shall be applied without thinning. All doors, lintels, and windows shall be cleaned to remove any rust or foreign material and shall be given one body and one finish coat of white paint. Bare metal surfaces shall be given a prime coat of corrosion-inhibiting primer prior to the body and finish coats.

109-4.9 Lights and switches. The Contractor shall furnish and install a minimum of two duplex convenience outlets in the vault room. Where a control room is specified, at least two duplex outlets shall be installed.

INSTALLATION OF EQUIPMENT IN AIRPORT ELECTRIC BUILDING

109-5.1 General. The Contractor shall furnish, install, and connect all equipment, equipment accessories, conduit, cables, wires, grounds, and support necessary to ensure a complete and operable electrical distribution center for the airport lighting system as specified herein and shown in the plans. When specified, an emergency power supply and transfer switch shall be provided and installed.

The equipment installation and mounting shall comply with the requirements of the National Electrical Code and local code agency having jurisdiction. All electrical work shall comply with the NEC and local code agency having jurisdiction including the separation of under 600V work from 5,000V work.

109-5.2 Power supply equipment. Transformers, regulators, booster transformers, and other power supply equipment items shall be furnished and installed at the location shown in the plans or as directed by the RPR. The power supply equipment shall be set on steel "H" sections, "I" beams, channels, or concrete blocks to provide a minimum space of 1-1/2 inch (38 mm) between the equipment and the floor. The equipment shall be placed so as not to obstruct the oil-sampling plugs of the oil-filled units; and name-plates shall, so far as possible, not be obscured.

109-5.3 Switchgear and panels. Fused cutouts, relays, transfer switches, panels, panel boards, and other similar items shall be furnished and installed at the location shown in the plans or as directed by the RPR. Wall or ceiling mounted items shall be attached to the wall or ceiling with galvanized bolts of not less than 3/8-inch (9 mm) diameter engaging metal expansion shields or anchors in masonry or concrete buildings.

109-5.4 Duct and conduit. The Contractor shall furnish and install square-type exposed metallic ducts with hinged covers for the control circuits in the airport electric building. These shall be mounted along the walls behind all floor-mounted equipment and immediately below all wall-mounted equipment. The hinged covers shall be placed to open from the front side with the hinges at the front bottom.

Wall brackets for square ducts shall be installed at all joints 2 feet (60 cm) or more apart with intermediate brackets as specified. Conduit shall be used between square ducts and equipment or between different items of equipment when the equipment is designed for conduit connection. When the equipment is not designed for conduit connection, conductors shall enter the square-type control duct through insulating bushings in the duct or on the conduit risers.

109-5.5 Wiring and connections. The Contractor shall make all necessary electrical connections in the airport electric building per the wiring diagrams furnished and as directed by the RPR. In wiring to the terminal blocks, the Contractor shall leave sufficient extra length on each control lead to make future changes in connections at the terminal block. This shall be accomplished by running each control lead the longest way around the box to the proper terminal. Leads shall be neatly laced in place.

109-5.6 Marking and labeling. All equipment, control wires, terminal blocks, etc., shall be tagged, marked, or labeled as specified below:

a. Wire identification. The Contractor shall furnish and install self-sticking wire labels or identifying tags on all control wires at the point where they connect to the control equipment or to the terminal blocks. Wire labels, if used, shall be of the self-sticking preprinted type and of the manufacturer's recommended size for the wire involved. Identification -markings designated in the plans shall be followed. Tags, if used, shall be of fiber not less than 3/4 inch (19 mm) in diameter and not less than 1/32 inch (1 mm) thick. Identification markings designated in the plans shall be stamped on tags by means of small tool dies. Each tag shall be securely tied to the proper wire by a nonmetallic cord.

b. Labels. The Contractor shall stencil identifying labels on the cases of regulators, breakers, and distribution and control relay cases with white oil paint as designated by the RPR. The letters and numerals shall be not less than one inch (25 mm) in height and shall be of proportionate width. The

Contractor shall also mark the correct circuit designations per the wiring diagram on the terminal marking strips, which are a part of each terminal block.

109-5.8 Airfield lighting control operation. Airfield lighting control shall be as shown on the plans and shall be connected into the existing airport lighting control system. The installation shall be fully tested as a completed unit prior to acceptance. Testing shall include the operation of each control not less than 10 times. Lighting systems on constant current regulators shall be tested on all steps. All tests shall be performed in the presence of the RPR.

109-5.9 Airport shutdowns. The airport shall be notified as least 48 hours prior to any power interruptions. Service must be maintained to the existing airport electric building and airfield. Power outages shall not occur during inclement weather.

109-5.10 Record drawings. Submit one copy of record drawings depicting the control wiring for the airfield lighting circuits. Identify and show all wired terminals. Include the wiring of each control panel as well as the interconnecting wiring. Interconnecting wiring shall show the tagged numbers as installed and colors if applicable.

METHOD OF MEASUREMENT

109-6.1 The quantity of equipment to be paid for under this item shall consist of all equipment installed, connected and accepted as a complete units, ready for operation, for the various building equipment installations will be measured on lump sum bases.

BASIS OF PAYMENT

109-7.1 Payment will be made at the lump sum prices for the various building equipment installations completed and accepted. These prices shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item. Partial payments of the lump sum prices bid may be made for these items as the work progresses, at the discretion of the RPR, in accordance with the approved schedule of values.

Payment will be made under:

Item L-109-1	10’ x 16’ Power and Control Equipment Shelter – per lump sum
Item L-109-2	4 KW Constant Current Regulator with Series Cutout– per lump sum
Item L-109-3	Transformer Within Equipment Shelter – per lump sum
Item L-109-4	Airfield Lighting Control and Monitoring System (ALCMS) – per lump sum
Item L-109-5	Deicing Fluid Storage Facility Power and Control Equipment, Local Conduits and Cable – per lump sum
Item L-109-6	Pump Station #1 Power and Control Equipment, Local Conduits and Cable – per lump sum
Item L-109-7	Pump Station #2 Power and Control Equipment, Local Conduits and Cable – per lump sum

Item L-109-8	Main Feed Pad Mounted Transformer and Switchgear Assembly, Shelter Site Power and Control Equipment – per lump sum

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-3	Specification for L-821, Panels for Remote Control of Airport Lighting
AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-10	Specification for Constant Current Regulators and Regulator Monitors
AC 150/5345-13	Specification for L-841 Auxiliary Relay Cabinet Assembly for Pilot Control of Airport Lighting Circuits
AC 150/5345-53	Airport Lighting Equipment Certification Program

American National Standards Institute / Insulated Cable Engineers Association (ANSI/ICEA)

ANSI/ICEA S-85-625	Standard for Telecommunications Cable Aircore, Polyolefin Insulated, Copper Conductor Technical Requirements

Commercial Item Description (CID)

A-A 59544	Cable and Wire, Electrical (Power, Fixed Installation) Institute of Electrical and Electronic Engineers (IEEE)
IEEE 1584	Guide for Performing Arc-Flash Hazard Calculations

Master Painter's Institute (MPI)

MPI Reference #9	Alkyd, Exterior, Gloss (MPI Gloss Level 6)

Underwriters Laboratories (UL)

UL Standard 514B	Conduit, Tubing, and Cable Fittings

National Fire Protection Association (NFPA)

NFPA-70	National Electrical Code (NEC)
NFPA-70E	Standard for Electrical Safety in the Workplace
NFPA-780	Standard for the Installation of Lightning Protection Systems

END OF ITEM L-109

Item L-110 Airport Underground Electrical Duct Banks and Conduits

DESCRIPTION

110-1.1 This item shall consist of underground electrical conduits and duct banks (single or multiple conduits encased in concrete or buried in sand) installed per this specification at the locations and per the dimensions, designs, and details shown on the plans. This item shall include furnishing and installing of all underground electrical duct banks and individual and multiple underground conduits and removal of existing duct banks. It shall also include all trenching, backfilling, removal, and restoration of any paved or turfed areas which are not otherwise disturbed; concrete encasement, mandrelling, pulling lines, duct markers, plugging of conduits, and the testing of the installation as a completed system ready for installation of cables per the plans and specifications. This item shall also include furnishing and installing conduits and all incidentals for providing positive drainage of the system. Verification of existing ducts is incidental to the pay items provided in this specification.

Restoration within grading limits will not be necessary as the establishment of paved or turf surfaces are included in the various pay items of the proposed work of this contact.

EQUIPMENT AND MATERIALS

110-2.1 General.

a. All equipment and materials covered by referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when requested by the RPR.

b. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications and acceptable to the RPR. Materials supplied and/or installed that do not comply with these specifications shall be removed, when directed by the RPR and replaced with materials, that comply with these specifications, at the Contractor's cost.

c. All materials and equipment used to construct this item shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in project that accrue directly or indirectly from late submissions or resubmissions of submittals.

d. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be neatly bound in a properly sized 3-ring binder, tabbed by specification section. The RPR reserves the right to reject any and all equipment, materials or procedures that do not meet the system design and the standards and codes specified in this document.

e. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

110-2.2 Steel conduit. Rigid steel conduit and fittings shall conform to the requirements of ANSI Standard C80.1 or Underwriters Laboratories, Inc., UL-6. Rigid galvanized steel (RGS) conduit and fittings shall be hot dipped galvanized inside and out and conform to the requirements of Underwriters Laboratories Standards 6, 514B, and 1242.

All RGS conduits or RGS elbows installed below grade, in concrete, permanently wet locations or other similar environments shall be painted with a 10-mil thick coat of asphaltum sealer or shall have a factory-bonded polyvinyl chloride (PVC) cover. Any exposed galvanizing or steel shall be coated with 10 mils of asphaltum sealer.

PVC coated rigid galvanized steel conduit shall have a 0.04-inch thick factory applied PVC coating meeting NEMA Standard No. RN1. Fittings shall have the same coating. When using PVC coated RGS conduit, care shall be exercised not to damage the factory PVC coating. Damaged PVC coating shall be repaired per the manufacturer's written instructions.

Stainless Steel Electrical Rigid Metal Conduit (ERMC-SS), Elbows, Couplings, and Nipples: Listing Criteria: investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following UL product categories: UL CCN DYWV; including UL 6A. Standard Features are stainless steel with a minimum trade size of metric designator 21 (trade size 3/4). Stainless steel rigid metal conduit shall be used within the Fluid Storage Facility area.

110-2.3 Plastic conduit and fittings. Plastic conduit and fittings shall be in compliance with Article 352 of the current National Electrical Code and as follows:

- **a.** PVC conduit shall conform to UL 651 or UL 651A. In addition, the conduit shall be one of the following types, as shown on the plans:
  - **1.** Type I–Schedule 40 or Schedule 80 PVC suitable for underground use either direct-buried or encased in concrete.
  - **2.** Type II–Schedule 40 PVC suitable for either above ground or underground use.
  - **3.** Type III – Schedule 80 PVC suitable for either above ground or underground use either direct-buried or encased in concrete.
- **b.** PVC fittings shall conform to UL 514B.
- **c.** PVC junction boxes and covers shall conform to UL 514C.

The type of solvent cement shall be as recommended by the conduit/fitting manufacturer.

110-2.4 Split conduit. Not used.

110-2.5 Conduit spacers. Conduit spacers shall be prefabricated interlocking units manufactured for the intended purpose. They shall be of double wall construction made of high grade, high density polyethylene complete with interlocking cap and base pads. They shall be designed to accept No. 4 reinforcing bars installed vertically.

110-2.6 Concrete. Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures.

110-2.7 Precast concrete structures. Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another RPR approved third party certification program. Precast concrete structures shall conform to ASTM C478.

110-2.8 Flowable backfill. Flowable material used to back fill conduit and duct bank trenches shall conform to the requirements of Item P-153, Controlled Low Strength Material.

110-2.9 Detectable warning tape. Plastic, detectable, American Public Works Association (APWA) red (electrical power lines, cables, conduit and lighting cable), orange (telephone/fiber optic cabling) with continuous legend magnetic tape shall be polyethylene film with a metallized foil core and shall be 3-6 inches (75-150 mm) wide. Detectable tape is incidental to the respective bid item. The legend shall read "CAUTION: BURIED ELECTRIC LINE BELOW", or similar language which includes the words "CAUTION" and "ELECTRIC".

110-2.10 Bedding. Bedding shall meet the requirements of ASTM C 33, fine aggregate for concrete. Gradation shall be in accordance with the table below:

	Percentage By Weight
Sieve Designations	**Passing Sieves**
3/8 Inch	100
No. 4	95-100
No. 8	80-100
No. 16	50-85
No. 30	25-60
No. 50	5-30
No. 100	0-10

110-2.11 Flexible conduit. Liquid-tight flexible metal conduit shall have a hot dipped zinc galvanized steel core with continuous grounding strip. The construction shall be in accordance with UL 360 and CSA C22.2 Number 56 requirements. The liquid-tight flexible metal conduit shall have a moisture, oil, sunlight resistant, flame retardant grey PVC jacket. Fittings and conduit bodies shall conform to ANSI/NEMA FB 1. The liquid-tight flexible metal conduit shall have the same inside diameter as the rigid steel or PVC conduit. The conduit shall be rated for direct earth burial and concrete embedment.

110-2.12 Reinforcing steel. Reinforcing steel shall be deformed bars of new billet steel meeting the requirements of ASTM A 615, Grade 60. Reinforcing steel shall be hot dipped galvanized in accordance with ASTM A-123, or epoxy coated.

110-2.13 Concrete bonding agent. Concrete bonding agent shall conform to the requirements of ASTM C 881. Concrete bonding agent shall be Type V, Grade 2 and un-pigmented. Concrete bonding agent shall be Class A, B, or C, depending on the temperature of the concrete surface to which the agent will be applied.

110-2.14 Backfill. Backfill shall be suitable on-site material obtained from the trench excavation, unless otherwise shown on the Contract Drawings.

110-2.15 Counterpoise wire. Counterpoise wire shall meet the requirements of Item L-108, Underground Cable for Airports.

110-2.16 Ground rods. Ground Rods shall meet the requirements of Item L-108, Underground Cable for Airports.

110-2.17 Concrete grouting material. This material shall have a maximum initial setting time of one hour. Compressive strength shall be a minimum of 2,000 psi after one day and 5,000 psi after 28 days. The material shall be able to withstand 25 cycles of freeze-thaw (10% NaCl) with a maximum loss of 4%. The material may exhibit expansion at no more than 0.40% and shrinkage of no more than 0.05% such

that no cracks are produced. The bond strength shall be a minimum of 200 psi after 5 days air cure without the use of a special bonding agent. The material shall exhibit no appreciable heat of hydration.

110-2.18 Separation Geotextile. Separation geotextile shall be Class 2; 0.02 sec^{-1} permittivity per ASTM D4491; Apparent opening size per ASTM D4751 with 0.60 mm maximum average roll value.

CONSTRUCTION METHODS

110-3.1 General. The Contractor shall install underground duct banks and conduits at the approximate locations indicated on the plans. The RPR shall indicate specific locations as the work progresses, if required to differ from the plans. Duct banks and conduits shall be of the size, material, and type indicated on the plans or specifications. Where no size is indicated on the plans or in the specifications, conduits shall be not less than 2 inches (50 mm) inside diameter or comply with the National Electrical Code based on cable to be installed, whichever is larger. All duct bank and conduit lines shall be laid so as to grade toward access points and duct or conduit ends for drainage. Unless shown otherwise on the plans, grades shall be at least 3 inches (75 mm) per 100 feet (30 m). On runs where it is not practicable to maintain the grade all one way, the duct bank and conduit lines shall be graded from the center in both directions toward access points or conduit ends, with a drain into the storm drainage system. Pockets or traps where moisture may accumulate shall be avoided. Under pavement, the top of the duct bank shall not be less than 18 inches (0.5 m) below the subgrade; in other locations, the top of the duct bank or underground conduit shall be not less than 18 inches (0.5 m) below finished grade.

The Contractor shall mandrel each individual conduit whether the conduit is direct-buried or part of a duct bank. An iron-shod mandrel, not more than 1/4 inch (6 mm) smaller than the bore of the conduit shall be pulled or pushed through each conduit. The mandrel shall have a leather or rubber gasket slightly larger than the conduit hole.

The Contractor shall swab out all conduits/ducts and clean base can, manhole, pull boxes, etc., interiors immediately prior to pulling cable. Once cleaned and swabbed the light bases, manholes, pull boxes, etc., and all accessible points of entry to the duct/conduit system shall be kept closed except when installing cables. Cleaning of ducts, base cans, manholes, etc., is incidental to the pay item of the item being cleaned. All raceway systems left open, after initial cleaning, for any reason shall be recleaned at the Contractor's expense. All accessible points shall be kept closed when not installing cable. The Contractor shall verify existing ducts proposed for use in this project as clear and open. The Contractor shall notify the RPR of any blockage in the existing ducts.

For pulling the permanent wiring, each individual conduit, whether the conduit is direct-buried or part of a duct bank, shall be provided with a 1,000 pound test polypropylene pull rope. The ends shall be secured and sufficient length shall be left in access points to prevent it from slipping back into the conduit. Where spare conduits are installed, as indicated on the plans, the open ends shall be plugged with removable tapered plugs, designed for this purpose.

All conduits shall be securely fastened in place during construction and shall be plugged to prevent contaminants from entering the conduits. Any conduit section having a defective joint shall not be installed. Ducts shall be supported and spaced apart using approved spacers at intervals not to exceed 5 feet (1.5 m).

Unless otherwise shown on the plans, concrete encased duct banks shall be used when crossing under pavements expected to carry aircraft loads, such as runways, taxiways, taxilanes, ramps and aprons. When under paved shoulders and other paved areas, conduit and duct banks shall be encased using flowable fill for protection.

All conduits within concrete encasement of the duct banks shall terminate with female ends for ease in current and future use. Install factory plugs in all unused ends. Do not cover the ends or plugs with concrete.

Where turf is well established and the sod can be removed, it shall be carefully stripped and properly stored.

Trenches for conduits and duct banks may be excavated manually or with mechanical trenching equipment unless in pavement, in which case they shall be excavated with mechanical trenching equipment. Walls of trenches shall be essentially vertical so that a minimum of shoulder surface is disturbed. Blades of graders shall not be used to excavate the trench.

Existing material, regardless of its nature, shall be removed to a depth of at least 3 inches (75 mm) below the required conduit or duct bank depth and it shall be replaced with bedding. Flowable backfill may alternatively be used The cost of excavation, regardless of the type of material encountered, shall be included in the various pay items involved.

Underground electrical warning (Caution) tape shall be installed in the trench above all underground duct banks and conduits in unpaved areas. Contractor shall submit a sample of the proposed warning tape for approval by the RPR. If not shown on the plans, the warning tape shall be located 6 inches above the duct/conduit or the counterpoise wire if present.

Joints in plastic conduit shall be prepared per the manufacturer's recommendations for the particular type of conduit. Plastic conduit shall be prepared by application of a plastic cleaner and brushing a plastic solvent on the outside of the conduit ends and on the inside of the couplings. The conduit fitting shall then be slipped together with a quick one-quarter turn twist to set the joint tightly. Where more than one conduit is placed in a single trench, or in duct banks, joints in the conduit shall be staggered a minimum of 2 feet (60 cm).

Changes in direction of runs exceeding 10 degrees, either vertical or horizontal, shall be accomplished using manufactured sweep bends.

Whether or not specifically indicated on the drawings, where the soil encountered at established duct bank grade is an unsuitable material, as determined by the RPR, the unsuitable material shall be removed per Item P-152 and replaced with suitable material. Additional duct bank supports shall be installed, as approved by the RPR.

All excavation shall be unclassified and shall be considered incidental to Item L-110. Dewatering necessary for duct installation, and erosion protection shall be per federal, state, and local requirements and shall be incidental to Item L-110.

Excavation for conduits and duct banks that are placed in embankment fill shall not be made until the embankment has been completed to a height above the top of the conduit and duct bank as shown on the plans.

The Contractor shall do such trench bracing, sheeting or shoring necessary to protect the excavation as required for safety and conformance to governing laws. Contractor shall brace, sheet or shore the trenches in areas such that existing pavements and utilities are not undermined. The bracing, sheeting or shoring shall not be removed in one operation, but shall be done in successive stages as determined by the Engineer to prevent overloading of the conduit or duct bank during backfilling operations. The cost of the bracing, sheeting or shoring and the removal of same shall be considered as a subsidiary obligation of the Contractor and included in the contract price for the pay items of work involved.

Unless otherwise specified, excavated materials that are deemed by the RPR to be unsuitable for use in backfill or embankments shall be removed and disposed of offsite.

Any excess excavation shall be filled with suitable material approved by the RPR and compacted per Item P-152.

It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Where existing active cables) cross proposed installations, the Contractor shall ensure that these cables are adequately protected. Where crossings are unavoidable, no splices will be allowed in the existing cables, except as specified on the plans. Installation of new cable where such crossings must occur shall proceed as follows:

a. Existing cables shall be located manually. Unearthed cables shall be inspected to assure absolutely no damage has occurred

b. Trenching, etc., in cable areas shall then proceed with approval of the RPR, with care taken to minimize possible damage or disruption of existing cable, including careful backfilling in area of cable.

In the event that any cable is damaged during the course of construction, the Contractor shall be responsible for the immediate and complete repair.

Minimum electrical separation requirements. The following table provides the minimum spacing requirements of power cable, conduits and ducts from other utilities:

TABLE II. Spacing of power cable ducts from other utilities.

UTILITY TYPE	PARALLEL LINES	PERPENDICULAR CROSSINGS
Water	36 inches horizontal separation	24 inches
Gravity Sewer	36 inches horizontal separation	24 inches
Force Main Sewer	36 inches horizontal separation	24 inches
Storm Drain	36 inches horizontal separation	24 inches
Natural Gas	60 inches horizontal separation	24 inches
Steam or Hot Water	60 inches horizontal separation	24 inches
Open Communications	24 inches horizontal separation of tamped soil or 3 inches of concrete	12 inches vertical separation of tamped soil or 3 inches of concrete
Secure Communications	36 inches horizontal separation of tamped soil or 6 inches of concrete; verify case-by-case with FAA office of primary responsibility.	24 inches vertical separation of tamped soil or 6 inches of concrete; verify case-by-case with FAA office of primary responsibility.
Electrical	12 inches horizontal separation of tamped soil or 3 inches of concrete	12 inches vertical separation of tamped soil or 3 inches of concrete

110-3.2 Duct banks. Unless otherwise shown in the plans, duct banks shall be installed so that the top of the concrete envelope is not less than 18 inches (0.5 m) below the bottom of the base or stabilized base course layers where installed under runways, taxiways, aprons, or other paved areas, and not less than 18 inches (0.5 m) below finished grade where installed in unpaved areas.

Unless otherwise shown on the plans, duct banks under paved areas shall extend at least 10 feet beyond the edges of pavement. Trenches for duct banks shall be opened the complete length before concrete is placed so that if any obstructions are encountered, provisions can be made to avoid them. Duct banks shall be constructed in accordance with the details shown on the Plans. Conduits within the duct bank shall be spaced not less than 3 inches (75 mm) apart (measured from outside wall to outside wall). All such multiple conduits shall be placed using conduit spacers applicable to the type of conduit. As the conduit laying progresses, concrete shall be placed around and on top of the conduits not less than 4 ½ inches thick unless otherwise shown on the plans. All conduits shall terminate with female ends for ease of access in current and future use. Install factory plugs in all unused ends. Do not cover the ends or plugs with concrete.

Conduits forming the duct bank shall be installed using conduit spacers. No. 4 reinforcing bars shall be driven vertically into the soil a minimum of 6 inches (150 mm) to anchor the assembly into the earth prior to placing the concrete encasement. For this purpose, the spacers shall be fastened down with locking collars attached to the vertical bars. Spacers shall be installed at 5-foot (1.5-m) intervals. Spacers shall be in the proper sizes and configurations to fit the conduits. Locking collars and spacers shall be submitted to the RPR for review prior to use.

When specified, the Contractor shall reinforce the bottom side and top of encasements with steel reinforcing mesh or fabric or other approved metal reinforcement. When directed, the Contractor shall supply additional supports where the ground is soft and boggy, where ducts cross under roadways, or where shown on the plans. Under such conditions, the complete duct structure shall be supported on reinforced concrete footings, piers, or piles located at approximately 5-foot (1.5-m) intervals. To relieve stresses on joints between concrete-encased duct banks and structure walls, reinforcement rods shall be placed in the structure wall and tied to the duct bank reinforcement at the time the duct bank is installed.

All pavement surfaces that are to have ducts installed therein shall be neatly saw cut to form a vertical face. All excavation shall be included in the contract with price for the duct.

Install a plastic, detectable, color as noted, 3 to 6 inches (75 to 150 mm) wide tape, 8 inches (200 mm) minimum below grade above all underground conduit or duct lines not installed under pavement. Utilize the 3-inch (75-mm) wide tape only for single conduit runs. Utilize the 6-inch (150-mm) wide tape for multiple conduits and duct banks. Install one warning tape above each counterpoise wire installed.

When existing cables are to be placed in split duct, encased in concrete, the cable shall be carefully located and exposed by hand tools. Prior to being placed in duct, the RPR shall be notified so that he may inspect the cable and determine that it is in good condition. Where required, split duct shall be installed as shown on the drawings or as required by the RPR.

Where duct banks are being extended, or where the duct bank is structurally tied to existing concrete, Contractor shall apply a concrete bonding agent to the surface of existing concrete prior to pouring fresh concrete.

Counterpoise wire and ground rods shall be installed in accordance with Item L-108, Underground Cable for Airports.

110-3.3 Conduits without concrete encasement. Trenches for single-conduit lines shall be not less than 6 inches (150 mm) nor more than 12 inches (300 mm) wide. The trench for 2 or more conduits installed at the same level shall be proportionately wider. Trench bottoms for conduits without concrete encasement shall be made to conform accurately to grade so as to provide uniform support for the conduit along its entire length.

Unless otherwise shown on the plans, a layer of fine earth material, at least 3 inches (75 mm) thick (loose measurement) shall be placed in the bottom of the trench as bedding for the conduit. The bedding material shall consist of soft dirt, sand or other fine fill, and it shall contain no particles that would be retained on a

1/4-inch (6.3 mm) sieve. The bedding material shall be tamped until firm. Flowable backfill may alternatively be used.

Unless otherwise shown on plans, conduits shall be installed so that the tops of all conduits within the Airport's secured area where trespassing is prohibited are at least 18 inches (0.5 m) below the finished grade. Conduits outside the Airport's secured area shall be installed so that the tops of the conduits are at least 24 inches (60 cm) below the finished grade per National Electric Code (NEC), Table 300.5.

When two or more individual conduits intended to carry conductors of equivalent voltage insulation rating are installed in the same trench without concrete encasement, they shall be spaced not less than 3 inches (75 mm) apart (measured from outside wall to outside wall) in a horizontal direction and not less than 6 inches (150 mm) apart in a vertical direction. Where two or more individual conduits intended to carry conductors of differing voltage insulation rating are installed in the same trench without concrete encasement, they shall be placed not less than 3 inches (75 mm) apart (measured from outside wall to outside wall) in a horizontal direction and lot less than 6 inches (150 mm) apart in a vertical direction.

Trenches shall be opened the complete length between normal termination points before conduit is installed so that if any unforeseen obstructions are encountered, proper provisions can be made to avoid them.

Conduits shall be installed using conduit spacers. No. 4 reinforcing bars shall be driven vertically into the soil a minimum of 6 inches (150 mm) to anchor the assembly into the earth while backfilling. For this purpose, the spacers shall be fastened down with locking collars attached to the vertical bars. Spacers shall be installed at 5-foot (1.5-m) intervals. Spacers shall be in the proper sizes and configurations to fit the conduits. Locking collars and spacers shall be submitted to the RPR for review prior to use.

Counterpoise wire and ground rods shall be installed in accordance with Item L-108, Underground Cable for Airports.

Install a plastic, detectable, color as noted, 3 to 6 inches (75 to 150 mm) wide tape, above all underground conduit or duct lines not installed under pavement, at the depth shown on the plans. One warning tape shall be installed above each counterpoise wire installed.

110-3.4 Markers. Not used.

110-3.5 Backfilling for conduits. For conduits, sand, soft earth, or other fine fill (loose measurement), as shown on the Plans, shall be placed around the conduits ducts and carefully tamped around and over them with hand tampers. The remaining trench shall then be backfilled and compacted per Item P-152 except that material used for back fill shall be select material not larger than 4 inches (100 mm) in diameter.

Flowable backfill may alternatively be used, provided flowable fill is used as bedding below the conduit. Flowable fill shall not be used above the bottom of subgrade beneath paved areas.

Trenches shall not contain pools of water during back filling operations.

The trench shall be completely backfilled and tamped level with the adjacent surface; except that, where sod is to be placed over the trench, the backfilling shall be stopped at a depth equal to the thickness of the sod to be used, with proper allowance for settlement.

Any excess excavated material shall be removed and disposed of per instructions issued by the RPR.

110-3.6 Backfilling for duct banks. After the concrete has cured, the remaining trench shall be backfilled and compacted in accordance with the details shown on the Plans. Where duct banks are installed under pavement, one moisture/density test per lift shall be made for each 250 linear feet (76 m) of duct bank or one work period's construction, whichever is less.

Flowable backfill may alternatively be used Flowable fill shall not be used above the bottom of subgrade beneath paved areas.

Trenches shall not contain pools of water during backfilling operations.

The trench shall be completely backfilled and tamped level with the adjacent surface; except that, where sod is to be placed over the trench, the backfilling shall be stopped at a depth equal to the thickness of the sod to be used, with proper allowance for settlement.

Any excess excavated material shall be removed and disposed of per instructions issued by the RPR.

110-3.7 Restoration. Suitable material excavated for conduit or duct bank installation may be deposited in embankment or shoulders areas. Excess suitable material and unsuitable material shall be disposed of on airport property or as ordered by the Engineer. Where sod has been removed, it shall be replaced as soon as possible after the backfilling is completed. All areas disturbed by the work shall be restored to its original condition. The restoration shall include topsoiling, seeding, and mulching shown on the plans. The Contractor shall be held responsible for maintaining all disturbed surfaces and replacements until final acceptance. Where conduits or duct banks are installed or removed outside of the general grading limits, or in areas that would not otherwise be disturbed, restoration shall be considered necessary and incidental to the work of this item and the costs shall be included in the associated pay items of work involved. Where conduits or duct banks are installed or removed within the general grading limits, restoration of the area will not be necessary as payment for establishment of turf or pavement will be included in the various pay items of work involved. Following restoration of all trenching near airport movement surfaces, the Contractor shall thoroughly visually inspect the area for foreign object debris (FOD), and remove any such FOD that is found. This FOD inspection and removal shall be considered incidental to the pay item of which it is a component part.

110-3.8 Cable Removal. All abandoned cable shall be removed from duct banks and conduits in cases where the duct bank or conduit is scheduled to remain and be abandoned in place. Abandoned cable is considered both cables abandoned as part of this project as well as previously abandoned and verified inactive/ dead cables. Cable removal is measured per the length of electrical conduit, regardless of how many cables are contained within the conduit.

It is the overall intent of the design to remove all previously abandoned cables as well as cables scheduled to be abandoned as part of this project in the existing duct bank system. Any duct banks shown on the plans to have abandoned cable removed shall be thoroughly inspected by the contractor in the presence of the RPR. Any and all abandoned cable to be removed shall be approved by the RPR prior to removal. The methods for removal of abandoned cable shall also be approved by the RPR.

The process used to remove existing cables shall not damage existing cables to remain. In the event of damage to existing utilities, operating cables, electrical manholes or duct banks the Engineer is to be notified immediately. The Contractor shall repair all damage, as directed by the RPR, immediately and at the Contractor's expense.

All cable removed shall become the property of the Contractor and shall be disposed of in a manner which is in accordance with all Federal, State and Local regulations. In no case, shall any removed cables be left within the airport limits. Contractor shall make every effort to recycle the used cable at an approved recycling center. When the Contractor chooses to dispose of cable off the airport property, the Contractor shall obtain and file with the RPR permission in writing from the property owner for the use of private property for this purpose.

No direct payment will be made for spoiling operations. The cost of spoiling material off-site shall be considered incidental to this Contract and the costs shall be included in the various pay items involved.110-3.9 Conduit and duct bank removal.

Where existing conduits and duct banks are to be removed in the same trench as proposed conduits and duct banks, the Contractor shall consider such removal as an incidental part of construction and include the costs thereof in the various pay items involved. Where existing conduits and duct banks are to be

removed outside of proposed trenching limits, they shall be paid for separately. The cost of such removal shall include excavation, conduit and duct bank removal, disposal, and backfill. Restoration shall be as specified below in the section titled "Restoration". Backfill shall be with suitable on-site material unless otherwise shown or specified. Backfill under paved areas shall be as shown on the plans. Conduit and duct banks shall be removed as shown on the plans and as directed by the Engineer. When conduit and duct banks are removed and disconnected from existing structures, the openings in the structure shall be closed watertight with brick and mortar. When conduits and duct banks are to be replaced, any structure modifications required to accept the proposed conduit and duct bank shall be done with all connections grouted watertight.

Where conduits or duct banks are installed or removed outside of the general grading limits, or in areas that would not otherwise be disturbed, restoration shall be considered necessary and incidental to the work of this item and the costs shall be included in the associated pay items of work involved.

Where conduits or duct banks are installed or removed within the general grading limits, restoration of the area will not be necessary as payment for establishment of turf or pavement will be included in the various pay items of work involved.

110-3.9 Conduit and duct bank removal. In general, cables will be removed from conduits which will be abandoned in-place. Where existing conduits and duct banks are to be removed in the same trench as proposed conduits and duct banks, or where other contract excavation requires or mandates incidental conduit removal, the Contractor shall consider such removal as an incidental part of construction and include the costs thereof in the various pay items involved. No separate payment will be made for conduit removal or disposal.

Restoration shall be as specified in the section titled "Restoration". Backfill shall be with suitable on-site material unless otherwise shown or specified. Backfill under paved areas shall be as shown on the plans. Conduit and duct banks shall be removed as shown on the plans and as directed by the Engineer. When conduit and duct banks are removed and disconnected from existing structures, the openings in the structure shall be closed watertight with brick and mortar. When conduits and duct banks are to be replaced, any structure modifications required to accept the proposed conduit and duct bank shall be done with all connections grouted watertight.

Where conduits or duct banks are installed or removed outside of the general grading limits, or in areas that would not otherwise be disturbed, restoration shall be considered necessary and incidental to the work of this item and the costs shall be included in the associated pay items of work involved.
Where conduits or duct banks are installed or removed within the general grading limits, restoration of the area will not be necessary as payment for establishment of turf or pavement will be included in the various pay items of work involved.

110-3.10 Grouting conduits in pavement. Conduit trenches in pavement to receive concrete grout material shall be thoroughly cleaned to the satisfaction of the Engineer prior to placement of grout material. Trench sides shall be saw cut to a vertical face with no surface spalling. Grout material shall be placed to the depths shown on the Contract Drawings. Grouting conduits in pavement shall be considered necessary and incidental to the work of this item and the costs shall be included in the various pay items involved.

METHOD OF MEASUREMENT

110-4.1 Underground conduits and duct banks shall be measured by the linear feet of conduits and duct banks installed, including encasement, locator tape, trenching and backfill with designated material, and

restoration, and for drain lines, the termination at the drainage structure, all measured in place, completed, and accepted. Separate measurement shall be made for the various types and sizes.

BASIS OF PAYMENT

110-5.1 Payment will be made at the contract unit price per linear foot for each type and size of conduit and duct bank completed and accepted, including trench and backfill with the designated material, and, for drain lines, the termination at the drainage structure. This price shall be full compensation for removal and disposal of existing duct banks and conduits as shown on the plans, furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item per the provisions and intent of the plans and specifications.

Payment will be made under:

Item L-110-1	2-Way, 4-Inch Concrete Encased Duct Bank - per linear foot
Item L-110-2	4-Way, 4-Inch Concrete Encased Duct Bank - per linear foot
Item L-110-3	2-Inch Dia. Sch. 80 PVC Conduit in Turf - per linear foot
Item L-110-4	4-Inch Dia. Sch. 80 PVC Conduit in Turf - per linear foot
Item L-110-5	2-Inch Dia. Concrete Encased Sch. 40 PVC Conduit in Pavement - per linear foot
Item L-110-6	4-Inch Dia. Concrete Encased Sch. 40 PVC Conduit in Pavement - per linear foot
Item L-110-7	Cable Removal in Existing Duct Bank or Conduit - per linear foot
Item L-110-8	2-Inch Sch. 80 PVC Electrical Drain Pipe - per linear foot

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circular (AC)

AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-53	Airport Lighting Equipment Certification Program

ASTM International (ASTM)

ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

National Fire Protection Association (NFPA)

NFPA-70	National Electrical Code (NEC)

Underwriters Laboratories (UL)

UL Standard 6	Electrical Rigid Metal Conduit - Steel
UL Standard 514B	Conduit, Tubing, and Cable Fittings
UL Standard 514C	Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
UL Standard 1242	Electrical Intermediate Metal Conduit Steel

UL Standard 651	Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings

END OF ITEM L-110

Item L-115 Electrical Manholes and Junction Structures

DESCRIPTION

115-1.1 This item shall consist of electrical manholes and junction structures (hand holes, pull boxes, junction cans, etc.) installed per this specification, at the indicated locations and conforming to the lines, grades and dimensions shown on the plans or as required by the RPR. This item shall include the installation of each electrical manhole and/or junction structures with all associated excavation, backfilling, sheeting and bracing, concrete, reinforcing steel, appurtenances, testing, dewatering and restoration of surfaces to the satisfaction of the RPR including removal of existing manholes and junction structures as shown on the plans.

This item shall also include the modification or removal of existing electrical manholes and junction structures with all associated excavation, backfilling, sheeting and bracing, concrete, reinforcing steel, ladders, appurtenances, testing, dewatering and restoration of surfaces to the satisfaction of the RPR.

EQUIPMENT AND MATERIALS

115-2.1 General.

a. All equipment and materials covered by referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when so requested by the RPR.

b. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications. Materials supplied and/or installed that do not comply with these specifications shall be removed (when directed by the RPR) and replaced with materials that comply with these specifications at the Contractor's cost.

c. All materials and equipment used to construct this item shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete any non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment to which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in the project that may accrue directly or indirectly from late submissions or resubmissions of submittals.

d. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications**.** The Contractor's submittals shall be neatly bound in a properly sized 3-ring binder, tabbed by specification section. The RPR reserves the right to reject any and all equipment, materials or procedures that do not meet the system design and the standards and codes, specified in this document.

e. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from the date of final

acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

115-2.2 Cast-in-place concrete structures. Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures. Cast-in-place concrete structures shall be as shown on the plans. Provide cast-in-place concrete structures where shown on the plans. Cast-in-place concrete structures shall conform to the details and dimensions shown on the plans. Contractor may precast structures to the details and dimensions shown on the plans. Reinforcing steel shall be deformed bars of new billet steel meeting the requirements of ASTM A 615, Grade 60. Reinforcing steel shall be hot dipped galvanized in accordance with ASTM A-123, or epoxy coated.

115-2.3 Precast concrete structures. Provide precast concrete structures where shown on the plans. Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another engineer approved third party certification program and shall be manufactured in accordance with and conforming to ASTM C913 and ASTM C478. Structures shall be pre-cast and designed to withstand aircraft loads as shown on the plans. The shop drawings shall have all reinforcement shown and must be accompanied by strength design calculations prepared and stamped by a Licensed Professional Engineer in NYS. Signed and sealed shop drawings, design calculations, and other information requested by the RPR shall be submitted by the Contractor to allow for a full evaluation by the RPR. The RPR shall review per the process defined in the General Provisions.

Precast structures shall have bitumastic sealer placed between all joints to make them watertight. Openings or knockouts shall be provided in the structure as detailed on the plans. Precast structures with multiple sections shall have bitumastic sealer placed between all joints to make them watertight. Threaded inserts and pulling eyes shall be cast in as shown on the plans.

115-2.4 Junction cans. Junction cans shall be L-867 Class 1A (non-load bearing) or L-868 Class 1A (load bearing) hot dipped galvanized airport light bases that are encased in concrete. Junction cans shall be size D (16-inch diameter), unless otherwise shown on the plans. The light bases shall have a L-894 blank cover, gasket, and stainless steel hardware. All bolts, studs, nuts, lock washers, and other similar fasteners used for the light fixture assemblies must be fabricated from 316L (equivalent to EN 1.4404), 18-8, 410, or 416 stainless steel. If 18-8, 410, or 416 stainless steel is utilized it shall be passivated and be free from any discoloration. Covers shall be 3/8-inch (9-mm) thickness for L-867 and 3/4-inch (19-mm) thickness for L-868. All junction cans shall be provided with both internal and external ground lugs.

115-2.5 Mortar. The mortar shall be composed of one part of cement and two parts of mortar sand, by volume. The cement shall be per the requirements in ASTM C150, Type I. The sand shall be per the requirements in ASTM C144. Hydrated lime may be added to the mixture of sand and cement in an amount not to exceed 15% of the weight of cement used. The hydrated lime shall meet the requirements of ASTM C206. Water shall be potable, reasonably clean and free of oil, salt, acid, alkali, sugar, vegetable, or other substances injurious to the finished product.

115-2.6 Concrete. Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures.

115-2.7 Frames and covers. The frames shall conform to one of the following requirements:

a. ASTM A536 Ductile iron castings

Castings shall be rated as airport extra heavy duty, proof load tested to 200,000 pounds as shown on the plans.

All castings or structural steel units shall conform to the dimensions shown on the plans and shall be designed to support the loadings specified.

Each frame and cover unit shall be provided with fastening members to prevent it from being dislodged by traffic, but which will allow easy removal for access to the structure.

All castings shall be thoroughly cleaned. After fabrication, structural steel units shall be galvanized to meet the requirements of ASTM A123.

Each cover shall have the word "ELECTRIC" or other approved designation cast on it. Each frame and cover shall be as shown on the plans or approved equivalent. No cable notches are required.

Each manhole shall be provided with a "DANGER -- PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER" safety warning sign as detailed in the Contract Documents and in accordance with OSHA 1910.146 (c)(2).

115-2.8 Ladders. Not used.

115-2.9 Reinforcing steel. All reinforcing steel shall be deformed bars of new billet steel meeting the requirements of ASTM A615, Grade 60.

115-2.10 Bedding/special backfill. Bedding or special backfill shall conform to the requirements of Item D-711 - Lining, unless otherwise shown the plans.

115-2.11 Flowable backfill. Flowable material used to backfill shall conform to the requirements of Item P-153, Controlled Low Strength Material.

115-2.12 Cable trays. Cable trays shall be of plastic ladder type, 6-inch wide and 4 inches deep, unless otherwise shown. Cable trays shall be located as shown on the plans.

115-2.13 Plastic conduit. Plastic conduit shall comply with Item L-110, Airport Underground Electrical Duct Banks and Conduits.

115-2.14 Conduit terminators. Conduit terminators shall be pre-manufactured for the specific purpose and sized as required or as shown on the plans.

115-2.15 Pulling-in irons. Pulling-in irons shall be manufactured with 7/8-inch (22 mm) diameter hot-dipped galvanized steel or stress-relieved carbon steel roping designed for concrete applications (7 strand, 1/2-inch (12 mm) diameter with an ultimate strength of 270,000 psi (1862 MPa)) or stainless steel as shown on the plans. Where stress-relieved carbon steel roping is used, a rustproof sleeve shall be installed at the hooking point and all exposed surfaces shall be encapsulated with a polyester coating to prevent corrosion.

115-2.16 Ground rods. Ground rods shall be copper-clad steel. The ground rods shall be of the length and diameter specified on the plans, but in no case be less than 8 feet (2.4 m) long and 5/8 inch (16 mm) in diameter.

115-2.17 Separation Geotextile. Separation geotextile shall be Class 2; 0.02 sec^{-1} permittivity per ASTM D4491; Apparent opening size per ASTM D4751 with 0.60 mm maximum average roll value. The cost of separation fabric used for the placement of structures shall be included in the cost of the concrete structures.

CONSTRUCTION METHODS

115-3.1 Unclassified excavation. It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Damage to utility lines, through lack of care in excavating, shall be repaired or replaced to the satisfaction of the RPR without additional expense to the Owner.

The Contractor shall perform excavation for structures and structure footings to the lines and grades or elevations shown on the plans. The excavation shall be of sufficient size to permit the placing of the full width and length of the structure or structure footings shown.

All excavation shall be unclassified and shall be considered incidental to Item L-115. Dewatering necessary for structure installation and erosion per federal, state, and local requirements is incidental to Item L-115.

Boulders, logs and all other objectionable material encountered in excavation shall be removed. All rock and other hard foundation material shall be cleaned of all loose material and cut to a firm surface either level, stepped or serrated, as directed by the RPR. All seams, crevices, disintegrated rock and thin strata shall be removed. When concrete is to rest on a surface other than rock, special care shall be taken not to disturb the bottom of the excavation. Excavation to final grade shall not be made until just before the concrete or reinforcing is to be placed.

The Contractor shall provide all bracing, sheeting and shoring necessary to implement and protect the excavation and the structure as required for safety or conformance to governing laws. The cost of bracing, sheeting and shoring shall be included in the unit price bid for the structure.

Unless otherwise provided, bracing, sheeting and shoring involved in the construction of this item shall be removed by the Contractor after the completion of the structure. Removal shall be effected in a manner that will not disturb or mar finished masonry. The bracing, sheeting or shoring shall not be removed in one operation, but shall be done in successive stages of backfill to prevent overloading of the pipe during backfilling operations. The cost of bracing, sheeting and shoring, and its removal shall be included in the unit price bid for the structure.

After each excavation is completed, the Contractor shall notify the RPR. Structures shall be placed after the RPR has approved the depth of the excavation and the suitability of the foundation material.

Prior to installation the Contractor shall provide a minimum of 12 inches of lining as a suitable base to receive the structure. The lining shall be compacted to 95% maximum density in accordance with ASTM D 1557, graded level and at proper elevation to receive the structure in proper relation to the conduit grade or ground cover requirements, as indicated on the plans.

Soil below the lining shall be compacted to 95% maximum density for non-cohesive soils and 90% maximum density for cohesive soils in accordance with ASTM D 1557.

115-3.2 Concrete structures. Concrete structures shall be built on prepared foundations conforming to the dimensions and form indicated on the plans. The concrete and construction methods shall conform to the requirements specified in Item P-610. Any reinforcement required shall be placed as indicated on the plans and shall be approved by the RPR before the concrete is placed.

115-3.3 Precast unit installations. Precast units shall be installed plumb and true. Joints shall be made watertight by use of sealant at each tongue-and-groove joint and at roof of manhole. Excess sealant shall be removed and severe surface projections on exterior of neck shall be removed.

115-3.4 Placement and treatment of castings, frames and fittings. All castings, frames and fittings shall be placed in the positions indicated on the Plans or as directed by the RPR and shall be set true to line and to correct elevation. If frames or fittings are to be set in concrete or cement mortar, all anchors or bolts shall be in place and position before the concrete or mortar is placed. The unit shall not be disturbed until the mortar or concrete has set.

Field connections shall be made with bolts, unless indicated otherwise. Welding will not be permitted unless shown otherwise on the approved shop drawings and written approval is granted by the casting manufacturer. Erection equipment shall be suitable and safe for the workman. Errors in shop fabrication or deformation resulting from handling and transportation that prevent the proper assembly and fitting of parts shall be reported immediately to the RPR and approval of the method of correction shall be obtained. Approved corrections shall be made at Contractor’s expense.

Anchor bolts and anchors shall be properly located and built into connection work. Bolts and anchors shall be preset by the use of templates or such other methods as may be required to locate the anchors and anchor bolts accurately.

Pulling-in irons shall be located opposite all conduit entrances into structures to provide a strong, convenient attachment for pulling-in blocks when installing cables. Pulling-in irons shall be set directly into the concrete walls of the structure.

115-3.5 Installation of ladders. Not used.

115-3.6 Removal of sheeting and bracing. In general, all sheeting and bracing used to support the sides of trenches or other open excavations shall be withdrawn as the trenches or other open excavations are being refilled. That portion of the sheeting extending below the top of a structure shall be withdrawn, unless otherwise directed, before more than 6 inches (150 mm) of material is placed above the top of the structure and before any bracing is removed. Voids left by the sheeting shall be carefully refilled with selected material and rammed tight with tools especially adapted for the purpose or otherwise as may be approved.

The RPR may direct the Contractor to delay the removal of sheeting and bracing if, in his judgment, the installed work has not attained the necessary strength to permit placing of backfill.

115-3.7 Backfilling. After a structure has been completed, the area around it shall be backfilled with suitable on-site material in horizontal layers not to exceed 6 inches (150 mm) in thickness measured after compaction. For backfill with suitable on-site material, the material shall be compacted to the density requirements of embankment as specified in Item P-152. For backfill with select material, compaction shall be in accordance with the referenced specification. Each layer shall be deposited all around the structure to approximately the same elevation. The top of the fill shall meet the elevation shown on the plans or as directed by the RPR.

Backfill shall not be placed against any structure until approval is given by the RPR. In the case of cast in place concrete, such approval shall not be given until tests made by the laboratory under supervision of the RPR establish that the concrete has attained sufficient strength to provide a factor of safety against damage or strain in withstanding any pressure created by the backfill or the methods used in placing it.

Where required, the RPR may direct the Contractor to add, at his own expense, sufficient water during compaction to assure a complete consolidation of the backfill. The Contractor shall be responsible for all damage or injury done to conduits, duct banks, structures, property or persons due to improper placing or compacting of backfill.

115-3.8 Connection of duct banks. To relieve stress of joint between concrete-encased duct banks and structure walls, reinforcement rods shall be placed in the structure wall and shall be formed and tied into duct bank reinforcement at the time the duct bank is installed. The size and spacing of the reinforcing bars shall match those in the concrete encased duct bank, but in no case shall they be less than No. 4 bars spaced at 6 inches maximum on center.

115-3.9 Grounding. A ground rod shall be installed in the floor of all concrete structures so that the top of rod extends 6 inches (150 mm) above the floor. The ground rod shall be installed within one foot (30 cm) of a corner of the concrete structure and shall be safety capped. Where the soil condition does not permit driving the ground rod into the earth without damage to the ground rod, the Contractor shall drill a 4-inch (100 mm) diameter hole into the earth to receive the ground rod. The hole around the ground rod shall be filled throughout its length, below slab, with Portland cement grout. Ground rods shall be installed in precast bottom slab of structures by drilling a hole through bottom slab and installing the ground rod. Bottom slab penetration shall be sealed watertight with Portland cement grout around the ground rod.

A grounding bus of 4/0 bare stranded copper shall be exothermically bonded to the ground rod and loop the concrete structure walls. The ground bus shall be a minimum of one foot (30 cm) above the floor of the structure and separate from other cables. No. 2 American wire gauge (AWG) bare copper pigtails shall bond the grounding bus to all metal cable trays and other metal hardware within the concrete structure. Connections to the grounding bus shall be exothermic. If an exothermic weld is not possible, connections

to the grounding bus shall be made by using connectors approved for direct burial in soil or concrete per UL 467. Hardware connections may be mechanical, using a lug designed for that purpose.

115-3.10 Cleanup and repair. After erection of all galvanized items, damaged areas shall be repaired by applying a liquid cold-galvanizing compound per MIL-P-21035. Surfaces shall be prepared and compound applied per the manufacturer's recommendations.

Prior to acceptance, the entire structure shall be cleaned of all dirt and debris.

115-3.11 Restoration. After the backfill is completed, the Contractor shall dispose of all surplus material, dirt and rubbish from the site. Surplus dirt may be incorporated into embankments on the project site provided it is suitable material. The Contractor shall restore all disturbed areas equivalent to or better than their original condition. Where no other work or soil disturbance is required, restoration shall be considered incidental to the respective Item L-115 pay item.

Electrical manholes and junction structures in areas of existing special surface treatment, such as aprons, taxiways, runways, shoulders, roads, sidewalks, or similar stabilized surfaces shall be restored using materials comparable to original materials, and at depths matching existing layers. Payment for restoration shall be considered a subsidiary and incidental part of the completion of this item and as such, the Contractor shall include all costs associated with restoration in the various pay items involved.

Electrical manholes and junction structures in proposed turf areas shall be restored in accordance with the topsoil, seeding and mulching specifications of this contract. Topsoil, seeding and mulching will be paid for at the contract unit price for the pay items involved. All other work associated with restoration shall be considered a subsidiary and incidental part of the completion of this item and as such, the Contractor shall include the costs associated with restoration in the various pay items involved.

Electrical manholes and junction structures in areas of proposed pavement such as aprons, taxiways, runways, shoulders, roads, sidewalks, or other similar stabilized surfaces shall be restored using the materials specified or as shown on the plans. Payment for restoration up to the bottom of the proposed pavement section shall be considered a subsidiary and incidental part of the completion of this item and as such, the Contractor shall include all costs associated with restoration in the various pay items involved.

The Contractor shall grade around structures as required to provide positive drainage away from the structure.

Following restoration of all excavations near airport movement surfaces, the Contractor shall thoroughly visually inspect the area for foreign object debris (FOD), and remove any such FOD that is found. This FOD inspection and removal shall be considered incidental to the pay item of which it is a component part.

After all work is completed, the Contractor shall remove all tools and other equipment, leaving the entire site free, clear and in good condition.

115-3.12 Inspection. Prior to final approval, the electrical structures shall be thoroughly inspected for conformance with the plans and this specification. Any indication of defects in materials or workmanship shall be further investigated and corrected by the Contractor without additional compensation. The earth resistance to ground of each ground rod shall not exceed 25 ohms. Each ground rod shall be tested using the fall-of-potential ground impedance test per American National Standards Institute / Institute of Electrical and Electronic Engineers (ANSI/IEEE) Standard 81. This test shall be performed prior to establishing connections to other ground electrodes.

115-3.13 Manhole elevation adjustments. The Contractor shall adjust the tops of existing manholes and junction structures in areas designated in the Contract Documents to the new elevations shown. The Contractor shall be responsible for determining the exact height adjustment required to raise or lower the top of each manhole and junction structures to the new elevations. The existing top elevation of each manhole and junction structures to be adjusted shall be determined in the field and subtracted/added from the proposed top elevation.

The Contractor shall remove/extend the existing top section or ring and cover on the manhole structure or manhole access. The Contractor shall install precast concrete sections or grade rings of the required dimensions to adjust the manhole top to the new proposed elevation or shall cut the existing manhole walls to shorten the existing structure, as required by final grades. The Contractor shall reinstall the manhole top section or ring and cover on top and check the new top elevation. Adjustments shall be as shown on the plans. Precast concrete sections or grade rings shall be in accordance with paragraph 115-2.3.

Where shown on the plans, the Contractor shall construct a concrete slab around the top of adjusted structures located in graded areas that are not to be paved. The concrete slab shall conform to the dimensions shown on the plans.

115-3.14 Duct extension to existing ducts. Junction structures shall be placed at the locations shown on the plans. Where existing concrete encased ducts are to be extended to the structure, the duct extension shall be concrete encased plastic conduit. The fittings to connect the ducts together shall be standard manufactured connectors designed and approved for the purpose. The duct extensions shall be installed according to the concrete encased duct detail and as shown on the plans.

The duct or conduit extension shall be made in accordance with Item L-110, Airport Underground Electrical Duct. Where indicated on the plans, duct or conduit extensions shall be considered a subsidiary and incidental part of the completion of this item and as such, the Contractor shall include all costs in the various pay items involved.

115-3.15 Removal of existing structures. Existing structures shall be removed at the locations shown on the plans and as directed by the Engineer. The cost of such removal shall include excavation, removal, backfilling and disposal of existing structures. Restoration shall be as specified above in the section titled "Restoration". Backfill shall be with suitable on-site material unless otherwise shown or specified. Backfill under paved areas shall be as shown on the plans. Excess material is to be disposed of on site at the spoil area.

METHOD OF MEASUREMENT

115-4.1 Electrical manholes, junction structures, modification of existing structures, and removal of existing structures shall be measured by each unit completed in place and accepted, or removed. The following items shall be included in the price of each unit: All required excavation and dewatering; sheeting and bracing; all required backfilling with on-site materials; restoration of all surfaces and finished grading and turfing; all required connections; temporary cables and connections; and ground rod testing

115-4.2 Manhole elevation adjustments shall be measured by the completed unit installed, in place, completed, and accepted. Separate measurement shall not be made for the various types and sizes.

BASIS OF PAYMENT

115-5.1 The accepted quantity of electrical manholes, junction structures, modification of existing structures, and removal of existing structures will be paid for at the Contract unit price per each, complete and in place. This price shall be full compensation for furnishing all materials and for all preparation, excavation, backfilling and placing of the materials, furnishing and installation of appurtenances and connections to duct banks and other structures as may be required to complete the item as shown on the plans and for all labor, equipment, tools and incidentals necessary to complete the structure.

115-5.2 Payment shall be made at the contract unit price for manhole elevation adjustments. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary, including but not limited to, spacers, concrete, rebar, dewatering, excavating, backfill, topsoil, sodding and pavement restoration, where required, to complete this item as shown in the plans and to the satisfaction of the RPR.

Payment will be made under:

Item L-115-1	Precast Electrical / Communications Pull Box - per each
Item L-115-2	Electrical Junction Can - per each
Item L-115-3	Removal of Electrical / Communications Pull Box or Manhole - per each
Item L-115-4	Removal of Electrical Junction Can - per each

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

American National Standards Institute / Insulated Cable Engineers Association (ANSI/ICEA)

ANSI/IEEE STD 81	IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System

Advisory Circular (AC)

AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-26	Specification for L-823 Plug and Receptacle, Cable Connectors
AC 150/5345-42	Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and Accessories
AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-53	Airport Lighting Equipment Certification Program

Commercial Item Description (CID)

A-A 59544	Cable and Wire, Electrical (Power, Fixed Installation)

ASTM International (ASTM)

ASTM A27	Standard Specification for Steel Castings, Carbon, for General Application
ASTM A47	Standard Specification for Ferritic Malleable Iron Castings
ASTM A48	Standard Specification for Gray Iron Castings

ASTM A123	Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products
ASTM A283	Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates
ASTM A536	Standard Specification for Ductile Iron Castings
ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM C144	Standard Specification for Aggregate for Masonry Mortar
ASTM C150	Standard Specification for Portland Cement
ASTM C206	Standard Specification for Finishing Hydrated Lime

FAA Engineering Brief (EB)

EB #83	In Pavement Light Fixture Bolts

Mil Spec

MIL-P-21035	Paint High Zinc Dust Content, Galvanizing Repair

National Fire Protection Association (NFPA)

NFPA-70	National Electrical Code (NEC)

END OF ITEM L-115

ITEM L-125 INSTALLATION OF AIRPORT LIGHTING SYSTEMS

DESCRIPTION

125-1.1 This item shall consist of airport lighting systems furnished and installed in accordance with this specification, the referenced specifications, and the applicable advisory circulars (ACs). The systems shall be installed at the locations and in accordance with the dimensions, design, and details shown in the plans. This item shall include the furnishing of all equipment, materials, services, and incidentals necessary to place the systems in operation as completed units to the satisfaction of the RPR.

125-1.2 Qualifications. Airfield lighting circuits differ greatly from standard commercial and industrial lighting by using constant current series circuits. The prime contractor shall submit the electrical subcontractors qualifications for review and approval during the pre-construction activities. The RPR, Owner and Airport Operations will review and make a determination on the electrical contractor's qualifications.

The following minimum qualifications are required:

1. The contractor shall have a NYS licensed master electrician on staff.
2. The contractor shall have a minimum of 5 years of aviation electrical experience, with work aspects matching the electrical scope of work under this project. Provide the project name and location, brief scope of work, contact reference and construction value (electrical items only) of at least 5 similar projects completed in the 5-year timeframe. This project includes the installation of constant current regulators and airfield lighting and signage.
3. Contractor shall demonstrate L-823 connector installation procedures by the actual person(s) designated to perform the work during construction to the SYR airport electrician and the RPR prior to the installation of any kits. Demonstration shall include all necessary tools and supplies as required.
4. Catalog data and calibration test reports for all electrical testing equipment including grounding and electrical circuit test equipment.
5. Lock out/ tag out procedures. Must incorporate Airport regulations.

EQUIPMENT AND MATERIALS

125-2.1 General.

a. Airport lighting equipment and materials covered by Federal Aviation Administration (FAA) specifications shall be certified under the Airport Lighting Equipment Certification Program in accordance with AC 150/5345-53, current version. FAA certified airfield lighting shall be compatible with each other to perform in compliance with FAA criteria and the intended operation. If the Contractor provides equipment that does not performs as intended because of incompatibility with the system, the Contractor assumes all costs to correct the system for to operate properly.

b. Manufacturer's certifications shall not relieve the Contractor of their responsibility to provide materials in accordance with these specifications and acceptable to the RPR. Materials supplied and/or

installed that do not comply with these specifications shall be removed, when directed by the RPR and replaced with materials, which do comply with these specifications, at the sole cost of the Contractor.

c. All materials and equipment used shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Clearly mark each copy to identify pertinent products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be clearly made with arrows or circles (highlighting is not acceptable). The Contractor shall be responsible for delays in the project accruing directly or indirectly from late submissions or resubmissions of submittals.

d. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be submitted in a neatly bound, properly sized 3-ring binder, tabbed by specification section. The RPR reserves the right to reject any or all equipment, materials or procedures, which, in the RPR's opinion, does not meet the system design and the standards and codes, specified herein.

e. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner. All LED light fixtures, with the exception of obstruction lighting (AC 150/5345-43) must be warranted by the manufacturer for a minimum of 4 years after date of installation inclusive of all electronics.

125-2.2 Conduit/Duct. Conduit shall conform to Specification Item L-110 Airport Underground Electrical Duct Banks and Conduits.

125-2.3 Cable and Counterpoise. Cable and Counterpoise shall conform to Item L-108 Underground Power Cable for Airports.

125-2.4 Tape. Plastic tape shall meet the requirements of ASTM D1000, such as Scotch Electrical Tapes number Scotch 88 (1-1/2" wide), as manufactured by the Minnesota Mining and Manufacturing Company, or approved equivalent. Rubber or synthetic rubber tape shall meet the requirements of ASTM D4388, such as Scotch 130C linerless rubber splicing tape (2" wide), as manufactured by the Minnesota Mining and Manufacturing Company, or approved equivalent.

125-2.5 Cable Connections. Cable Connections shall conform to Item L-108 Installation of Underground Cable for Airports.

125-2.6 Retroreflective Markers. Not used.

125-2.7 Runway and Taxiway Lights. Runway and taxiway lights shall conform to the requirements of AC 150/5345-46 and as shown and specified on the Contract Drawings. Lamps shall be of size and type indicated, or as required by fixture manufacturer for each lighting fixture required under this contract. Filters shall be of colors conforming to the specification for the light concerned or to the standard referenced. The airfield lighting systems are designed using the fixtures indicated on the plans. Other approved airfield lighting fixtures are permissible provided the Contractor assumes all costs for the redesign of the airfield lighting and necessary power distribution systems and all costs incurred furnishing and installing any additional equipment. In no case shall the Contractor be allowed to reduce the size of the constant current regulators or the power distribution systems.

A nominal quantity of spare lighting fixtures shall be turned over to SYR at the completion of the project, new and unpackaged. The list of requested spare light fixtures is shown on the electrical details.

125-2.8 Runway and Taxiway Signs. Runway and Taxiway Guidance Signs should conform to the requirements of AC 150/5345-44 and as shown and specified on the Contract Drawings.

125-2.9 Runway End Identifier Light (REIL). Not required.

125-2.10 Precision Approach Path Indicator (PAPI). Not required.

125-2.11 Circuit Selector Cabinet and Switches. Not Required.

125-2.12 Light Base and Transformer Housings. Light Base and Transformer Housings should conform to the requirements of AC 150/5345-42. Light bases shall be Type L-867 for non-load bearing locations or L-868 for load bearing locations, Class 1B (stainless steel), Size B (12-inch diameter) shall be provided as indicated or as required to accommodate the fixture or device installed thereon. Base plates, cover plates, and adapter plates shall be provided to accommodate various sizes of fixtures.

125-2.13 Isolation Transformers. Isolation Transformers shall be Type L-830, size as required for each installation. Transformer shall conform to AC 150/5345-47.

125-2.14 Power adapter. Not Required.

125-2.15 Concrete. Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures.

125-2.16 Reinforcing steel. All reinforcing steel shall be deformed bars of new billet steel meeting the requirements of ASTM A 615, Grade 60.

125-2.17 Anchor bolts and concrete anchor studs. Anchor bolts and concrete anchor studs shall be sized in accordance with the equipment manufacturer's requirements. Anchor bolts and studs less than 3/4 inch in diameter shall be stainless steel.

125-2.18 Water tight termination. Water tight terminations for conduits, ducts, nipples, equipment and bases shall be mechanical compression type and shall be sized for the application and number of conductors.

125-2.19 Identification tags. Identification tags shall be a 2 inch diameter disk of non-corrosive based metal with numbers permanently stamped or engraved on the surface and as shown on the plans.

125-2.20 Fixture Hold Down Bolts. Fixture hold down bolts and installations shall adhere to the following requirements: All bolts shall be all-thread, 18-8, Type 304 stainless steel and shall be a sufficient length to extend at least ½-inch past the bottom flange of the light base. Bolt information shall be submitted for approval of the Engineer. Submittal shall specifically identify, as a minimum, the bolt material, dimensions, and threading. Bolt material shall be readily identifiable in the field by appropriate ASTM markings on the bolts or by having material identified on bolt packaging, as approved through the Engineer. Stainless steel bolts shall receive anti seize compound.

125-2.21 High Performance Non-Shrink Grout. Where specified in the plans, a high performance non-shrink grout shall be used for backfill around light bases and conduit. Contractor shall use this product in accordance with the manufacturer’s recommendations and warnings. The RPR may require that Contractor have a representative of the manufacturer onsite to demonstrate the proper use of the product if Contractor cannot demonstrate prior experience.

125-2.22 Bedding. Bedding shall meet the requirements of ASTM C 33, fine aggregate for concrete. gradation shall be in accordance with the table below:

Percentage By Weight

Sieve Designations	Passing Sieves
3/8 Inch	100
No. 4	95-100
No. 8	80-100
No. 16	50-85
No. 30	25-60
No. 50	5-30
No. 100	0-10

INSTALLATION

125-3.1 Installation. The Contractor shall furnish, install, connect and test all equipment, accessories, conduit, cables, wires, buses, grounds and support items necessary to ensure a complete and operable airport lighting system as specified here and shown in the plans.

The equipment installation and mounting shall comply with the requirements of the National Electrical Code and state and local code agencies having jurisdiction.

The Contractor shall install the specified equipment in accordance with the applicable advisory circulars and the details shown on the plans.

Equipment installation shall be as shown on the plans.

125-3.1.1 Excerpts from AC 150/5340-30J, Appendix E

E.1 Electrical Notes.

E.1.1 General.

1. The electrical installation, at a minimum, must meet the NEC and local regulations.
2. The contractor must ascertain that all lighting system components furnished (including FAA approved equipment) are compatible in all respects with each other and the remainder of the new/existing system. Any non-compatible components furnished by the contractor must be replaced at no additional cost to the airport sponsor with a similar unit that is approved by the RPR and compatible with the remainder of the airport lighting system.
3. In case the contractor elects to furnish and install airport lighting equipment requiring additional wiring, transformers, adapters, mountings, etc., to those shown on the drawings and/or listed in the specifications, any cost for these items must be incidental to the equipment cost.
4. The contractor-installed equipment (including FAA approved) must not generate any EMI in the existing and/or new communications, weather, air navigation, and ATC equipment. Any equipment generating such interference must be replaced by the contractor at no additional cost with equipment meeting the applicable specifications.
5. When a specific type, style, class, etc., of FAA approved equipment is specified only that type, style, class, etc., will be acceptable, though equipment of other types, style, class, etc., may be FAA approved.
6. Any and all instructions from the RPR to the contractor regarding changes in, or deviations from, the plans and specifications must be in writing with copies sent to the airport sponsor and the FAA

field office (Airports District Office (ADO)/Airports Field Office (AFO)). The contractor must not accept any verbal instructions from the RPR regarding any changes from the plans and specifications.

7. A minimum of three copies of instruction books must be supplied with each type of equipment. For more sophisticated types of equipment, such as regulators, etc., the instruction book must contain the following:

    a. A detailed description of the overall equipment and its individual components.

    b. Theory of operation including the function of each component.

    c. Installation instructions.

    d. Start-up instructions.

    e. Preventative maintenance requirements.

    f. Chart for troubleshooting.

    g. Complete power and control detailed wiring diagram(s), showing each conductor/connection/component; "black" boxes are not acceptable. The diagram or the narrative must show voltages/currents/wave shapes at strategic locations to be used when checking and/or troubleshooting the equipment. When the equipment has several brightness steps, these parameters must be indicated for all the different modes.

    h. Parts list will include all major and minor components, such as resistors, diodes, etc. It must include a complete nomenclature of each component and, if applicable, the name of its manufacturer and the catalog number.

    i. Safety instructions.

E.1.2 Power and Control.

1. Stencil all electrical equipment to identify function, circuit voltage and phase. Where the equipment contains fuses, also stencil the fuse or fuse link ampere rating. Where the equipment does not have sufficient stenciling area, the stenciling must be done on the wall next to the unit. The letters must be one inch (25 mm) high and painted in white or black paint to provide the highest contrast with the background. Engraved plastic nameplates may also be used with one inch (25 mm) white (black background) or black (white background) characters. All markings must be of sufficient durability to withstand the environment.

2. Color code all phase wiring by the use of colored wire insulation and/or colored tape. Where tape is used, the wire insulation must be black. Black and red must be used for single-phase, three wire systems and black, red and blue must be used for three-phase systems. Neutral conductors, size No. 6 AWG or smaller, must be identified by a continuous white or natural outer finish. Conductors larger than No. 6 AWG must be identified either by a continuous white or natural gray outer finish along its entire length or by the use of white tape at its terminations and inside accessible wireways.

3. All branch circuit conductors connected to a particular phase must be identified with the same color. The color coding must extend to the point of utilization.

4. In control wiring, the same color must be used throughout the system for the same function, such as 10%, 30%, 100% brightness control, etc.

5. All power and control circuit conductors must be copper; aluminum must not be accepted. This includes wire, cable, busses, terminals, switch/panel components, etc.

6. Low voltage (600 V) and high voltage (5000 V) conductors must be installed in separate wireways.

7. Neatly lace wiring in distribution panels, wireways, switches and pull/junction boxes.
8. The minimum size of pull/junction boxes, regardless of the quantity and the size of the conductors shown, must be as follows:

a. In straight pulls, the length of the box must not be less than eight times the trade diameter of the larger conduit. The total area (including the conduit cross-sectional area) of a box end must be at least three times greater than the total trade cross-sectional area of the conduits terminating at the end.

b. In angle or u-pulls, the distance between each conduit entry inside the box and the opposite wall of the box must not be less than six times the trade diameter of the largest conduit. This distance must be increased for additional entries by the amount of the sum of the diameters of all other conduit entries on the same wall of the box. The distance between conduit entries enclosing the same conductor must of not be less than six times the trade diameter of the largest conduit.

9. A run of conduit between terminations at equipment enclosures, square ducts and pull/junction boxes, must not contain more than the equivalent of four quarter bends (360 degrees total), including bends located immediately at the terminations. Cast, conduit type outlets must not be treated as pull/junction boxes.
10. Equipment cabinets must not be used as pull/junction boxes. Only wiring terminating at the equipment must be brought into these enclosures.
11. Splices and junction points must be permitted only in junction boxes, ducts equipped with removable covers, and at easily accessible locations.
12. Circuit breakers in power distribution panel(s) must be thermal-magnetic, molded case, permanent trip with 100-ampere, minimum, frame.
13. Dual lugs must be used where two wires, size No. 6 or larger, are to be connected to the same terminal.
14. All wall mounted equipment enclosures must be mounted on wooden mounting boards.
15. Not used.
16. Rigid steel conduit must be used throughout the installation unless otherwise specified. The minimum trade size must be 3/4 inch (19 mm).
17. All rigid conduit must be terminated at CCRs with a section (10 inch (254 mm) minimum, 3-foot maximum) of flexible conduit.
18. Unless otherwise shown all exposed conduits must be run parallel to, or at right angles with, the lines of the structure.
19. All steel conduits, fittings, nuts, bolts, etc., must be galvanized.
20. Use conduit bushings at each conduit termination. Where No. 4 AWG or larger ungrounded wire is installed, use insulated bushings.
21. Use double lock nuts at each conduit termination. Use weather tight hubs in damp and wet locations. Sealing locknuts must not be used.
22. Wrap all primary and secondary power transformer connections with sufficient layers of insulating tape and cover with insulating varnish for full value of cable insulation voltage.
23. Unless otherwise noted, all indoor single conductor control wiring must be No. 12 AWG.

24. Both ends of each control conductor must be terminated at a terminal block. The terminal block must be of proper rating and size for the function intended and must be located in equipment enclosures or special terminal cabinets.
25. All control conductor terminators must be of the open-eye connector/screw type. Soldered, closed-eyed terminators, or terminators without connectors are not acceptable.
26. In terminal block cabinets, the minimum spacing between parallel terminal blocks must be 6 inches (152 mm). The minimum spacing between terminal block sides/ends and cabinet sides/bottom/top must be 5 inches (127 mm). The minimum spacing will be increased as required by the number of conductors. Additional spacing must be provided at conductor entrances.
27. Both ends of all control conductors must be identified as to the circuit, terminal, block, and terminal number. Only stick-on labels must be used.
28. A separate and continuous neutral conductor must be installed and connected for each breaker circuit in the power panel(s) from the neutral bar to each power/control circuit.
29. The following must apply to relay/contactor panel/enclosures:
    a. All components must be mounted in dust proof enclosures with vertically hinged covers.
    b. The enclosures must have ample space for the circuit components, terminal blocks, and incoming internal wiring.
    c. All incoming/outgoing wiring must be terminated at terminal blocks.
    d. Each terminal on terminal blocks and on circuit components must be clearly identified.
    e. All control conductor terminations must be of the open-eye connector/screw type. Soldered, closed-eye connectors, or terminations without connectors are not acceptable.
    f. When the enclosure cover is opened, all circuit components, wiring, and terminals must be exposed and accessible without any removal of any panels, covers, etc., except those covering high voltage components.
    g. Access to, or removal of, a circuit component or terminal block will not require the removal of any other circuit component or terminal block.
    h. Each circuit component must be clearly identified indicating its corresponding number shown on the drawing and its function.
    i. A complete wiring diagram (not a block or schematic diagram) must be mounted on the inside of the cover. The diagram must represent each conductor by a separate line.
    j. The diagram must identify each circuit component and the number and color of each internal conductor and terminal.
    k. All wiring must be neatly trained and laced.
    l. Minimum wire size must be No. 12 AWG.

E.1.3 Field Lighting.

1. Unless otherwise stated, all underground field power multiple and series circuit conductors must be FAA approved Type L-824. Insulation voltage and size must be as specified.
2. No components of the primary circuit such as cable, connectors and transformers must be brought above ground at edge lights, signs, REIL, etc.

3. There must be no exposed power/control cables between the point where they leave the underground (DEB or L-867 bases) and where they enter the equipment (such as taxiway signs, PAPI, REIL, etc.). Enclosures. These cables must be enclosed in rigid conduit or in flexible water-tight conduit with frangible coupling(s) at the grade or the housing cover, as shown in applicable details.
4. The joints of the L-823 primary connectors must be wrapped with one layer of rubber or synthetic rubber tape and one layer of plastic tape, one half lapped, extending at least 1-1/2 inches (38 mm) on each side of the joint, as shown in Figure E-9.
5. The cable entrance into the field attached L-823 connectors must be enclosed by heat-shrinkable tubing with continuous internal adhesive as shown in Figure E-9.
6. The ID of the primary L-823 field attached connectors must match the cable OD to provide a watertight cable entrance. The entrance must be encapsulated in heat shrinkable tubing with continuous factory applied internal adhesive, as shown in Figure E-9.
7. L-823 type 11, two-conductor secondary connector must be class “A” (factory molded).
8. There must be no splices in the secondary cable(s) within the stems of a runway/taxiway edge/threshold lighting fixtures and the wireways leading to taxiway signs and PAPI/REIL equipment.
9. Electrical insulating grease must be applied within the L-823, secondary, two conductor connectors to prevent water entrance. The connectors must not be taped.
10. Not used.
11. Not used.
12. A slack of 3 ft. (0.9 m), minimum above grade, must be provided in the primary cable at each transformer/connector termination.
13. Direction of primary cables must be identified by color coding as follows when facing light with back facing pavement: cable to the left is coded red and cable to the right is coded blue, this applies to the stake-mounted lights and base-mounted lights where the base has only one entrance.
14. L-867 bases must be size B, 24" (610 mm) deep Class 1 unless otherwise noted.
15. Base-mounted frangible couplings must not have weep holes to the outside. Plugged holes are not acceptable. The coupling must have a 1/4" (6 mm) diameter minimum or equivalent opening for drainage from the space around the secondary connector into the L-867 base.
16. The elevation of the frangible coupling groove must not exceed 1-1/2" (38 mm) above the edge of the cover for base-mounted couplings or the top of the stake for stake-mounted couplings.
17. Where the frangible coupling is not an integral part of the light fixture stem or mounting leg, a bead of silicone rubber seal must be applied completely around the light stem or wireway at the frangible coupling to provide a watertight seal.
18. Not used.
19. Plastic lighting fixture components, such as lamp heads, stems, frangible couplings, base covers, brackets, stakes, are not acceptable. L-867 plastic transformer housings are acceptable. A metal threaded fitting must be set in flange during casting process. Base cover bolts must be fabricated from 18-8 stainless steel.
20. The tolerance for the height of runway/taxiway edge lights must be ±1 inch (25 mm). For base-mounted lights, the specified lighting fixture height must be measured between the top of the base

flange and the top of the lens, and includes the base cover, the frangible coupling, the stem, the lamp housing and the lens.

21. The tolerance for the lateral spacing (light lane to runway/taxiway centerline) of runway/taxiway edge lights must be ±1 inch (25.4 mm). This also applies at intersections to lateral spacing between lights of a runway/taxiway and the intersecting runway/taxiway.
22. L-867 bases may be precast. Entrances into L-867 bases must be plugged from the inside with duct seal.
23. Galvanized/painted equipment/component surfaces must not be damaged by drilling, filing, etc. – this includes drain holes in metal transformer housings.
24. Not used.
25. Cable/splice/duct markers must be pre-cast concrete of the size shown. Letters/numbers/arrows for the legend to be impressed into the tops of the markers must be pre-assembled and secured in the mold before the concrete is poured. Legends inscribed by hand in wet concrete are not acceptable.
26. All underground cable runs must be identified by cable markers at 200 ft (61 m) maximum spacing with an additional marker at each change of direction of the cable run. Cable markers must be installed above the cable.
27. Not used.
28. The cable and splice markers must identify the circuits to which the cables belong. For example: RWY 4-22, PAPI-4, PAPI-22.
29. Locations of ends of all underground ducts must be identified by duct markers.
30. The preferred mounting method of runway and taxiway signs is by the use of single row of legs. However, two rows will be acceptable.
31. Reference Figure E-13 and Figure E-14 for an example of a lighted sign installation.
    a. Power to the sign must be provided through breakaway cable connectors installed within the frangible point portion of the sign's mounting legs.
    b. There must be no above ground electrical connection between signs in a sign array.
32. Not used.
33. Not used.
34. All power and control cables in man/hand holes must be tagged. Use embossed stainless steel strips or tags attached at both ends to the cable by the use of UV resistant plastic straps. A minimum of two tags must be provided on each cable in a man/hand hole - one at the cable entrance, and one at the cable exit.
35. Apply a corrosion inhibiting, anti-seize compound to all screws, nuts and frangible coupling threads. If coated bolts are used per EB #83, do not apply anti-seize compound.
36. There must be no splices between the isolation transformers. L-823 connectors are allowed at transformer connections only, unless shown otherwise.

E.1.4 Equipment Grounding.

1. Ground all non-current-carrying metal parts of electrical equipment by using conductors sized and routed per NEC Handbook, Article 250.

2. All ground connections to ground rods, busses, panels, etc., must be made with pressure type solderless lugs and ground clamps. Soldered or bolt and washer type connections are not acceptable. Clean all metal surfaces before making ground connections. Exothermic welds are the preferred method of connection to a ground rod
3. Tops of ground rods must be 6 inches (152 mm) below grade.
4. The resistance to ground of the vault grounding system with the commercial power line neutral disconnected must not exceed 10 ohms.
5. The resistance to ground of the counterpoise system, or at isolation locations, such as airport beacon must not exceed 10 ohms.

125-3.2 Testing. The Contractor shall furnish all necessary equipment and appliances for testing the airport electrical systems and underground cable circuits before and after installation. The Contractor shall perform all tests in the presence of the RPR. The Contractor shall demonstrate the electrical characteristics to the satisfaction of the RPR. All costs for testing are incidental to the respective item being tested. For phased projects, the tests must be completed by phase and results meeting the specifications below must be maintained by the Contractor throughout the entire project as well as during the ensuing warranty period.

Earth resistance testing methods shall be submitted to the RPR for approval. Earth resistance testing results shall be recorded on an approved form and testing shall be performed in the presence of the RPR. All such testing shall be at the sole expense of the Contractor.

Should the counterpoise or ground grid conductors be damaged or suspected of being damaged by construction activities the Contractor shall test the conductors for continuity with a low resistance ohmmeter. The conductors shall be isolated such that no parallel path exists and tested for continuity. The RPR shall approve of the test method selected. All such testing shall be at the sole expense of the Contractor.

The test equipment for insulation resistance shall be an insulation resistance tester (1,000V megger) with a digital readout. The instrument shall provide a 500 volt test for insulation resistance with a meter range of 0 to 500 megohms.

After installation, the Contractor shall test and demonstrate to the satisfaction of the RPR the following:

a. That all affected lighting power and control circuits (existing and new) are continuous and free from short circuits.
b. That all affected circuits (existing and new) are free from unspecified grounds.
c. That the insulation resistance to ground of all new non-grounded series circuits or cable segments is not less than 50 megohms.
d. That the insulation resistance to ground of all non-grounded conductors of new multiple circuits or circuit segments is not less than 50 megohms.
e. That all affected circuits (existing and new) are properly connected in accordance with applicable wiring diagrams.
f. That all affected circuits (existing and new) are operable. All circuits shall be fully tested by continuous operation for not less than 24 hours as a completed system prior to acceptance. The test shall include operating the constant current regulator in each step not less than 10 times at the beginning and end of the 24-hour test. The fixtures shall illuminate properly during each portion of the test.

g. That the impedance to ground of each ground rod does not exceed 25 ohms prior to establishing connections to other ground electrodes. The fall-of-potential ground impedance test shall be used, as described by ANSI/IEEE Standard 81, to verify this requirement.

Two copies of tabulated results of all cable tests performed shall be supplied by the Contractor to the RPR. Where connecting new cable to existing cable, ground resistance tests shall be performed on the new cable prior to connection to the existing circuit.

There are no approved "repair" procedures for items that have failed testing other than complete replacement.

125-3.3 Shipping and Storage. Equipment shall be shipped in suitable packing material to prevent damage during shipping. Store and maintain equipment and materials in areas protected from weather and physical damage. Any equipment and materials, in the opinion of the RPR, damaged during construction or storage shall be replaced by the Contractor at no additional cost to the owner. Painted or galvanized surfaces that are damaged shall be repaired in accordance with the manufacturer's recommendations.

125-3.4 Placing lights, signs and approach lighting aids. Water, debris, and other foreign substances shall be removed prior to installing fixture base and light.

A jig or holding device shall be used when installing each light fixture to ensure positioning to the proper elevation, alignment, level control, and azimuth control. Light fixtures shall be oriented with the light beams parallel to the runway or taxiway centerline, unless otherwise required, and facing in the required direction. Light bases in pavement shall be installed such that the light base is level and the top of the base plate or light unit is even with the downhill slope of the pavement. Surplus sealant or flexible embedding material shall be removed. Sealant which leaks into the light base shall be removed before it sets. The holding device shall remain in place until sealant has reached its initial set.

The airport lights, signs or approach lighting aids shall be installed at the approximate location indicated in the Contract Drawings. The exact location shall be as directed by the RPR. The lights, signs or shall be installed in accordance with the Contract Drawings and the manufacturer's recommendations.

Contractor's surveyor shall be on-site during installation of approach lighting aids to verify elevations, alignment and sighting angles of approach lighting aids prior to energizing the equipment. Any deviations shall be corrected by the Contractor and verified by the surveyor before the equipment is put to service.

Contractor shall have experience installing approach lighting aids, or the manufacturer's representative shall be onsite during installation. Experience shall be documented by the Contractor by providing the RPR with a list of three previous installations of the equipment being installed.

Tolerances for light fixtures shall be as follows:

A. The lateral tolerance, both station and offset, for the center point of light units shall be +/- 1-inch of the distance or location specified.

B. All lights in a tangent segment shall be within +/- 1-inch of each other.

C. All light units shall be orientated on the correct azimuth for the intended use within a tolerance of +/- 1 degree.

125-3.5 Excavation. All excavation shall be considered unclassified excavation. Unclassified excavation shall consist of the excavation of all material, regardless of its nature and the disposal of all such material as directed by the RPR.

A. The Contractor shall do all excavation for airport lights, signs and navigational system installations to the lines and grades or elevations shown on the Contract Drawings or as directed by the RPR.

The excavation shall be of sufficient size to permit the placing of the airport lights, signs or navigational system.

B. Boulders, logs or any other objectionable material encountered in excavation shall be removed. All rock or other hard foundation material shall be cleaned of all loose material and cut to a firm surface either level, stepped or serrated, as directed by the RPR. All seams or crevices shall be cleaned out and grouted. All loose and disintegrated rock and thin strata shall be removed. When concrete is to rest on a surface other than rock, special care shall be taken not to disturb the bottom of the excavation and excavation to final grade shall not be made until just before the concrete or reinforcing is to be placed.

C. The Contractor shall do all bracing, sheeting or shoring necessary to implement and protect the excavation and the structure as required for safety or conformance to governing laws. The cost of bracing, sheeting or shoring shall be included in the unit price bid for the structure. All trench bracing, sheeting and shoring shall be in accordance with the Sheeting and Bracing section of the General Provisions.

D. Unless otherwise provided, bracing, sheeting and shoring involved in the construction of this item shall be removed by the Contractor after the completion of the structure. Removal shall be effected in a manner which will not disturb or mar finished masonry. The cost of removal shall be included in the unit bid for that item.

125-3.6 Backfilling. Backfilling around structures shall not be commenced until directed by the RPR. Prior to backfilling, all conduits and openings shall be sealed water tight. Backfill shall be placed evenly and simultaneously on all sides of structures in 6-inch lifts. All structures shall be backfilled to the lines and grades shown on the Contract Drawings, or as required for proper operation of the airport lights, signs or navigation system and as directed by the RPR. Contractor shall use previously excavated material if it is suitable for backfill, or if additional material is required for backfill, the Contractor shall provide suitable backfill. All materials used for backfill shall be approved in advance by the RPR. No direct payment will be made for backfill material or its placement.

125-3.7 Removal of lights, signs and approach lighting aids. Where existing lights, signs and approach lighting aids are to be removed in the same location as proposed fixtures, the Contractor shall consider such removal as an incidental part of construction and include the costs thereof in the various pay items of work involved. Where existing lights, signs and approach lighting aids are to be removed at locations where a new fixture is not being placed, removal shall be paid for separately. The cost of such removal shall include excavation, removal of fixture and foundation, backfilling, disposal of existing fixture, and restoration. Lights, signs and approach lighting aids shall be removed from the locations shown on the Contract Drawings, unless otherwise directed by the RPR.

For lights to be temporary removed, stored and replaced, the Contractor shall provide new light fixture gaskets and properly torqued bolts upon reinstallation. Gaskets, base plates and hardware shall not be reused. The light fixture cable connector can be disconnected from the isolation secondary connector.

125-3.8 Restoration. After the backfill is completed, the Contractor shall dispose of all surplus material, dirt and rubbish from the site. Suitable material may be deposited in embankment or shoulders areas. Unsuitable material shall be disposed of on airport property or as ordered by the RPR.

Areas disturbed by the Contractor's operation shall be restored to their original condition. Restoration of surfaces shall be performed in accordance with the details of the Contract Drawings.

Where airport lights, signs or approach lighting aids are installed or removed outside of the general grading limits, or in areas that would not otherwise be disturbed, restoration shall be considered necessary and

incidental to the work of this item and the costs shall be included in the associated pay items for airport lights, signs or approach lighting aids installed or removed.

Where airport lights, signs or approach lighting aids are installed or removed within the general grading limits, restoration of the area will not be necessary as payment for establishment of turf or pavement will be included in the various pay items of work involved.

The Contractor shall be responsible for maintaining all disturbed surfaces and restorations until final acceptance.

125-3.9 Installation of cables and conduits. Excavation for trenches, backfilling, furnishing and installation of cables and conduits shall be performed in accordance with Items L-108, Underground Cable for Airports and L-110, Airport Underground Electrical Duct Banks and Conduits.

125-3.10 Installation of retroreflective markers. Not used.

125-3.11 Spoil material. SYR Airport Operations reserves the right to salvage any portion of the existing lighting system components scheduled for demolition. SYR will mark and inform the Contractor of what equipment they wish to salvage prior to construction, with a preference on that in best operating condition. There is no guarantee on the quantity of equipment or material requested for salvage. The Contractors demolition pricing shall include cost provisions to cover spoiling everything off site, carefully removing and stockpiling everything for salvage, or a composite blend of the two circumstances.

SYR may elect to salvage the following equipment: constant current regulators, edge light assemblies (light unit, light post, transformer, light base cover), guidance sign assemblies (sign housing, panels, legs, floor flanges), cable, electrical power and control equipment.

The Contractor shall separate useable equipment from unusable equipment. The equipment to be salvaged shall be carefully removed by the Contractor, transported and stockpiled at a location designated by BNIA in proper working condition. All other materials shall be spoiled off airport property at a proper disposal site at the Contractor expense.

125-3.12 Brightness adjustments for internally lighted guidance signs. Upon completion of the sign installation, the contractor shall make necessary brightness adjustment for each sign unit. The contractor shall make the required adjustments in accordance with the manufacturer's printed instructions.

METHOD OF MEASUREMENT

125-4.1 Taxiway lights will be measured by the number of each type installed as completed units in place, ready for operation, or removed, and accepted by the RPR. Guidance signs will be measured by the number of each type and size installed as completed units, in place, ready for operation, or removed, and accepted by the RPR.

Light fixture payment items shall include the light fixture, base plate, frangible coupling, light head, post, isolation transformer, L-823 connectors, gaskets, bolts and ground cable.

Light base payment items shall include the light base, conduit connections, ground rod and lugs, exterior safety ground jumper, concrete encasement, spacer rings and adaptors.

125-4.2 Spare lighting and signage parts shall be provided as listed in the Contract Drawings. The cost of the spare parts shall not exceed $10,000, not 10% of the total value of the fixtures. Spare parts shall be measured on a Lump Sum basis. A separate itemized equipment vendor invoice(s) shall be submitted to substantiate the cost. No Contractor mark-up is allowed.

BASIS OF PAYMENT

125-5.1 Payment will be made at the Contract unit price for each complete runway or taxiway light, guidance sign , reflective marker installed by the Contractor, or removed, and accepted by the RPR. This payment will be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools and incidentals necessary to complete this item.

125-5.2 Payment will be made as a lump sum for the spare light and sign parts indicated on the Contract Drawings and provided to the Owner. The total bid price shall not exceed $10,000, nor 10% of the cost of the fixtures.

Payment will be made under:

Item L 125-1	Medium Intensity Taxiway Edge Light Fixture, Elevated, LED - per each
Item L 125-2	Medium Intensity Taxiway Edge Light Fixture, Semi-Flush, LED - per each
Item L 125-3	Salvage and Reinstall Existing Medium Intensity Taxiway Edge Light Fixture, Base Mounted - per each
Item L 125-4	L-868B Load Bearing Light Base, In Pavement - per each
Item L 125-5	L-867B Non Load Bearing Light Base, In Turf - per each
Item L 125-6	Retroreflective Stop and International No Aircraft Entry Sign – per each
Item L 125-7	Airfield Guidance Sign and Foundation, LED, Size 3, 2 Module - per each
Item L 125-8	Airfield Guidance Sign and Foundation, LED, Size 3, 3 Modules - per each
Item L 125-9	Airfield Guidance Sign and Foundation, LED, Size 3, 4 Modules - per each
Item L-125-10	Removal of Guidance Sign and Foundation - per each
Item L-125-11	Removal of Light Fixture and Appurtenances - per each
Item L-125-12	Removal of Light Base - per each
Item L-125-13	Spare Parts (Not to Exceed $10,000 or 10% Total Cost) - per lump sum

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

AC 150/5340-18	Standards for Airport Sign Systems
AC 150/5340-26	Maintenance of Airport Visual Aid Facilities
AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-26	Specification for L-823 Plug and Receptacle, Cable Connectors
AC 150/5345-42	Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and Accessories

AC 150/5345-44	Specification for Runway and Taxiway Signs
AC 150/5345-46	Specification for Runway and Taxiway Light Fixtures
AC 150/5345-47	Specification for Series to Series Isolation Transformers for Airport Lighting Systems
AC 150/5345-53	Airport Lighting Equipment Certification Program

Engineering Brief (EB)

EB No. 67	Light Sources Other than Incandescent and Xenon for Airport and Obstruction Lighting Fixtures

END OF ITEM L-125

Item PQ-101 Deicing Fluid Storage Facility

DESCRIPTION

101-1.1 This item shall consist of network panels, enclosures, cables and converters, optic fiber cabling and accessories, copper cabling and accessories, cable testers and labels, aircraft deicing fluid storage tank systems and all appurtenances, stair and catwalk assemblies, sign and markings, potassium acetate storage tanks and all appurtenances, deice and anti-ice system controls and all other components of the deicing fluid storage facility as shown on the Contract Drawings and installed in accordance with the details as shown on the Contract Drawings and as directed by the RPR required to install the complete the deicing fluid storage facility.

MATERIALS

101-2.1 Network Panels, Enclosures, Cables and Converters. Refer to specification 271100.

101-2.2 Optical Fiber Cabling and Accessories. Refer to specification 271300.

101-2.3 Copper Cabling and Accessories. Refer to specification 271500.

101-2.4 Cable Testers and Labels. Refer to specification 271700.

101-2.5 Aircraft Deicing Fluid Storage Tank Systems and All Appurtenances. Refer to specification 231323.

101-2.6 Stair and Catwalk Assemblies. Refer to specification 231323.

101-2.7 Signs and Markings. Refer to specifications 231323 and 430000.

101-2.8 Potassium Acetate Storage Tanks and All Appurtenances. Refer to specification 430000.

101-2.9 Deice and Anti-Ice System Controls. Refer to specification 430000.

CONSTRUCTION METHODS

101-3.1 General. Refer to specifications 271100, 271300, 271500, 271700, 231323 and 430000.

101-3.2 Preparation. Refer to specification 432000.

101-3.2 Installation. Refer to specifications 271100, 271300, 271500, 231323 and 430000.

101-3.3 Cable Testing. Refer to specification 271700.

101-3.4 Cable Labeling. Refer to specification 271700.

101-3.5 Permitting and Notification. Refer to specification 231323.

101-3.6 Field Quality Control / Testing. Refer to specification 430000.

101-3.7 Calibration. Refer to specification 430000.

101-3.8 Start Up and Commissioning. Refer to specification 430000.

METHOD OF MEASUREMENT

101-4.1 Method of measurement shall be on a per each basis for complete 20,000 gallon horizontal cylindrical double wall above ground steel tank with all appurtenances including catwalk and stairway system measured, completed and accepted.

101-4.2 Method of measurement shall be on a per each basis for complete 8-foot dia., 5,600 gallon vertical cylindrical polyethylene tank with all appurtenances measured, completed and accepted.

101-4.3 Method of measurement shall be on a lump sum basis for deicing fluid storage facility equipment.

101-4.4 Method of measurement shall be on a lump sum basis for deicing fluid storage facility equipment installation, site work, plumbing system, pads and supports.

BASIS OF PAYMENT

101-5.1 Payment shall be made at the contract unit price per each, which price and payment shall be full compensation for furnishing and placing all material and for all labor, equipment, tools, and incidentals necessary to complete the work prescribed in this item.

101-5.2 Payment shall be made at the contract unit price per each, which price and payment shall be full compensation for furnishing and placing all material and for all labor, equipment, tools, and incidentals necessary to complete the work prescribed in this item.

101-5.3 Payment shall be made at the contract unit price lump sum, which price and payment shall be full compensation for furnishing and placing all material and for all labor, equipment, tools, and incidentals necessary to complete the work prescribed in this item.

101-5.4 Payment shall be made at the contract unit price lump sum, which price and payment shall be full compensation for furnishing and placing all material and for all labor, equipment, tools, and incidentals necessary to complete the work prescribed in this item.

Payment will be made under:

Item PQ-101-1	20,000 Gallon Horizontal Cylindrical Double Wall Above Ground Steel Tank with All Appurtenances Including Catwalk and Stairway – per each
Item PQ-101-2	8-Foot Dia., 5,600 Gallon Vertical Cylindrical Polyethylene Tank with All Appurtenances – per each
Item PQ-101-3	Deicing Fluid Storage Facility Equipment – per lump sum
Item PQ-101-4	Deicing Fluid Storage Facility Equipment Installation, Site Work, Plumbing System, Pads and Supports – per lump sum

END OF ITEM PQ-101

Item PQ-102 Spoil Area Liner System

DESCRIPTION

102-1.1 This item shall consist of geotextile, geocomposite drainage layer, geomembrane liner and geomembrane cover as shown on the Contract Drawings and installed in accordance with the details as shown on the Contract Drawings and as directed by the RPR required to install the complete spoil area liner system.

MATERIALS

102-2.1 Geotextile. Refer to specification 02710.

102-2.2 Geocomposite Drainage Layer. Refer to specification 02720.

102-2.3 Geomembrane Liner. Refer to specification 02730.

102-2.4 Geomembrane Cover. Refer to specification 02740.

CONSTRUCTION METHODS

102-3.1 General. Refer to specifications 02710, 02720, 02730 and 02740.

102-3.2 Familiarization. Refer to specifications 02710, 02720, 02730 and 02740.

102-3.3 Handling and placement. Refer to specifications 02710 and 02720.

102-3.4 Seams and overlaps. Refer to specifications 02710 and 02720.

102-3.5 Repairs. Refer to specifications 02710 and 02720.

102-3.6 Protection. Refer to specifications 02710 and 02720.

102-3.7 Placement of soil and aggregate materials. Refer to specification 02710.

102-3.8 Subgrade surface preparation. Refer to specifications 02730 and 02740.

102-3.9 Geomembrane deployment. Refer to specifications 02730 and 02740.

102-3.10 Field seaming. Refer to specifications 02730 and 02740.

102-3.11 Material in contact with the Geomembrane. Refer to specifications 02730 and 02740.

102-3.13 Survey control. Refer to specifications 02730 and 02740.

102-3.14 Geomembrane acceptance. Refer to specifications 02730 and 02740.

METHOD OF MEASUREMENT

102-4.1 Method of measurement shall be on a per square foot basis for complete spoil area material liner system, including cover drainage geocomposite layer, cap liner, non-woven geotextile cover, base line, base geocomposite layer, anchors, and all other labor and materials to complete measured on the ground surface, completed and accepted.

BASIS OF PAYMENT

102-5.1 Payment shall be made at the contract unit price per square foot, which price and payment shall be full compensation for furnishing and placing all material and for all labor, equipment, tools, and incidentals necessary to complete the work prescribed in this item.

Payment will be made under:

Item PQ-102-1 Spoil Area Material Liner System, All Sides Encapsulated - per square foot

END OF ITEM PQ-102

SECTION 02060 - DEMOLITION

PART 1 GENERAL

1.1 SCOPE

A. Demolish structures, equipment, and appurtenances as shown in the Contract Documents. Except for material and equipment indicated to be retained by the Owner, dispose of all demolition material off-site at proper disposal facilities.

B. Protect, salvage, and return to the Owner, material and equipment indicated to be retained by Owner.

C. The staging and sequencing of demolition shall be specified by the Contractor in his Plan of Operations.

D. Restoration of surfaces.

E. All demolition operations shall be in accordance with the Fire Code of New York State in terms of fire safety during construction, hot work, and temporary heating appliances. All demolition operations shall also be in accordance with all pertinent OSHA regulations.

NOTE : All paid through item P-640.

1.2 RELATED WORK

A. Section 028200 – Asbestos Abatement Removal

B. Section 02090 – Universal Wastes

1.3 SUBMITTALS

A. Submit items below in accordance with general contract requirements.

B. Plan of Operations. At a minimum, the Plan of Operations shall include:

1. Demolition and removal procedures, schedule, and all critical sequencing.

2. **Site specific** fire safety and prefire plan. Generic company policies and plans are unacceptable, however shall be submitted to help supplement the site specific plans.

3. Manufacturer data sheets for RPZ backflow prevention device, approved application for backflow prevention device installation, and completed backflow prevention device certification forms.

4. Proof of general fire prevention and fire extinguisher training for those individual engaging in hot work and fire watch operations.

C. Required OSHA Documentation and Training Plans. At a minimum, the following information for the Contractor shall be onsite in a labeled booklet:

1. Asbestos compliance plan for construction.
2. Electrical safety plan for construction.
3. Fall protection plan in construction.
4. Lead exposure plan in construction.
5. Lockout/tagout plan.
6. Confined space identification and entry plan.
7. Personal protective equipment and respiratory protection plans.
8. Safety and health program for construction.
9. Scaffolding safety for construction.
10. Site safety plan for construction.
11. Steel erection plan for construction.
12. Welding and cutting safety program.

D. Record documents.

1.4 EXISTING CONDITIONS

A. Inspect structures and equipment prior to start of work and notify the Engineer, in writing, of any hazardous conditions. Protect workers from all hazardous conditions inherent in demolition operations. Study requirements for sequencing of demolition to maintain the Owner's full use of facilities as applicable.

B. Protect and safeguard from damage all existing structural systems, utilities, equipment and finishes that will remain. Disconnection of all existing utilities shall be coordinated with the Owner and the appropriate utility company.

C. Site and building entrances and exits shall remain accessible at all times. Plans for any prolonged (other than momentary) obstruction to pedestrian and/or vehicular access must be reviewed and approved by the Owner prior to implementation. Similarly, the Owner's access to equipment and utilities shall be maintained to allow the Owner continuous use of the portions of the Project site that will not be demolished.

D. A hazardous material survey was performed by Lu Engineers, December 2024 indicated some hazardous material exist. A copy of the survey (which details findings of the survey), is included as an attachment to the project specifications. The survey is provided to the Contractor for informational purposes only and is not part of the Contract. The Contractor shall be responsible for verifying all existing field conditions including, but not limited to, locations of hazardous materials.

1.5 REGULATORY REQUIREMENTS

A. Occupational Safety and Health Administration (OSHA).

1. 29 CFR 1910 – Occupational Safety and Health Standards
2. 29 CFR 1926 – Occupational Safety and Health Standards for Construction
3. 3096 – Asbestos Standard for the Construction Industry
4. 3146 – Fall Protection in Construction

B. Building Code of New York State

C. Fire Code of New York State, (which references National Fire Protection Association NFPA 241 – Standard for Safeguarding Construction, Alteration, and Demolition Operations).

D. Mechanical Code of New York State.

E. Fuel Gas Code of New York State.

F. NFPA (National Fire Protection Association) 70 – National Electrical Code.

G. ANSI/IEEE (American National Standards Institute/Institute of Electrical and Electronics Engineers) C2 – National Electrical Safety Code.

H. New York State Department of Environmental Conservation (NYSDEC).

I. United States Environmental Protection Agency (EPA), including National Emission Standards for Hazardous Air Pollutants (NESHAP); 40 CFR Part 61.

J. New York State Department of Health Cross Connection Control regulations and standards.

K. Local codes/ordinances and Authority Having Jurisdiction requirements.

1.6 NOTIFICATIONS

A. Provide written notification to the EPA regional office with jurisdiction over the project a pre-scribed Demolition/Renovation Notification Form prepared by the EPA, in accordance with the NESHAP regulation.

B. Provide written notification to the local fire, police, and emergency medical first responders outlining the work to be taking place in the building with an attached copy of the building site specific fire safety plan indicating the location of fire department appurtenances, usable entrances/exits, hazardous materials to be stored on site with attached Material Safety Data Sheets (MSDS), etc.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 PREPARATION

A. Acquire all permits as required prior to commencement of demolition. Do not close or obstruct roadways or sidewalks without permits and approvals.

B. Plan demolition to minimize interference with adjacent structures and public access. Plan operations with minimum interference to public or private thoroughfares. Maintain egress and access at all times.

C. Provide and maintain temporary barriers and security devices.

D. Provide bracing and shoring as necessary to prevent damage, movement, or settlement of adjacent features or structures.

E. Protect existing facilities that are not to be demolished.

F. Disconnect, remove, and secure designated utility lines within demolition areas.

G. Identify utilities and indicate disconnection locations and location of utilities abandoned in-place on Project Record Documents.

3.2 FIRE SAFETY DURING DEMOLITION AND CONSTRUCTION ACTIVITES

A. Compliance with the Fire Code of New York State, Building Code of New York State, NFPA 241, other listed codes/standards, and the requirements of the Authority Having Jurisdiction is required for items not specifically addressed herein.

B. Temporary Heating Equipment

1. Temporary heating devices shall be listed and labeled in accordance with the Mechanical Code of New York State or the Fuel Gas Code of New York State. Installation, maintenance and use of temporary heating devices shall be in accordance with the terms of the listing.

2. Appliances shall be allowed to cool prior to refueling.

3. Clearance to combustibles from temporary heating devices shall be maintained in accordance with the labeled equipment. When in operation, temporary heating devices shall be fixed in place and protected from damage, dislodgement, or overturning in accordance with manufacturers instructions.

4. The use of temporary heating devices shall be supervised and maintained by competent personnel.

C. Precautions Against Fire

1. Smoking shall be prohibited on the premises. Signs shall be posted and posted at each entrance to the building and posted in conspicuous locations throughout the building.

2. Combustible debris shall not be accumulated within the building. Combustible debris, rubbish, and waste material shall be removed from the building at the end of each shift of work. Combustible debris, rubbish, and waste material shall not be disposed of by burning on the site.

3. There shall be no open burning allowed on the site.

4. Materials susceptible to spontaneous ignition, such as oily rags, shall be stored in listed disposal containers located outside of the building in a secure space.

5. Where required by the Authority Having Jurisdiction for building demolition that is hazardous in nature (i.e. hot work of any sort), qualified personnel shall be provided at the Contractors expense, shall be provided to serve as an on-site fire watch. The sole duty of fire-watch personnel shall be to watch for the occurrence of fire.

6. Operations involving the use of cutting and welding shall be done in accordance with Chapter 26 of the Fire Code of New York State and as outlined herein.

7. Temporary wiring for electrical power and lighting installations used in connection with the construction, alteration, or demolition of the building shall

8. comply with Chapter 27 of the Building Code of New York State, The National Electrical Code, and the National Electrical Safety Code.

D. Flammable and Combustible Liquids

1. The storage and use of flammable and combustible liquids shall be in accordance with Chapter 34 of the Fire Code of New York State.

2. The storage, use, and handling of Class I and Class II liquids shall be in accordance with Chapter 34 of the Fire Code of New York State. Ventilation shall be provided for operations involving the application of materials containing flammable solvents.

3. Flammable and combustible liquid storage areas shall be maintained clear of combustible vegetation and waste materials. Such storage areas shall not be used for the storage of combustible materials.

4. Sources of ignition shall be prohibited in flammable and combustible liquid storage areas. Signs shall be posted in these areas indicating the hazard present and that no open flame is allowed in the area.

5. Class I and II liquids shall be kept in approved safety containers and storage cabinets.

6. Leaking vessels shall be immediately repaired or taken out of service, the Owner notified of the spill/leakage (only for spills 1 gallon or larger), and the spill cleaned up and disposed of properly.

E. Flammable Gases

1. The storage, use, and handling of flammable gases shall comply with Chapter 35 of the Fire Code of New York State.

F. Owner Fire Prevention Program Superintendent

1. The Owner shall designate a person to be the Fire Prevention Program Superintendent who shall be responsible for the job site fire prevention program and its enforcement carried out through completion of the project. The Fire Prevention Program Superintendent shall have the authority to enforce the provisions of this specification and the Fire Code of New York State and other provision as they see fit to ensure that the intent of the site fire prevention program and the Fire Code of New York Sate are secured.

2. The Fire Prevention Program Superintendent, with assistance from the Contractor, and local emergency responders, shall develop and maintain a site specific prefire plan. The local Fire Chief and Authority Having Jurisdiction shall be notified of changes affecting the utilization of information contained in the prefire plan.

3. Training of responsible personnel in the use of fire protection equipment shall be the responsibility of the Fire Prevention Program Superintendent and the Contractor.

4. The Fire Prevention Program Superintendent shall determine that all fire protection equipment is maintained and serviced in accordance with the Fire Code of New York State. The quantity and type of fire protection equipment shall be approved by the Owner, Authority Having Jurisdiction, local emergency responders, and the Owners Representative.

5. The Fire Prevention Program Superintendent shall be responsible for supervising the permit system for hot work operations in accordance with Chapter 26 of the Fire Code of New York State and as specified herein.

6. Impairments to any fire protection system or components shall be in accordance with Chapter 9 of the Fire Code of New York State. Any impairment to a fire protection system or component in the building shall be routed through the Fire Prevention Program Superintendent a minimum of 72 hours prior to the impairment so that an impairment management plan and the appropriate notifications can be made. Failure to provide this 72 hour notice will result in a delay to the approved impairment of the systems or components.

7. Coverings placed on or over fire protection devices to protect them from damage during construction processes shall be immediately removed upon completion of the construction processes in the room or area in which the devices are located. The Fire Prevention Program Superintendent shall inspect the job site at the end of work each day to confirm that fire protection systems and components are operational and not impaired.

G. Emergency Reporting

1. Readily accessible and reliable emergency telephone facilities shall be provided in an approved location at the job site. The street address of the job site and the local emergency responder contact number shall be posted adjacent to the telephone in a permanently framed/secured manner.

H. Access for Firefighting

1. Approved vehicle access for firefighting shall be provided at the job site. Vehicle access shall be provided to within 100 feet of temporary or permanent fire department connections. Vehicle access shall be provided by either temporary or permanent roads capable of supporting vehicle loading under all weather conditions. Vehicle access shall be maintained until permanent fire apparatus access roads are available.

I. Means of Egress

1. A minimum of one temporary, constantly lighted egress stairway shall be provided in the building at any one time.

2. Required means of egress components shall be maintained during the demolition and construction process.

J. Water Supply for Fire Protection

1. An approved water supply for fire protection, either temporary or permanent, shall be made available as soon as combustible material arrives on site.

K. Standpipes

1. The existing building standpipe system shall remain operational during the course of demolition and construction so as to be available of use by the fire department in a minimum of one accessible stairwell. The building standpipe system shall be reconfigured into a dry-manual standpipe system to be supplied with water by the local building fire department. Re-pipe building fire department connection to be the only supply point to the building standpipe system. Label the building fire department connection as being a Dry-Manual Standpipe.

L. Portable Fire Extinguishers

1. The building shall be provided with not less than one approved portable fire extinguisher at each stairway on all floor levels where combustible materials have accumulated. An approved portable fire extinguisher shall be provided in every storage and construction shed. The Authority Having Jurisdiction is authorized to require additional approved portable fire extinguishers where special hazards exist. Fire extinguishers shall comply with Chapter 9 of the Fire Code of New York State. Located with each fire extinguisher shall be an air powered, boat style emergency horn to assist in notifying building occupants of a fire situation in the building.

M. Single Station Heat Detection

1. Residential style, single station, 9 volt battery powered, heat detectors (such as those as manufactured by FIREX) shall be temporarily installed throughout the building to detect the presence of a fire and to assist in notifying building occupants of a fire situation in the building. Heat detection shall be mounted and spaced in accordance with manufacturer listings in all egress paths, material/equipment storage areas, each level of each stairwell, and any place else designated by the Authority Having Jurisdiction.

N. Motorized Equipment

1. Internal combustion powered construction equipment shall be used in accordance with all of the following conditions:

   a. Equipment shall be located so that exhausts do not discharge against combustible material.

   b. Exhausts shall be piped to the outside of the building.

   c. Equipment shall not be refueled while in operation. All refueling operations shall take place outside of the building.

   d. Fuel for equipment shall be stored in an approved area outside of the building.

O. Safeguarding Roofing Operations

1. Roofing operations utilizing heat producing systems or other ignition sources shall be performed by a contractor licensed and bonded for the type of roofing process to be performed.

2. Asphalt and tar kettles shall be operated in accordance with Chapter 3 of the Fire Code of New York State.

3. Fire extinguishers shall be provided in accordance with Chapter 9 with the Fire Code of New York State. There shall be at least one multi-purpose portable fire extinguisher with a rating of not less than 2-A:20B:C on the roof being covered or repaired.

3.3 WELDING AND OTHER HOT WORK

A. Definitions

1. Hot Work – Operations including but not limited to cutting, welding, Thermit welding, brazing, soldering, grinding, thermal spraying, thawing pipe, installation of torch applied roof systems, or any other similar situation.

2. Hot Work Area – The area exposed to sparks, hot slag, radiant heat, or convective heat as a result of the hot work taking place in or around the building.

3. Hot Work Equipment – Electric or gas welding, cutting, or grinding equipment used for hot work.

4. Hot Work Program – A permitted program, carried out by approved facilities-designated personnel, allowing them to oversee and issue permits for hot work conducted by their personnel or at their facility. The intent is to have trained, on-site, responsible personnel ensure that required hot work safety measures are taken to prevent fires and fire spread.

5. Responsible Person – A person trained in the safety and fire safety considerations concerned with hot work. Responsible for reviewing the sites prior to issuing permits as part of the hot work permit program and following up as the job progresses.

6. Torch-Applied Roof System – Bituminous roofing systems using membranes that are adhered by heating with a torch and melting asphalt back coating instead of mopping hot asphalt for adhesion.

B. General Requirements

1. Welding, cutting, open torches, and other hot work operations and equipment shall comply with Chapter 26 of the Fire Code of New York State and shall be

governed by the hot work programmed as administered by the job site Fire Prevention Program Superintendent.

2. Hot work shall only be conducted in areas designed or authorized for that purpose by the Fire Prevention Program Superintendent. Hot work shall not be conducted in the following areas unless approval has been obtained by the Authority Having Jurisdiction.

    a. Areas where the building sprinkler system is impaired.

    b. Areas where there exists the potential of an explosive atmosphere, such as locations where flammable gases, liquids, or vapors are present.

    c. Areas with readily ignitable materials, such as storage of large quantities of bulk sulfur, baled paper, cotton, lint, dust, or loose combustible materials.

    d. At other locations as specified by the Authority Having Jurisdiction.

4. A permit for hot work operations shall not be issued unless the individuals in charge of performing such operations are capable of performing such operations safely. Demonstration of a working knowledge of the provisions of Chapter 26 of the Fire Code of New York State shall constitute acceptable evidence of compliance with this requirement.

5. The individual responsible for the hot work area shall maintain "pre-work check" reports. These reports shall be maintained on the premises for a minimum of 48 hours after work is complete.

6. Visible hazard identification signs shall be provided. Where the hot work area is accessible to persons other than the operation or the hot work equipment, conspicuous signs shall be posted to warn others before they enter the hot work area. Signs shall display the following warning: "CAUTION – HOT WORK IN PROGRESS – STAY CLEAR".

7. Fire Safety Requirements

    a. Hot work areas shall not contain combustibles or shall be provided with appropriate shielding to prevent sparks, slag, or heat from igniting exposed combustibles.

    b. Openings or cracks in walls, floors, ducts, or shafts within the hot work area shall be tightly covered to prevent the passage of sparks to adjacent combustible areas, or shielded by metal fire-resistant guards, or curtains shall be provided to prevent passage of sparks or slag.

    c. Floors shall be kept clean within the hot work area.

d. Partitions segregating hot work areas from other areas of the building shall be noncombustible.

e. Hot work shall not be performed on containers or equipment that contains or has contained flammable liquids, gases, or solids until the containers and equipment have been thoroughly cleaned, inerted, or purged. NO HOT TAPPING OF PIPE IS ALLOWED IN THE BUILDING.

f. Automatic sprinkler protection shall not be shut off while hot work is performed. Where hot work is performed close to automatic sprinklers, noncombustible barriers or damp cloth guards shall shield the individual sprinkler heads and shall be removed when the work is completed. If the work extends over several days, the shields shall be removed at the end of work each day.

g. Approved special precautions shall be taken to avoid accidental operations of automatic fire detection systems.

8. Fire Watches

a. When required by the Fire Prevention Program Superintendent or the Authority Having Jurisdiction, a fire watch shall be provided during hot work activities and shall continue a minimum of 30 minutes after the conclusion of the work. The above parties are authorized to extend the fire watch based on the hazards or work being performed.

b. The fire watch shall include the entire hot work area. Hot work conducted in areas with vertical or horizontal fire exposures that are not observable by a single individual shall have additional personnel assigned to fire watches to ensure that exposed areas are monitored.

c. Individuals designated to fire watch duty shall have fire-extinguishing equipment readily available and shall be trained in the use of such equipment. Individuals assigned to fire watch duty shall be responsible for extinguishing spot fires and communicating an alarm.

d. The individuals responsible for performing the hot work and individuals responsible for providing the fire watch shall be trained in the use of portable fire extinguishers.

e. Where hoselines are required, they shall be connected, charged, and ready for operation.

f. A minimum of one portable fire extinguisher with a minimum 2-A:20-B:C rating shall be readily accessible within 30 feet of the location where hot work is being performed.

9. Area Hot Work Reviews

    a. Before hot work is permitted and at least once per day, the area shall be inspected by the Fire Prevention Program Superintendent to ensure that it is a fire safe area.

10. Pre-Hot Work Checks – A pre-hot work check shall be conducted prior to work to ensure that all equipment is safe and hazards are recognized and protected. A report of the check shall be kept at the work site during the work and available upon request. The pre-hot work check shall determine all of the following:

    a. Hot work equipment to be used shall be in satisfactory operating condition and in good repair.

    b. Hot work site is clear of combustibles or combustibles are protected.

    c. Exposed construction is of noncombustible materials or if combustible are protected.

    d. Opening area protected.

    e. Floors are kept clean.

    f. No exposed combustibles are located on the opposite side of partitions, walls, ceilings, or floors.

    g. Fire watches, where required, are assigned.

    h. Approved actions have been taken to prevent accidental activation of suppression and detection equipment.

    i. Fire extinguishers and fire hoses (where provided) are operable and visible.

3.4 PROCEDURE AND TIMING

A. Procedure

The demolition work shall be executed in an orderly and careful manner with due consideration for employees, the public and active operations in adjacent facilities. Maintain barreries or enclosures at all openings to adjacent areas not being demolished, at all times, with necessary signs, lights, bracing and guards for the protection of all personnel and existing facilities.

B. Timing

1. Refer to the general front-end specifications for time and sequencing requirements.

3.5 LEAD SAFE WORK PRACTICES

A. The Contractor shall comply with all applicable federal, state, and local, regulations (including, but not limited to, Occupational Safety and Health Administration [OSHA] regulations) during the implementation of the work.

B. The Contractor and all subcontractors shall be required to comply with all aspects of OSHA 29 CFR 1926.62 “Lead in Construction Regulations” with regard to disturbance of these materials when performing their work. It shall be the sole responsibility of each Contractor for compliance with OSHA including all costs associated with, but not limited to:

1. Development and implementation of a Lead Compliance Program.

2. Development and implementation of a Respiratory Program.

3. Development and implementation of a Medical Monitoring Program.

4. Development and implementation of a Hazard Communication Program.

5. Performance of any lead testing required by the project.

6. Performance of any Negative Exposure Assessments required.

7. Providing all medical examinations required.

8. Providing all equipment required (including appropriate Personal Protective Equipment [PPE]).

9. Providing all engineering controls and associated work practices.

10. Disposing of all paint chip material and associated debris in accordance with applicable laws, rules, and regulations.

11. Avoid creating dust and fumes wherever possible. Do no torch-cut or burn any painted surfaces. Mechanical sanding or cutting shall be only allowed is tools are equipped with properly functioning HEPA-vacuum systems to control potential lead dust.

3.6 EXECUTION

A. Prior to demolishing indicated structures, equipment, and appurtenances the Contractor must remove Presumed Asbestos-Containing Materials (PACM) and Asbestos-Containing Materials (ACM). All demolition must be done in an orderly and careful manner.

B. Cease operations and notify the Owner's Representative immediately if adjacent

structures or existing walls that are to remain appear to be endangered. Do not resume operations until corrective measures have been taken.

C. Except for material and equipment to be retained by the Owner or to be processed for use as on-site fill material or except where noted otherwise, remove demolished material from site on a daily basis.

D. As determined by the Owner's Representative, relics, and similar objects discovered during demolition remain the property of the Owner. Notify the Owner's Representative prior to removal and obtain acceptance regarding method of removal.

E. Remove materials identified in the Contract Documents to be salvaged and re-used or retained by Owner in manner to prevent damage.

F. Remove promptly and properly characterize and dispose of contaminated, vermin infested, or hazardous materials encountered in compliance with all regulatory agency requirements.

G. Except for material to be processed for use as on-site fill, do not place, burn, or bury materials on site.

H. Keep work sprinkled with water to minimize dust. Refer to Division 1 specifications for related requirements. All New York State Department of Health Cross Connection Control requirements shall be adhered to if potable water supply is to be used for this purpose. Provide RPZ (reduced pressure zone) principle backflow prevention devices connected to the potable water supply before any hose or temporary water main connections to the building. Contact local water department if potable water supply is to be used to ascertain metering requirements. Prior to potable water supply being put into to service, the Contractor provided backflow prevention assembly shall be tested by a New York State Certified Backflow Prevention Device Inspector.

I. Backfill areas caused as a result of demolition. Backfill material placement and compaction shall be as specified in specification P-152.

J. Rough grade and compact areas affected by demolition to maintain site grades and contours. Restore surfaces as specified in specification P-152.

K. Remove temporary barriers and leave site in clean condition.

L. Use no explosives on site.

3.7 MATERIALS TO BE RETAINED BY OWNER

A. As indicated on the Contract Drawings or as selected by the Owner.

END OF SECTION

SECTION 02090 - UNIVERSAL WASTES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Characterize, remove, and dispose of regulated Universal Wastes, including batteries, mercury thermostats, and lamps as defined below.

B. Provide additional protection and services as specified herein.

NOTE: All paid through item P-640.

1.2 RELATED WORK

A. Section 028200 – Asbestos Abatement

1.3 DEFINITIONS

A. Universal Waste – Universal Wastes are defined as:

1. Those wastes regulated by the United States Environmental Protection Agency (USEPA) under 40 CFR Part 273, *Standards for Universal Waste Management*; and

2. Those wastes regulated by the New York State Department of Environmental Conservation (NYSDEC) under 6 NYCRR Subpart 374-3, *Standards for Universal Wastes*.

1.4 SCOPE OF WORK

A. Characterize, remove, and properly dispose/recycle of Universal Wastes from all areas of the Project where they exist.

B. A visual survey of the building was conducted to inventory the quantity of Universal Wastes. The following materials have been identified within the project site:

1. Batteries
2. Mercury containing equipment
3. Lamps/Ballasts
4. Pesticides
5. Aerosol cans
6. Electronic devices

C. In accordance with the regulations cited above, complete the removal and characterization of the materials described in this Section prior to demolition and prior to performance of any other Work that may result in the disturbance of these materials.

D. These items may be located on, within, and along the surfaces of the structure to be demolished. Carefully and deliberately plan the Work to avoid danger to workers and the public.

E. In addition to the wastes specifically described in this section and referenced documents, other unanticipated wastes (which cannot be classified as clean fill or uncontaminated construction and demolition debris) may be encountered during this Work which require reporting, notification, and characterization prior to removal or disposal.

F. Provide security as required to protect facilities.

G. Universal Wastes are to be staged and accumulated each day within an onsite secure location. The location of the onsite storage area is to be approved by the Owner.

1.5 REGULATIONS

A. Comply with applicable federal, state, municipal, and local regulations including, but not limited to, the following:

1. United States Environmental Protection Agency (USEPA) 40 CFR Part 273, *Standard for Universal Waste Management*.

2. United States Occupational Safety and Health Administration (OSHA), including Title 29, Code of Federal Regulations, and Parts 1910 and 1926, OSHA, United States Department of Labor (USDOL).

3. New York State Department of Environmental Conservation (NYSDEC) 6 NYCRR Subpart 374-3, *Standards for Universal Wastes*.

4. NYSDEC 6 NYCRR Part 360, *Solid Waste Management Facilities*.

5. NYSDEC 6 NYCRR Part 364, *Waste Transporter Permit*.

6. Transportation regulations, including United States Department of Transportation (USDOT) regulations, Title 29 Parts 171 and 172, and New York State Department of Transportation (NYSDOT) rules and regulations.

B. Whenever there is a conflict or overlap of the above references, the most stringent provision is applicable.

C. Whenever there is a conflict among or overlap between the laws, rules, and regulations referenced above, the most stringent provision shall apply. If any requirement of this Specification conflicts with or contradicts any such requirement, immediately notify the Owner of such conflict or contradiction. In such cases, the law, rule, or regulation shall apply.

D. Post all applicable regulations in a conspicuous place at the jobsite. Assure that the regulations are not altered, defaced or covered by other materials.

1.6 SUBMITTALS AND NOTICES

A. Submit items below in accordance with contract general front-end requirements.

B. No work shall begin until the following documents have been reviewed and approved:

1. A complete description of the Contractor's Plan of Operations, laying out the sequencing and phasing of the work to ensure the proper removal, characterization, and disposal/recycle of all Universal Wastes. Describe Waste Management System as required in Part 3 –Execution.

2. Proof that all required permits, disposal/recycle facilities, and arrangements for transportation and disposal/recycle of wastes have been addressed and obtained. Submit copies of 6NYCRR Part 360 and Part 364 permits, and appropriate documentation and permits for each disposal/reclamation/recycling facility to be utilized for this Work.

C. At the completion of the characterization and removal of all Universal Wastes, but at least five days prior to application for payment for this work, provide records showing final disposition of all Universal Wastes removed from the project site (see also Part 3 of this Section for waste management requirements). Provide a written letter certifying that all Universal Wastes removed from the project site were disposed of or recycled properly, and with attachments to that letter providing proof of transportation, acceptance and disposal or recycling.

1.7 PROTECTION OF CONTRACTOR'S PERSONNEL

A. The Contractor is solely responsible for the protection of his work force, in accordance with Federal and State regulations. Worker protection shall include personnel protective equipment (including respiratory protection), at a minimum. In addition, protection from other hazards inherent in demolition projects shall be provided, including temporary shoring and support for building structural elements, as required.

1.8 DISPOSAL/RECLAMATION

A. Comply with current federal, state and local regulations concerning the waste handling, transportation, and final disposition of Universal Wastes removed as part of this project.

PART 2 - MATERIALS AND EQUIPMENT Not Used

PART 3 - EXECUTION

3.1 WORK BARRIERS

A. In addition to other barriers specified elsewhere, provide appropriate work barriers for the protection of workers and the public from environmental concerns that may result from the removal, handling, and disposal of the Universal Wastes identified in this Section.

3.2 WASTE MANAGEMENT

A. Waste Management System

1. Establish a management system that accounts for Universal Wastes identified in this Section. Describe the management system in writing for review and acceptance by the Engineer. Demonstrate custody over Universal Wastes from the time the waste is removed from the work area until it reaches its final destination for disposal or recycling.

2. Provide final transport and disposal/recycling documents to the Engineer within ten (10) working days of the removal of wastes from the site by the waste hauler.

END OF SECTION

SECTION 02710 - GEOTEXTILE

PART 1 – GENERAL

1.01 SCOPE OF WORK

A. This Section describes the materials, installation, and testing requirements to perform the installation, quality control, and maintenance of the geotextile for the final cover system of the spoil area.

1.02 RELATED WORK

A. Other work that is related to the work in this section includes, but is not limited to:

1.	Section 70-19	Environmental Protection
2.	Section SP 60-12	Submittal Procedure
3.	Section C-107	Survey and Stakeout
4.	Section P-152	Excavation, Subgrade, and Embankment
5.	Section T-901	Seeding
6.	Section T-905	Topsoil
7.	Section T-908	Mulching
8.	Section PQ-102	Spoil Area Liner System
9.	Section 02720	Geocomposite Drainage Layer
10.	Section 02730	Geomembrane Liner (Base Layer)
11.	Section 02740	Geomembrane Cover (Cap Liner)

1.03 REFERENCES

A. Latest version of American Society for Testing and Materials (ASTM) Standards:

1.	ASTM D 4355	Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture, and Heat in a Xenon Arc Type Apparatus.
2.	ASTM D 4533	Standard Test Method for Trapezoid Tearing Strength of Geotextiles.
3.	ASTM D 4632	Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
4.	ASTM D 4833	Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products.
5.	ASTM D 4873	Standard Guide for Identification, Storage, and Handling of Geosynthetic Rolls and Samples.

6. ASTM D 5261 Standard Test Method for Measuring Mass per Unit Area of Geotextiles.
7. ASTM D 5321 Standard Test Method for Determining the Coefficient of Soil and Geosynthetic or Geosynthetic and Geosynthetic Friction by the Direct Shear Method.
8. ASTM D 5514 Standard Test Method for Large Scale Hydrostatic Puncture Testing of Geosynthetics.
9. ASTM D 6193 Standard Practice for Stitches and Seams.

1.04 SUBMITTALS

A. Submit the following to the Engineer for review not less than 14 calendar days prior to shipment.

1. Geotextile Manufacturer and product name.
2. Certification of minimum average roll values and the corresponding test procedures for all geotextile properties listed in Table 1.
3. Projected geotextile delivery dates.
4. Manufacturer quality control tests and manufacturer certifications per Section 2.02.

B. Submit manufacturing quality control certificates for each roll of geotextile as specified in this Section to the Engineer for review at least 14 calendar days prior to geotextile shipment. This documentation must be reviewed and approved by the Engineer to satisfy the requirements of these specifications prior to transporting any geotextile to the site.

1.05 AS-BUILT DOCUMENTATION

A. The Contractor shall prepare as-built drawings of the spoil pile, including all engineered materials in accordance with Section SP 60-12 – Submittal Procedure.

1.06 CONSTRUCTION QUALITY ASSURANCE

A. The installation of geotextiles will be monitored by the Engineer for consistency with a construction quality assurance (CQA) program. The CQA program will consist of Engineer oversight to verify compliance with the Contract Documents, including observation of subgrade preparation, geosynthetic deployment, and seaming activities; review of required submittals; and confirmation that field testing (e.g., nondestructive and destructive seam testing) is performed in accordance with the specified ASTM/GRI standards. The Contractor remains responsible for all QC activities and required testing unless otherwise directed by the Engineer.

B. The Engineer will perform material conformance testing of the geotextiles.

C. The Contractor shall be aware of the activities required of the Engineer by the CQA program and shall account for these activities in the construction schedule.

D. The Contractor shall correct all deficiencies and nonconformances identified by the Engineer at no additional cost to the Owner.

PART 2 – PRODUCTS

2.01 GEOTEXTILE

A. Furnish geotextile products with minimum average roll values (95 percent lower confidence limit) meeting or exceeding the required property values in Table 1.

B. Furnish geotextiles that are manufactured from first quality polymers, with not more than 20 percent reclaimed polymer used in production.

C. Furnish polymeric threads for stitching that are ultra-violet (UV) light stabilized to at least the same requirements as the geotextile to be sewn. Furnish polyester or polypropylene threads that have a minimum size of 2,000 denier.

2.02 MANUFACTURING QUALITY CONTROL

A. Sample and test the geotextile to demonstrate that the material conforms to the requirements of this Section.

B. Perform manufacturing quality control tests to demonstrate that the geotextile properties conform to the values specified in Table 1. Perform as a minimum, the following manufacturing quality control tests at a minimum frequency of either one per lot or as shown in the below table, whichever is more frequent:

Test	Procedure	Frequency (min)
Mass per unit area	ASTM D 5261	one per 90,000 ft^2
Grab strength	ASTM D 4632	one per 90,000 ft^2
Tear strength	ASTM D 4533	one per 90,000 ft^2
Puncture strength	ASTM D 6241	one per 90,000 ft^2
UV resistance	ASTM D 4355	one per formulation

C. Submit quality control certificates signed by the geotextile Manufacturer quality control manager. Certificates shall state that the material is resistant to UV exposure and that the geotextiles are continuously inspected and are needle-free. The quality control certificates shall also include: lot, batch, and roll number and identification; and results of manufacturing quality control tests including description of test methods used.

D. Do not supply any geotextile roll that does not comply with the manufacturing quality control requirements.

E. If a geotextile sample fails to meet the quality control requirements of this Section, sample and test rolls manufactured at the same time or in the same lot as the failing roll. Continue to sample and test the rolls until the extent of the failing rolls are bracketed by passing rolls. Do not supply failing rolls.

2.03 PACKAGING AND LABELING

A. Supply geotextiles in rolls wrapped in relatively impermeable and opaque protective wrapping. Wrapping which becomes torn or damaged shall be repaired with similar materials.

B Mark or tag geotextile rolls in accordance with ASTM D 4873 with the following information:

1. manufacturer's name;
2. product identification;
3. lot or batch number;
4. roll number; and
5. roll dimensions.

A. Geotextile rolls not labeled in accordance with this Section or on which labels are illegible shall be rejected and replaced by the Contractor at no additional cost to the Owner.

2.04 HANDLING AND STORAGE

A. Protect geotextiles from sunlight, moisture, excessive heat or cold, puncture, mud, dirt, and dust or other damaging or deleterious conditions. Follow all geotextile manufacturer recommendations for handling and storage.

B. Store geotextile rolls on pallets or other elevated structures. Do not store geotextile rolls directly on the ground.

C. Outdoor storage of rolls shall not exceed the manufacturer's recommendation or longer than 6 months, whichever is less.

PART 3 – EXECUTION

3.01 PLACEMENT

A. Handle geotextiles so as to ensure they are not damaged in any way.

B. Take necessary precautions to prevent damage to underlying layers including rutting during placement of the geotextiles.

C. After unwrapping the geotextiles from their opaque cover, do not leave them exposed for a period in excess of 14 calendar days.

D. If white colored geotextiles are used, take precautions against "snow blindness" of personnel. Precautions against "snow blindness" include wearing sunglasses and avoiding exposure for long periods of time.

E. Anchor or weight geotextile with sandbags, or the equivalent, to prevent damage from wind. Install sandbags during placement and maintain them until overlying material is placed. Geotextiles installed on slopes shall be secured in anchor trenches, as shown on the drawings.

F. Examine the geotextile surface after installation to ensure that no potentially harmful foreign objects are present. Remove any such objects and replace any damaged geotextiles at no additional cost to the Owner.

3.02 SEAMS AND OVERLAPS

A. Seams shall continuously overlap a minimum of 6 inches and sew geotextiles (i.e., spot sewing is not allowed) using a "single prayer" seam. Sew seams using Stitch Type 401 as per ASTM D 6193. When overlapped, the geotextile panels need to be shingled in the direction of placement of the overlaying layer to prevent the geotextile from peeling as the overlaying layer is placed. Overlaps (without seams) shall be at least 3 feet long.

B. Do not install horizontal seams on slopes that are steeper than 10 horizontal to 1 vertical. Seams shall be along, not across, the slopes.

C. All geotextiles should be placed with all seams up to facilitate inspection and repair.

3.03 REPAIR

A. Repair any holes or tears in the geotextiles using a patch made from the same geotextile material. Extend geotextile patches a minimum of 1 foot or 1.5 times the size of the hole or tear, whichever is greater, beyond the damaged area. Sew

geotextile patches into place no closer than 1 inch from any panel edge. Should any tear exceed 50 percent of the width of the roll, remove, and replace that roll at no additional cost to the Owner.

B. Remove any soil or other material that may have penetrated the torn geotextiles.

3.04 PLACEMENT OF SOIL AND AGGREGATE MATERIALS

A. Place soil materials on top of geotextiles in such a manner as to ensure that:

1. the geotextiles and the underlying materials are not damaged; and
2. slippage does not occur between the geotextile and the underlying layers during placement.

B. Spread soil on top of the geotextile to cause the soil to cascade over the geotextile rather than be shoved across the geotextile.

C. Equipment placing soil and aggregate material on geotextile shall be as approved by the Engineer.

D. Place geotextile over the spoils prior to placement of geomembrane cover as indicated on the Contract Drawings.

TABLE 1. REQUIRED PROPERTY VALUES FOR GEOTEXTILE

PROPERTIES	QUALIFIER	UNITS	SPECIFIED(1) VALUES	TEST METHOD
Type				
nonwoven needle-punched				(-)
Polymer composition	minimum	%	95 polypropylene or polyester by weight	(-)
Mass per unit area	minimum	oz/yd^2	10	ASTM D 5261
Mechanical Requirements				
Grab strength	minimum	lb	230	ASTM D 4632(3)
Tear strength	minimum	lb	95	ASTM D 4533(4)
Puncture strength	minimum	lb	700	ASTM D 6241(5)
Interface Friction Testing	minimum		See Note (2).	ASTM D 5321
Durability				
Ultraviolet Resistance	minimum	%	70	ASTM D 4355

Notes:

(1) All values represent minimum average roll values (MARV).

(2) The required peak and residual shear strength parameters are included in a figure as part of Section 02235 – Protective Soil Layer.

(3) Minimum of values measured in machine and cross machine directions with 1 inch clamp on Constant Rate of Extension (CRE) machine.

(4) Minimum value measured in machine and cross machine direction.

(5) Tension testing machine with a 1.75-inch diameter ring clamp, the steel ball being replaced with 0.31-inch diameter solid steel cylinder with flat tip centered within the ring clamp.

(6)

mm	=	millimeter
%	=	percent
oz/yd^2	=	ounce per square yard
sec	=	second
lb	=	pound
psi	=	pound per square inch

END OF SECTION

SECTION 02720 - GEOCOMPOSITE DRAINAGE LAYER

PART 1 GENERAL

1.01 SCOPE OF WORK

A. This Section describes the materials, installation, and testing requirements to perform the installation, quality control, and maintenance of the geocomposite drainage layer for the cap surface water management and spoil pile stormwater management.

1.02 RELATED WORK

A. Other work that is related to the work in this section includes, but is not limited to:

1.	Section 70-19	Environmental protection
2.	Section SP 60-12	Submittal procedure
3.	Section C-107	Survey and stakeout
4.	Section P-152	Excavation, Subgrade, and Embankment
5.	Section T-901	Seeding
6.	Section T-905	Topsoil
7.	Section T-908	Mulching
8.	Section PQ-102	Spoil Area Liner System
9.	Section 02710	Geotextile
10.	Section 02730	Geomembrane (Base Liner)
11.	Section 02740	Geomembrane Liner (Cap Liner)

1.03 REFERENCES

A. Latest version of American Society for Testing and Materials (ASTM) standards:

1.	ASTM D 1505.	Standard Test Method for Density of Plastics by the Density-Gradient Technique.
2.	ASTM D 1603.	Standard Test Method for Carbon Black in Olefin Plastics.
3.	ASTM D 4218.	Standard Test Method for Determination of Carbon Black Content in Polyethylene Compounds by Muffle-Furnace Technique.
4.	ASTM D 4491.	Standard Test Method for Water Permeability of Geotextiles by Permittivity.

5. ASTM D 4533. Standard Test Method for Trapezoid Tearing Strength of Geotextiles.
6. ASTM D 4632. Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
7. ASTM D 4716. Standard Test Method for Constant Head Hydraulic Transmissivity (In-Plane Flow) of Geotextiles and Geotextile Related Products.
8. ASTM D 4751. Standard Test Method for Determining Apparent Opening Size of a Geotextile.
9. ASTM D 4833. Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products.
10. ASTM D 4873. Standard Guide for Identification, Storage, and Handling of Geosynthetic Rolls and Samples.
11. ASTM D 5199. Standard Method for Measuring Nominal Thickness of Geosynthetics.
12. ASTM D 5261. Standard Test Method for Measuring Mass Per Unit Area of Geotextiles.
13. ASTM D 7005. Standard Test Method for Determining the Bond Strength (Ply Adhesion) of Geocomposites.

1.04 SUBMITTALS

A. Submit the following to the Engineer for review not less than 14 calendar days prior to shipment.

1. Geocomposite Manufacturer and product name.
2. Certification of minimum average roll values and the corresponding test procedures for all geocomposite properties listed in Table 1.
3. Projected geocomposite delivery dates.
4. Manufacturer quality control tests and manufacturer certifications per Section 2.02.

B. This documentation must be reviewed and approved by the Engineer to satisfy the requirements of these specifications prior to transporting any geocomposite to the site.

1.05 AS-BUILT DOCUMENTATION

A. The Contractor shall prepare as-built drawings of the spoil pile, including all engineered materials in accordance with Section SP 60-12 – Submittal Procedure.

1.06 CONSTRUCTION QUALITY ASSURANCE

A. The installation of the geocomposite drainage layer will be monitored as required in the Construction Quality Assurance (CQA) program.

B. The Contractor shall be aware of the activities required of the Engineer by the CQA program and shall account for these activities in the construction schedule.

C. The Contractor shall correct all deficiencies and nonconformances identified by the Engineer at no additional cost to the Owner.

PART 2 PRODUCTS

2.01 GEOCOMPOSITE

A. The geocomposite shall be composed of a high density polyethylene (HDPE) drainage net (geonet) with a nonwoven, needle-punched geotextile bonded to each side of the geonet. The geotextile shall not be glued or bonded to the geonet in any manner other than heat bonding. Along edges, six inches of the geotextile shall not be heat bonded to the geonet to allow connection in the field.

B. Furnish geocomposite having properties that comply with the required property values shown in Table 1. The Manufacturer shall provide test results for these procedures, as well as certification that the materials meet or exceed the specified values.

C. During shipment and storage, the geocomposite shall be protected from mud, dirt, dust, cutting, or other damaging or deleterious conditions.

2.02 MANUFACTURING QUALITY CONTROL

A. Sample and test the geocomposite to demonstrate that the material conforms to the requirements of this Section.

B. Perform manufacturing quality control tests to demonstrate that the geocomposite properties conform to the values specified in Table 1. Perform as a minimum, the following manufacturing quality control tests at a minimum frequency of either one per lot or as shown in the below table, whichever is more frequent:

Test	Procedure	Frequency (min)
Geonet		
Polymer Density	ASTM D 1505	one per 90,000 ft^2
Thickness	ASTM D 5199	one per 90,000 ft^2
Carbon Black	ASTM D 1603 or ASTM D 4218	one per 90,000 ft^2
Geotextile		
Mass per unit area	ASTM D 5261	one per 90,000 ft^2
Apparent opening size	ASTM D 4751	one per 90,000 ft^2
Permittivity	ASTM D 4491	one per 90,000 ft^2
Grab strength	ASTM D 4632	one per 90,000 ft^2
Tear strength	ASTM D 4533	One per 90,000 ft^2
Puncture strength	ASTM D 4833	one per 90,000 ft^2
Geocomposite		
Hydraulic Transmissivity	ASTM D 4716	one per 90,000 ft^2
Peel strength	ASTM D 7005	one per 90,000 ft^2

C. Submit quality control certificates signed by the geocomposite Manufacturer quality control manager. Certificates shall state that the material is resistant to UV exposure and that the geocomposites are continuously inspected and are needle-free. The quality control certificates shall also include: lot, batch, and roll number and identification; and results of manufacturing quality control tests including description of test methods used.

D. Do not supply any geocomposite roll that does not comply with the manufacturing quality control requirements.

E. If a geocomposite sample fails to meet the quality control requirements of this Section, sample and test rolls manufactured at the same time or in the same lot as the failing roll. Continue to sample and test the rolls until the extent of the failing rolls are bracketed by passing rolls. Do not supply failing rolls.

2.04 PACKING AND LABELING

A. Supply geocomposite in rolls wrapped in relatively impermeable and opaque protective wrapping. Wrapping which becomes torn or damaged shall be repaired with similar materials.

B Mark or tag geocomposite rolls in accordance with ASTM D 4873 with the following information:

1. manufacturer's name;
2. product identification;
3. lot or batch number;
4. roll number; and
5. roll dimensions.

C. Geocomposite rolls not labeled in accordance with this Section or on which labels are illegible shall be rejected and replaced.

2.05 HANDLING AND STORAGE

A. Protect geocomposite from sunlight, moisture, excessive heat or cold, puncture, mud, dirt, and dust or other damaging or deleterious conditions. Follow all geocomposite manufacturer recommendations for handling and storage.

B. Store geocomposite rolls on pallets or other elevated structures. Do not store geocomposite rolls directly on the ground.

C. Outdoor storage of rolls shall not exceed the manufacturer's recommendation or longer than 6 months, whichever is less.

PART 3 EXECUTION

3.01 FAMILIARIZATION

A. Prior to implementing any of the work described in this Section, the Contractor shall become thoroughly familiar with all portions of the work falling within this Section.

B. Inspection:

1. Prior to implementing any of the work in this Section, the Contractor shall carefully inspect the installed work of all other Sections and verify that all work is complete to the point where the installation of this section may properly commence without adverse impact.

2. If the Contractor has any concerns regarding the installed work of other Sections, the Contractor shall immediately notify the Engineer in writing. Failure to inform the Engineer in writing or continuance of installation of the geocomposite drainage layer will be construed as the Contractor's acceptance of the related work of all other Sections.

3.02 HANDLING AND PLACEMENT

A. The geocomposite shall be handled in such a manner as to ensure the geocomposite is not damaged in any way.

B. Necessary precautions shall be taken to prevent damage to underlying layers during placement of the geocomposite drainage layer.

C. The geocomposite shall only be cut using Manufacturer's recommended procedures.

D. Anchor or weight geocomposite with sandbags, or the equivalent, to prevent damage from wind. Install sandbags during placement and maintain them until overlying material is placed. Geocomposite drainage layer installed on slopes shall be anchored securely at the top of the slope with the designed minimum run-out distance as shown on the Contract Drawings.

E. Care shall be taken during placement of geocomposite drainage layer not to entrap dirt or excessive dust in the geocomposite drainage layer that could cause clogging of the drainage system, and/or stones that could damage the adjacent geosynthetic.

F. Unless otherwise specified, geocomposites shall not be welded to the geomembrane cover.

G. The geocomposite drainage layer shall be positioned by hand after being unrolled to minimize wrinkles.

H. Tools and sandbags shall not be left on, in, or under the geocomposite drainage layer.

I. After unwrapping the geocomposite from its opaque cover, the geocomposite shall not be left exposed for a period in excess of 30 days, unless if approved by the Engineer.

3.03 SEAMS AND OVERLAPS

A. The components of the geocomposite (i.e., geotextile - geonet - and geotextile) are not to be bonded together at the edges of the rolls. Each component shall be secured or seamed to the like component at overlaps.

B. Geonet Components:

1. The geonet components shall be overlapped by at least 4 inches. These overlaps shall be secured by tying.
2. Tying shall be achieved by plastic fasteners or polymer braid. Tying devices shall be white or yellow for easy inspection. Metallic devices shall not be used.
3. Tying shall be every 5 feet along the slope, every 2 feet on end-to-end seams.

C. Geotextile Components:

1. The bottom layers of geotextile shall be overlapped a minimum of 4 inches prior to seaming. The top layers of geotextiles shall be continuously sewn (i.e., spot sewing or thermal bonding is only allowed for repairs). The top layers of geotextiles shall be overlapped a minimum of 6 inches prior to seaming.
2. To the extent practical, installing horizontal seams shall be avoided. If it is not practical to avoid horizontal seams on the side slopes, then the horizontal seams shall be discontinuous (i.e., staggered) between adjacent panels.
3. Polymeric thread, with chemical resistance properties equal to or exceeding those of the geotextile component, shall be used for all sewing. The seams shall be sewn using Stitch Type 401. The seam type shall be Federal Standard Type SSN-1.

3.04 REPAIR

A. If the geonet is undamaged but the geotextile is damaged, the damaged area shall be repaired as follows:

1. remove damaged geotextile;
2. cut patch of new geotextile to provide minimum 12-inch overlap in all directions; and
3. thermally bond geotextile patch to existing geocomposite.

B. All seams that have no geotextile flaps available for sewing shall have a geotextile patch, extending 1-ft beyond the edges of the panel, thermally bonded.

C. Any holes or tears in the geocomposite drainage layer shall be repaired by removing the damaged portion of the geonet, placing a patch extending 0.5 ft beyond the edges of the hole or tear. The patch shall be secured by tying fasteners through the bottom geotextile and the geonet of the patch, and through the panel. The patch shall be secured every 6 inches with approved tying devices. A geotextile patch shall be heat sealed to the top of the geocomposite drainage layer needing repair. If the hole or tear width across the panel is more than 50 percent of the width of the panel, the damaged area shall be cut out and the two portions of the geonet shall be joined in accordance with this Section.

3.05 PRODUCT PROTECTION

A. All means necessary shall be used to protect prior work and materials and completed work of other Sections.

TABLE 1. REQUIRED PROPERTY VALUES FOR GEOCOMPOSITE

PROPERTIES	QUALIFIER	UNITS	SPECIFIED VALUES(1)	TEST METHOD
Geonet Component: Polymer composition	Minimum	%	95% polyethylene by weight	---
Polymer density	Minimum	g/cm^3	0.935	ASTM D 1505
Carbon black content	Range	%	2 - 3	ASTM D 1603 or D 4218
Nominal thickness	Minimum	mils	200	ASTM D 5199
Geotextile Components: Type	None	none	needlepunched nonwoven	---
Polymer composition	Minimum	%	95 polyester or polypropylene	
Mass per unit area	Minimum	oz/yd^2	8	ASTM D 5261
Apparent opening size	Maximum	mm	$O_{95} \leq 0.21$ mm	ASTM D 4751
Permittivity	Minimum	sec^{-1}	0.9	ASTM D 4491
Grab strength	Minimum	lb	190	ASTM D 4632(2)
Tear strength	Minimum	lb	75	ASTM D 4533(2)
Puncture strength	Minimum	lb	95 lb	ASTM D 4833(3)
Geocomposite Transmissivity	Minimum	m^2/s	2×10^{-3}	ASTM D 4716(4)
Peel strength	Minimum	lb/in	0.5 (min) 1.0 (average)	ASTM D 7005

Notes: (1) All values represent minimum average roll values (i.e., any roll in a lot should meet or exceed the values in this table).

(2) Minimum value measured in machine and cross machine direction.

(3) Tension testing machine with a 1.75-in. diameter ring clamp, the steel ball bearing replaced with 0.31-in. a solid steel cylinder with a flat tip centered with the ring clamp.

(4) The transmissivity is the hydraulic transmissivity of the geocomposite drainage layer measured using water at 68ºF with a gradient of not less than 0.33, under a compressive stress of not less than 240 psf with the site-specific boundary conditions of the protective cover soil interface on the upper geotextile and the selected geomembrane against the lower geotextile.

(5)

%	=	percent	mils	=	milli inches
g/cm^3	=	gram per cubic centimeter	lb	=	pound
oz/yd^2	=	ounces per square yard	sec	=	seconds
mm	=	millimeter	lbs/in.	=	pounds per inch
m^2/s	=	square meter per second.			

END OF SECTION

SECTION 02730 - GEOMEMBRANE LINER (BASE LINER)

PART 1 – GENERAL

1.01 SCOPE OF WORK

A. The work covered in this Section consists of the installation of a 60-mil high density polyethylene (HDPE) geomembrane (textured on both sides). These geomembranes shall be placed in accordance with the Project Specifications and Drawings. The Contractor shall furnish all labor, materials, equipment, supervision, and incidentals necessary to perform the scope of work.

B. All geomembrane material placed as a part of this project shall be placed, tested, and documented in accordance with this Section unless specifically approved by the Engineer.

1.02 RELATED WORK

A. Work in this section includes, but is not limited to:

1.	Section 70-19	Environmental Protection
2.	Section SP 60-12	Submittal Procedure
3.	Section 70-06	Sanitary, Health, and Safety provisions
4.	Section P-152	Excavation, Subgrade, and Embankment
5.	Section PQ-102	Spoil Area Liner System
6.	Section 02710	Geotextile
7.	Section 02720	Geocomposite Drainage Layer
8.	Section 02740	Geomembrane (Cap Liner)

1.03 REFERENCES

A. Latest version of the American Society for Testing and Materials (ASTM) standards:

1.	ASTM D 792	Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement.
2.	ASTM D 1004	Standard Test Method of Tear Resistance (Graves Tear) of Plastic Film and Sheeting.
3.	ASTM D 1238	Standard Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer.
4.	ASTM D 1505	Standard Test Methods for Density of Plastics by the Density-Gradient Technique.
5.	ASTM D 1603	Standard Test Method for Carbon Black Content in Olefin Plastics.

6. ASTM D 3895 Standard Test Method for Oxidative-Induction Time of Polyolefins by Differential Scanning Calorimetry
7. ASTM D 4218 Standard Test Method for Determination of Carbon Black Content in Polyethylene Compounds by the Muffle-Furnace Technique
8. ASTM D 4833 Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products.
9. ASTM D 5321 Standard Test Method for Determining the Coefficient of Soil and Geosynthetic or Geosynthetic and Geosynthetic Friction by the Direct Shear Method.
10. ASTM D 5397 Standard Test Method for Evaluation of Stress Crack Resistance of Polyolefin Geomembranes Using Notched Constant Tensile Load Test.
11. ASTM D 5596 Standard Test Method for Microscopic Examination the Dispersion of Carbon Black in Polyolefin Geosynthetics.
12. ASTM D 5994 Standard Test Method for Measuring the Core Thickness of Textured Geomembrane.
13. ASTM D 6392 Standard Test Method for Determining the Integrity of Nonreinforced Geomembrane Seams Produced Using Thermo-Fusion Methods.
14. ASTM D 6693 Standard Test Method for Determining Tensile Properties of Nonreinforced Polyethylene and Nonreinforced Flexible Polypropylene Geomembranes.
15. ASTM D 7466 Standard Test Method for Measuring the Asperity Height of Textured Geomembrane.
16. GRI GM 9 Cold Weather Seaming of Geomembranes.

1.04 SUBMITTALS

A. Submit the following information to the Engineer for review not less than 45 calendar days prior to use for all geomembrane furnished.

1. Geomembrane manufacturer capabilities, including daily production capacity available for this contract and manufacturing quality control procedures.
2. A list of 10 completed facilities for which the Manufacturer has manufactured a minimum total of 10,000,000 square feet of polyethylene geomembrane. Provide the following information for each facility:
   a. Name, location, purpose of facility, and date of installation;
   b. Names of owner, project manager, design engineer, and installer; and
   c. Thickness and surface area of geomembrane provided.

3. Origin (resin supplier's name, resin production plant) and identification (brand name, number) of the polyethylene resin used.
4. Certification of minimum average roll values (95 percent lower confidence limit) for physical, mechanical, and environmental properties and the corresponding test procedures for the geomembrane properties listed in Table 1 for the 60-mil base liner geomembrane. Submit values that are specific to the resin used in manufacturing of the geomembrane.
5. Certification that HDPE welding rod is compatible with the specifications and consists of the same resin as the geomembrane.
6. Manufacturer warranty as specified in this Section.

B. Submit to the Engineer for review not less than 14 calendar days prior to geomembrane use the following documentation on the resin used to manufacture any geomembranes:

1. Copies of quality control certificates issued by the resin supplier including the production dates and origin of the resin used to manufacture the geomembrane for this Contract.
2. Results of tests conducted by the Manufacturer to verify the quality of the resin used to manufacture the geomembrane rolls assigned to the project.
3. Certification that no reclaimed polymer is added to the resin during the manufacturing of the geomembrane to be used for this project except as allowed by this specification.

C. Submit to the Engineer for review the following documentation on geomembrane roll production at least 5 calendar days prior to transporting any geomembrane to the site.

1. Manufacturing certificates for each shift's production of geomembrane, signed by the Manufacturer quality control manager, and notarized.
2. Certificate shall include roll numbers and identification, sampling procedures and results of Manufacturer quality control tests, including descriptions of the test methods used (the Manufacturer quality control tests to be performed are given in Part 2 of this Section).
3. Cold weather seaming procedures (including manufacturer specifications), which should follow the standards of GRI GM 9.

D. Submit to the Engineer for review the following information from the Installer at least 14 calendar days prior to mobilization of the Installer to the site.

1. Layout drawings showing the installation layout identifying geomembrane panel configurations, dimensions, details, locations of seams, as well as any variance or additional details which deviate from the Construction Drawings. The layout drawings shall be adequate for use as a construction

plan and shall include dimensions, details, etc. The layout drawings, as modified and/or approved by the Engineer, shall become part of the contract.

2. Installation schedule.
3. Copy of Installer's letter of approval or license by the Manufacturer.
4. Installation capabilities, including information on equipment proposed for this project, average daily production anticipated for this project and quality control procedures to include quality control organization.
5. A list of 10 completed facilities for which the Installer has installed a minimum of 5,000,000 square feet of polyethylene geomembrane. The following information shall be provided for each facility:
    a. Name and purpose of the facility, its location, and installation dates.
    b. Names of owner, project manager, and geomembrane manufacturer.
    c. Name and qualifications of the supervisor of the installation crew;
    d. Thickness and surface area of installed geomembrane;
    e. Type of seaming and type of seaming apparatus used; and
    f. Duration of installation.
6. Resumes of the Installer Superintendent and quality control chief to be assigned to this project, including dates and duration of employment.
7. Resumes of all personnel who will perform seaming operations on this project, including dates and duration of employment.
8. Evidence that the installation crew has the following experience.
    a. The foreman shall have supervised the installation of a minimum of 50 acres of comparable geosynthetic systems, on a minimum of 5 different projects.
    b. At least one seamer shall have experience seaming a minimum of 500,000 square feet of polyethylene geomembrane using the same type of seaming apparatus to be used at this site. Seamers with such experience will be designated "master seamers" and shall provide direct supervision over less experienced seamers.
    c. All other seaming personnel shall have seamed at least 100,000 square feet of polyethylene geomembrane using the same type of seaming apparatus to be used at this site. Personnel who have seamed less than 100,000 square feet of seams shall be allowed to seam only under the direct supervision of the master seamer or Superintendent.

E. Submit to the Engineer for review at least 14 days prior to geomembrane placement, a Certificate of Calibration less than 12 months old for the field tensiometer. Tensiometer shall be calibrated within one year of date of test. Calibration shall be traceable to national or industry recognized standards where possible.

F. Submit subgrade acceptance certificates, signed by the Installer, for each area to be covered by the geomembrane prior to that area being covered by geomembrane.

G. Within 14 calendar days of completion of the geomembrane installation, submit a one-year installation warranty to the Engineer.

1.05 AS-BUILT DOCUMENTATION

A. The Contractor shall prepare as-built drawings of the spoil pile, including all engineered materials in accordance with Section SP 60-12 – Submittal Procedure.

1.06 CONSTRUCTION QUALITY ASSURANCE

A. The construction of the geomembrane will be monitored as required in the CQA program.

B. The Engineer will perform material conformance testing of geomembrane materials and installation quality assurance testing of the geomembrane seams, as required in the CQA program.

C. The Contractor shall be aware of the activities required of the Engineer by the CQA program and shall account for these activities in the construction schedule.

D. The Contractor shall correct all deficiencies and nonconformances identified by the Engineer at no additional cost. The Contractor shall also provide assistance as needed to the post-construction electrical leak location survey to be performed for the base liner by a specialty leak location contractor reporting to the CQA Engineer. The work may include but not limited to: providing electrical isolation around perimeter and or liner penetrations; exposing the liner manually to create and repair test hole through the geomembrane; providing access to AC power; providing laborers to layout out survey grid; adding of water to soils (above and below liner) to promote electrical conductivity; installing electrical probes and wires under the liner; and assisting in the repair of any identified leaks.

PART 2 – PRODUCTS

2.01 RESIN

A. Provide geomembrane manufactured from new, first-quality polyethylene resin. Do not add reclaimed polymer to the resin. The use of polymer recycled during

the manufacturing process is permitted if performed with appropriate cleanliness and if the recycled polymer during the manufacturing process does not exceed 10 percent by weight of the total polymer weight. The percentage of recycled polymer shall not affect the quality of the finished product.

B. Use high density polyethylene (HDPE) resin having the following properties:

1. Formulated Sheet Density: 0.940 g/ml maximum (ASTM D792 Method A or ASTM D1505)
2. Resin Specific Gravity: 0.93 g/ml minimum (ASTM D792 Method B or ASTM D1505).
3. Melt Flow Index: 1.0 g/10 min., maximum (ASTM D1238 Condition E)

2.02 GEOMEMBRANE PROPERTIES

A. The Contractor shall furnish HDPE geomembrane having properties that comply with the required values shown in Table 1 for 60-mil HDPE geomembrane.

D. In addition, furnish geomembrane that:

1. contains a maximum of 1 percent by weight of additives, fillers, or extenders not including carbon black;
2. does not have striations, pinholes, bubbles, blisters, nodules, undispersed raw materials, or any sign of contamination by foreign matter on the surface or in the interior;
3. is free of holes, blisters, modules, undispersed raw materials, or any sign of contamination by foreign matter; and
4. is manufactured in a single layer (thinner layers shall not be welded together to produce the final required thickness).

2.03 MANUFACTURING QUALITY CONTROL

A. Resin:

1. Sample and test resin at a minimum frequency of one test per rail car to demonstrate that the resin complies with the requirements of this Section.

Perform tests on resin after the addition of additives to the virgin resin. Certify in writing that the resin meets the requirements of this Section.

2. Do not use any noncomplying resin.

B. Rolls:

1. Continuously monitor for geomembrane defects during manufacturing.
2. Do not supply geomembrane that exhibits any defects.
3. Regularly monitor for geomembrane thickness during manufacturing.
4. Do not supply geomembrane that fails to meet the specified thickness.
5. Sample and test the geomembrane, to demonstrate that its properties conform to the values specified in Table 1. Perform the following quality control tests at a minimum frequency, as shown:

Test	Procedure	Frequency
Thickness	ASTM D 5994	one per 50,000 ft^2
tensile strength	ASTM D 6693	one per 50,000 ft^2
tensile elongation	ASTM D 6693	one per 50,000 ft^2
tear resistance	ASTM D 1004	one per 50,000 ft^2
carbon black content	ASTM D 1603	one per 50,000 ft^2
carbon black dispersion	ASTM D 5596	one per 50,000 ft^2
specific gravity	ASTM D 1505	one per 50,000 ft^2
asperity height	ASTM D 7466	one per 50,000 ft^2
oxidative induction time	ASTM D 3895	one per formulation
Stress Crack Resistance	ASTM D 5397	one per formulation[1]

[1]ASTM D 5397 is not appropriate for use on textured geomembranes. The test should instead be conducted on smooth edges of the textured geomembrane rolls or on smooth sheets made from the same formulation as being used for the textured geomembrane.

6. Provide a geomembrane sample for use in sandwich shear testing (ASTM D 5321) to demonstrate that the geomembrane properties conform to the shear strength parameters specified in Table 1.
7. If a geomembrane sample fails to meet the quality control requirements of this Section, sample and test rolls manufactured, in the same resin batch, or at the same time, as the failing roll. Continue to sample and test the rolls until the extent of the failing rolls are bracketed by passing rolls. Do not supply any failing rolls.

C. Permit the Engineer to visit the manufacturing plant for project specific visits. If possible, such visits will be prior to, or during, the manufacturing of the geomembrane rolls for this project.

2.04 LABELING

A. Label the geomembrane rolls with the following information.

1. thickness of the material;
2. length and width of the roll;
3. name of Manufacturer;
4. product identification;
5. lot number; and
6. roll number.

B. Geomembrane rolls not labeled in accordance with this Section or on which labels are illegible will be rejected and replaced.

2.05 TRANSPORTATION, HANDLING, AND STORAGE

A. Deliver geomembranes to the site at least 14 calendar days prior to the planned deployment date to allow the Engineer adequate time to perform conformance testing on the geomembrane samples as described in the CQA program.

B. Provide proper handling and storage of the geomembrane at the site. Protect the geomembrane from excessive heat or cold, dirt, puncture, cutting, or other damaging or deleterious conditions. Provide any additional storage procedures required by the Manufacturer.

C. Store geomembrane rolls on palates or other elevated structures. Do not store geomembrane rolls directly on the ground surface. Do not store more than 3 rolls high.

PART 3 – EXECUTION

3.01 FAMILIARIZATION

A. Prior to implementing any of the work described in this Section, the Contractor shall become thoroughly familiar with all portions of the work falling within this Section.

B. Inspection:

1. Prior to implementing any of the work in this Section, the Contractor shall carefully inspect the installed work of all other Sections and verify that all work is complete to the point where the installation of this section may properly commence without adverse impact.
2. If the Contractor has any concerns regarding the installed work of other Sections, the Contractor shall immediately notify the Engineer in writing.

Failure to inform the Engineer in writing or continuance of installation of the geomembrane will be construed as the Contractor's acceptance of the related work of all other Sections.

3.02 SUBGRADE SURFACE PREPARATION

A. The Contractor shall provide certification in writing from the Geomembrane Installer that the surface on which the geomembrane will be installed is acceptable. This certification of acceptance shall be given to the Engineer prior to commencement of geomembrane installation in the area under consideration.

B. Special care shall be taken to maintain the prepared soil surface.

C. No geomembrane shall be placed onto an area which has been softened by precipitation or which has excessively cracked due to desiccation. The soil surface shall be observed daily to evaluate the effects of desiccation cracking and/or softening on the integrity of the subgrade.

D. Any damage to the subgrade caused by installation activities shall be repaired at the Contractor's expense.

3.03 GEOMEMBRANE DEPLOYMENT

A. General:

1. The Contractor shall produce layout drawings prior to geomembrane deployment. These drawings shall indicate the geomembrane configuration, dimensions, details, locations of seams, etc. The layout drawings must be approved by the Engineer prior to the installation of any geomembranes. The layout drawings, as modified and/or approved by the Engineer, shall become part of these specifications.
2. Do not deploy geomembrane until the layout drawings are approved by the Engineer.
3. Do not deploy a geomembrane panel in an area until the Engineer has been provided with a certificate of subgrade acceptance for that area.
4. Do not deploy geomembranes until Engineer completes conformance evaluation of the geomembrane and performance evaluation of previous work, including evaluation of Contractor's survey results for previous work.
5. Deploy each geomembrane panel in accordance with the approved layout drawings.

B. Field Panel Identification:

1. A geomembrane field panel is a roll or a portion of roll cut in the field.

2. Give each field panel an identification code (number or letter-number). This identification code shall be agreed upon by the Engineer and the Installer.

C. Field Panel Placement:

1. Place each geomembrane panel one at a time and seam each panel immediately after its placement.
2. Use temporary rubsheets as required to prevent displacement or damage to underlying geosynthetics. High spots in geomembrane-backed geosynthetic clay liners shall be covered by a temporary rubsheets during placement of geomembrane.
3. Do not place geomembrane panels when the ambient temperature is below 40° Fahrenheit (F), unless authorized in writing by the Engineer. For cold weather (<40°F) deployment, use the additional procedures authorized in writing by the Engineer. Additional procedures authorized by the engineer for cold weather seaming shall include, more trial welds, deploying panels the night before to maintain consistent temperatures between the panels being seamed, and utilizing temporary enclosed structures with heaters. In addition, all manufacturer specifications for cold weather seaming and panel placement for the selected geomembrane shall be followed. The procedures will also address placement of the gravel during cold weather. The manufacturer recommendations for cold weather will be followed.
4. Do not place geomembranes during any precipitation, in the presence of heavy fog or dew, in an area of ponded water, or in the presence of wind in excess of 20 miles per hour.
5. Ensure that:
    a. No vehicular traffic drives directly on the geomembrane.
    b. Equipment used does not damage the geomembrane by handling, trafficking, or leakage of hydrocarbons (i.e., fuels).
    c. Personnel working on the geomembrane do not smoke, bring glass onto the geomembrane, or engage in other activities that could damage the geomembrane.
    d. The method used to unroll the panels does not scratch or crimp the geomembrane and does not damage lower geosynthetics or the supporting soil.
    e. The method used to place the panels minimizes wrinkles (especially differential wrinkles between adjacent panels). The method used to place the panels results in intimate contact with geosynthetic clay liner, where present. Adjust or repair any area of geomembrane wrinkles where the wrinkle height causes a concern for wrinkle to fold over during placement of material on top. A wrinkle height of 4 inches

measured perpendicular to the slope can be used as a general guide. The method used to place the panels does not cause the panels to lift up or trampoline during the coolest portion of the day.

g. The geomembrane is anchored or weighted with sandbags, or the equivalent, to prevent damage or uplift from wind. Install sufficient anchoring or weighting to prevent uplift and maintain such system until overlying material is placed.

6. Replace any field panel or portion thereof that becomes damaged (torn, twisted, or crimped). Remove from the work area damaged panels or portions of damaged panels.

3.04 FIELD SEAMING

A. Personnel shall be experienced as specified in this Section. Do not perform seaming unless a "master seamer" and the Engineer are on-site.

B. Orient seams parallel to the line of maximum slope (i.e., oriented down, not across, the slope). Minimize the number of seams in corners and at odd-shaped geometric locations. No horizontal seam shall be less than 10 feet from the toe of the slope, except where approved by the Engineer. Do not locate seams at an area of potential stress concentration.

C. Weather Conditions for Seaming:

1. Do not seam geomembrane at ambient temperatures below 40°F or above 104°F, unless authorized in writing by the Engineer. Do not seam geomembrane at sheet temperatures above 158°F. For cold (<40°F) or hot (>104°F) weather seaming, use the additional procedures authorized in writing by the Engineer. Cold weather procedures (including manufacturer specifications) will be a contractor submittal that will be made available to the regulators.
2. Measure ambient temperatures between 0 to 6 inches above the geomembrane surface.
3. In all cases the geomembrane seam areas shall be dry and protected from wind. Do not seam geomembrane during periods of precipitation or if winds are in excess of 20 miles per hour.

D. Overlapping and Temporary Bonding:

1. Sufficiently overlap geomembrane panels for welding and to allow peel tests to be performed on the seam. Any seams that cannot be destructively tested because of insufficient overlap are failing seams.
2. Control the temperature of the air at the nozzle of heat bonding apparatus such that the geomembrane is not damaged.

E. Seam Preparation:

1. Prior to seaming, clean the seam area and ensure that area to be bonded is free of moisture, dust, dirt, debris of any kind, and foreign material.
2. If seam overlap grinding is required, complete the process according to the Manufacturer's instructions or within 60 minutes of the seaming operation. Do not grind to a depth that exceeds ten percent of the geomembrane thickness. Grinding marks shall not appear beyond 0.25 inch of the extrudate after it is placed.
3. Align seams with the fewest possible number of wrinkles and "fishmouths".

F. General Seaming Requirements:

1. Extend seams to the outside edge of panels to be placed in the anchor trench.
2. If required, place a firm substrate such as a flat board or similar hard surface directly under the seam overlap to achieve proper support.
3. Cut fishmouths or wrinkles at the seam overlaps along the ridge of the wrinkle to achieve a flat overlap. Seam the cut fishmouths or wrinkles and patch any portion where the overlap is less than 6 inches with an oval or round patch of geomembrane that extends a minimum of 6 inches beyond the cut in all directions.
4. Place the electric generator used for power supply to the welding machines outside the area to be lined or mount it on soft tires such that no damage occurs to the geomembrane. Properly ground the electric generator. Place a smooth insulating plate or fabric beneath the hot welding apparatus after use.

G. Seaming Process:

1. Approved processes for field seaming are extrusion welding and fusion welding. The primary method of welding shall be fusion. Seaming equipment shall not damage the geomembrane. Use only geomembrane Manufacturer-approved equipment.
2. Extrusion Equipment and Procedures:
   a. Maintain at least one spare operable seaming apparatus on site.

b. Equip extrusion welding apparatus with gauges giving the temperature in the apparatus and at the nozzle.
c. Prior to beginning a seam, purge the extruder until all heat-degraded extrudate has been removed from the barrel. Whenever the extruder is stopped, purge the barrel of all heat-degraded extrudate.

3. Fusion Equipment and Procedures:
   a. Maintain at least one spare operable seaming apparatus on site.
   b. Fusion-welding apparatus shall be automated self-propelled devices equipped with gauges giving the applicable temperatures and pressures.
   c. Fusion-welding apparatus shall produce a double-track seam.
   d. Abrade the edges of cross seams to a smooth incline (top and bottom) prior to extrusion welding.

H. Trial Seams:

1. Make trial seams on excess pieces of geomembrane to verify that seaming conditions are adequate. Conduct trial seams on the same material to be installed and under similar field conditions as production seams. Conduct trial seaming at the beginning of each seaming period, after every four hours of continuous seaming, every time seaming equipment is changed and if significant changes in geomembrane temperature are observed, for each seaming apparatus used that day prior to seaming. In addition, each seamer shall make at least one trial seam each day, for each day that seaming is performed by that seamer. Conduct trial seaming under the same conditions as the actual seaming. Prepare trial seams that are at least 15 feet long by 1 foot wide (after seaming) with the seam centered lengthwise for fusion equipment and at least 3 feet long by 1 foot wide for extrusion equipment. Prepare seam overlap as indicated in the "Overlapping and Temporary Bonding" Article of this Part.
2. Cut four specimens, each 1.0 inch wide, from the trial seam sample. Test two specimens in shear and two in peel, using a field tensiometer. The test specimens shall not fail in the seam. If a specimen fails, repeat the entire operation. If the additional specimen fails, do not accept the seaming apparatus or seamer until the deficiencies are corrected and two consecutive successful trial seams are achieved. A seamer may start production seaming prior to testing of the trial seams. In the event the trial seam fails, all production seams by the seamer are failed seams.

I. Nondestructive Seam Continuity Testing:

1. Nondestructively test for continuity field seams over their full length. Perform continuity testing as the seaming work progresses, not at the

completion of field seaming. Record the location, date, unit number of test apparatus, name of tester and results of testing. Complete any required repairs in accordance with the "Defects and Repairs" Article of this Part. Apply the following procedures:

a. use vacuum testing for extrusion welds; and
b. use air pressure testing for double-track fusion seams.

2. Vacuum Testing:
   a. Use the following equipment:
      i. A vacuum box assembly consisting of a stiff housing, a transparent viewing window, a soft neoprene gasket attached to the bottom, port hole or valve assembly, and a vacuum gauge.
      ii. A system for applying 5 pound per square inch (psi) gauge suction to the box.
      iii. A bucket of soapy solution and applicator.

   b. Follow these procedures:
      i. Energize the vacuum pump and reduce the tank pressure to 5 ±1 psi gauge.
      ii. Wet an area of the geomembrane seam larger than the vacuum box with the soapy solution.
      iii. Place the box over the wetted area.
      iv. Close the bleed valve and open the vacuum valve.
      v. Ensure that a leak tight seal is created.
      vi. Examine the geomembrane through the viewing window for the presence of soap bubbles for not less than 20 seconds.
      vii. If no bubbles appear after 20 seconds, close the vacuum valve and open the bleed valve, move the box over the next adjoining area with a minimum 3 inch overlap, and repeat the process.
      viii. Mark all areas where soap bubbles appear with a marker that will not damage the geomembrane and repair in accordance with the "Defects and Repairs" Article of this Part.

3. Air Pressure Testing:
   a. Use the following equipment:
      i. an air pump (manual or motor driven) or air reservoir, equipped with a pressure gauge, capable of generating and sustaining a pressure between 25 and 30 pounds per square inch;
      ii. a rubber hose with fittings and connections; and
      iii. a hollow needle, or other approved pressure feed device.

   b. Follow these procedures:
      i. Seal both ends of the seam to be tested.

ii. Insert needle, or other approved pressure feed device, into the tunnel created by the fusion weld.
iii. Insert a protective cushion between the air pump and the geomembrane.
iv. Energize the air pump to a pressure between 25 and 30 pounds per square inches, close valve, and sustain the pressure for not less than 5 minutes.
v. If loss of pressure exceeds 3 pounds per square inches, or does not stabilize, locate faulty area and repair in accordance with the "Defects and Repairs" Article of this Part.
vi. Cut opposite end of air channel from pressure gauge and observe release of pressure to ensure air channel is not blocked.
vii. Remove needle, or other approved pressure feed device, and seal both ends in accordance with the "Defects and Repairs" Article of this Part.

J. Destructive Testing:

1. Destructive testing shall be performed by the CQA Personnel. The Contractor shall provide assistance if requested by the CQA Personnel to obtain samples. Perform destructive seam tests to evaluate seam strength and integrity (see Table 2 for seam properties of 60-mil HDPE). Perform destructive testing as the seaming work progresses, not at the completion of field seaming.
2. Sampling and Testing:
   a. Collect destructive test samples at a minimum average frequency of one test location per 500 feet of seam length and at additional locations of suspected nonperformance. A minimum of one test sample for each seaming machine operating on a given day is required. The Engineer will select test locations, including locations with evidence of excess geomembrane crystallinity, contamination, offset seams, or any other evidence of inadequate seaming.
   b. Cut samples at the locations designated by the Engineer at the time the locations are designated. Number each sample and identify the sample number and location on the panel layout drawing. Immediately repair all holes in the geomembrane resulting from the destructive seam sampling in accordance with the repair procedures described in the "Defects and Repairs" Article of this Part. Test the continuity of the new seams in the repaired areas according to "Nondestructive Seam Continuity Testing" Article of this Part.
   c. Cut two strips 1 inch wide and 12 inch long with the seam centered parallel to the width from either side of the sample location. Test the two 1-inch wide strips in the field tensiometer in the peel mode. The

Engineer may request an additional test in the shear mode. If these samples pass the field test, prepare a laboratory sample at least 1 foot wide by 3.5 feet long with the seam centered lengthwise. Cut the laboratory sample into three parts and distribute as follows:

i. one portion 1 foot long to the Installer;
ii. one portion 1.5 feet long to the Engineer for testing; and
iii. one portion 1 foot long to the Engineer for archival storage.

3. In the event of failing field or laboratory test results, the Contractor may reconstruct the entire seam between two passing destructive tests; otherwise, the Engineer will identify the extent of the nonconforming area following the procedures given in the CQA program. Obtain additional samples for testing as requested by the Engineer.

K. Defects and Repairs:

1. Inspect the geomembrane before and after seaming for evidence of defects, holes, blisters, undispersed raw materials, and any sign of contamination by foreign matter. The surface of the geomembrane shall be clean at the time of inspection. Sweep or wash the geomembrane surface if surface contamination inhibits inspection.
2. Test each suspect location, both in seam and non-seam areas, using the methods described in the "Nondestructive Seam Continuity Testing" Article of this Part. Repair each location that fails nondestructive testing.
3. Cut and reseam wrinkles not conforming with Part 2 of this Section. Test the seams thus produced like any other seam.
4. Repair Procedures:
   a. Repair any portion of the geomembrane exhibiting a flaw, or failing a destructive or nondestructive test. Use the most appropriate of the available procedures:
      i. patching, used to repair large holes, tears, undispersed raw materials, and contamination by foreign matter;
      ii. abrading and reseaming, used to repair small sections of extruded seams;
      iii. spot seaming, used to repair minor, localized flaws;
      iv. capping, used to repair long lengths of failed seams;
      v. topping, used to repair areas of inadequate seams, which have an exposed edge less than 4 inches in length; and
      vi. removing bad seam and replacing with a strip of new material seamed into place (used with long lengths of fusion seams).

   b. When making repairs, satisfy the following:

i. abrade surfaces of the geomembrane that are to be repaired no more than 20 minutes prior to the repair;
ii. clean and dry all geomembrane surfaces immediately prior to repair;
iii. only use approved seaming equipment; and
iv. extend patches or caps at least 6 inches beyond the edge of the defect, and round corners of patches to a radius of at least 3 inches.

5. Repair Verification:
   a. Test each repair using the methods described in the "Nondestructive Seam Continuity Testing" Article of this Part. Repairs that pass the nondestructive test are adequate unless the Engineer elects to also perform destructive tests. Re-repair and retest failed tests.

3.05 MATERIALS IN CONTACT WITH THE GEOMEMBRANE

A. Take all necessary precautions to prevent damage to the geomembrane during the installation of other components of the liner system.

B. Do not drive equipment directly on the geomembrane. Only use low ground pressure equipment above the geomembrane.

C. The protection measures for the liner along the perimeter channel area include, restricting traffic to foot traffic and low weight portable equipment and tools on an as-needed basis, performing routine visual inspections, and repairing the liner. At the start of every dredge season, the exposed liner will be inspected. Repairs will be performed as necessary based on the inspection.

3.06 SURVEY CONTROL

A. Survey the installed geomembrane for preparing the as-built panel layout drawing.

B. Locate panel seams and intersections as requested by the Engineer.

3.07 GEOMEMBRANE ACCEPTANCE

A. The Contractor shall retain all ownership and responsibility for the geomembrane until accepted by the Engineer.

B. The geomembrane shall be accepted by the Owner when:

1. The installation is finished;

2. All documentation of installation is completed including the Engineer's final report; and
3. Verification of the adequacy of all field seams and repairs, including associated testing, is complete.

3.08 PROTECTION OF WORK

A. The Contractor shall protect all prior work and all materials and completed work of other Sections.

B. In the event of damage, the Contractor shall make all repairs or replacements necessary to be in full compliance with the Contract Documents.

TABLE 1
REQUIRED GEOMEMBRANE PROPERTIES FOR 60-MIL HDPE

Properties	Qualifiers	Units[1]	Specified Values	Test Method
Physical Properties				
Thickness	minimum average	Mils	60	ASTM D 5994
Asperity Height (Note 3)	minimum average	Mils	10	ASTM D 7466
Density	minimum	g/cm^3	0.940	ASTM D 1505
Carbon Black Content	range	%	2.0-3.0	ASTM D 1603
Carbon Black Dispersion	N/A	None	9 of 10 views in category 1 or 2	ASTM D 5596
Tensile Properties (each direction)				
1. Tensile Strength (force per unit width at break)	minimum	lb/in	90	ASTM D 6693
2. Elongation at Break	minimum	%	100	ASTM D 6693
3. Tensile Strength (force per unit width at yield)	minimum	lb/in	126	ASTM D 6693
4. Elongation at Yield	minimum	%	12	ASTM D 6693
Tear Resistance	minimum	Lb	42	ASTM D 1004 Die C Puncture
Puncture Resistance	minimum	Lb	90	ASTM D 4833
Shear Strength	minimum		See Note 2	ASTM D 5321
Oxidative Induction Time (OIT)	minimum average	Minutes	100	ASTM D 3895
Stress Crack Resistance	minimum	Hours	300	ASTM D 5397 (Note 4)

Notes:

1. mils = milli-inches
   % = percent
   g = grams
   g/cm^3 = grams per cubic centimeter
   lb = pound
   lb/in = pounds per inch
2. The required peak and residual shear strength parameters are included in a figure as part of Section 02250.
3. Of 10 readings, 8 out of 10 must be greater or equal to 7 mils and the lowest must be greater or equal to 5 mils.
4. ASTM D 5397 is not appropriate for use on textured geomembranes. The test should instead be conducted on smooth edges of the textured geomembrane rolls or on smooth sheets made from the same formulation as being used for the textured geomembrane.

TABLE 2
REQUIRED GEOMEMBRANE SEAM PROPERTIES FOR 60-MIL HDPE

Properties	Qualifiers	Units[3]	Specified Values	Test Method
Shear Strength[1]				
Fusion	minimum	lb/in	120	ASTM D 6392
Extrusion	minimum	lb/in	120	ASTM D 6392
Peel Adhesion			FTB[2]	
Fusion	minimum	lb/in	91	ASTM D 6392
Extrusion	minimum	lb/in	78	ASTM D 6392

Notes:

1. Also called "Bonded Seam Strength".
2. FTB = Film Tear Bond. (Maximum 10 percent seam separation)
3. lb/in = pounds per inch

END OF SECTION

SECTION 02740 - GEOMEMBRANE COVER (CAP LINER)

PART 1 – GENERAL

1.01 SCOPE OF WORK

A. The work covered in this Section consists of the installation of a 40-mil linear low-density polyethylene (LLDPE) geomembrane cover. This geomembrane cover shall be placed as shown in the Contract Drawings. The LLDPE geomembrane shall be textured on both sides. The Contractor shall furnish all labor, materials, equipment, supervision, and incidentals necessary to perform the scope of work.

B. All geomembrane material placed as a part of this project shall be placed, tested, and documented in accordance with this Section unless specifically approved by the Engineer.

1.02 RELATED WORK

A. Other work that is related to the work in this section includes, but is not limited to:

1.	Section 70-19	Environmental Protection
2.	Section 60-12	Submittal Procedure
3.	Section C-107	Survey and Stakeout
4.	Section P-152	Excavation, Subgrade, and Embankment
5.	Section T-901	Seeding
6.	Section T-905	Topsoil
7.	Section T-908	Mulching
8.	Section PQ-102	Spoil Area Liner System
9.	Section 02710	Geotextile
10.	Section 02720	Geocomposite Drainage Layer
11.	Section 02730	Geomembrane Liner (Base Liner)

1.03 REFERENCES

A. Latest version of the American Society for Testing and Materials (ASTM) standards:

1.	ASTM D 792	Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement.

2. ASTM D 1004 Standard Test Method of Tear Resistance (Graves Tear) of Plastic Film and Sheeting.
3. ASTM D 1238 Standard Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer.
4. ASTM D 1505 Standard Test Methods for Density of Plastics by the Density-Gradient Technique.
5. ASTM D 1603 Standard Test Method for Carbon Black Content in Olefin Plastics.
6. ASTM D 3895 Standard Test Method for Oxidative-Induction Time of Polyolefins by Differential Scanning Calorimetry.
7. ASTM D 4218 Standard Test Method for Determination of Carbon Black Content in Polyethylene Compounds by the Muffle-Furnace Technique.
8. ASTM D 4833 Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products.
9. ASTM D 5199 Standard Test Method for Measuring the Nominal Thickness of Geosynthetics.
10. ASTM D 5321 Standard Test Method for Determining the Coefficient of Soil and Geosynthetic or Geosynthetic and Geosynthetic Friction by the Direct Shear Method.
11. ASTM D 5596 Standard Test Method for Microscopic Examination the Dispersion of Carbon Black in Polyolefin Geosynthetics.
12. ASTM D 5994 Standard Test Method for Measuring the Core Thickness of Textured Geomembrane.
13. ASTM D 6392 Standard Test Method for Determining the Integrity of Nonreinforced Geomembrane Seams Produced Using Thermo-Fusion Methods.
14. ASTM D 6693 Standard Test Method for Determining Tensile Properties of Nonreinforced Polyethylene and Nonreinforced Flexible Polypropylene Geomembranes.
15. ASTM D 7466 Standard Test Method for Measuring the Asperity Height of Textured Geomembrane.
16. GRI GM 9 Cold Weather Seaming of Geomembranes.

1.04 SUBMITTALS

A. Submit the following information to the Engineer for review not less than 14 calendar days prior to use for all geomembrane furnished.

1. Geomembrane manufacturer capabilities, including daily production capacity available for this contract and manufacturing quality control procedures.

2. A list of 10 completed facilities for which the Manufacturer has manufactured a minimum total of 10,000,000 square feet of polyethylene geomembrane. Provide the following information for each facility:
    a. Name, location, purpose of facility, and date of installation;
    b. Names of owner, project manager, design engineer, and installer; and
    c. Thickness and surface area of geomembrane provided.
3. Origin (resin supplier's name, resin production plant) and identification (brand name, number) of the polyethylene resin used.
4. Certification of minimum average roll values (95 percent lower confidence limit) for physical, mechanical, and environmental properties and the corresponding test procedures for the geomembrane properties listed in Table 1 for the 40-mil final cover geomembrane. Submit values that are specific to the resin used in manufacturing of the geomembrane.
5. Certification that LLDPE welding rod is compatible with the specifications and consists of the same resin as the geomembrane.
6. Manufacturer warranty as specified in this Section.

B. Submit the following documentation on the resin used to manufacture any geomembranes to the Engineer for review not less than 14 calendar days prior to geomembrane use:

1. Copies of quality control certificates issued by the resin supplier including the production dates and origin of the resin used to manufacture the geomembrane for this Contract.
2. Results of tests conducted by the Manufacturer to verify the quality of the resin used to manufacture the geomembrane rolls assigned to the project.
3. Certification that no reclaimed polymer is added to the resin during the manufacturing of the geomembrane to be used for this project except as allowed by this specification.

C. Submit to the Engineer for review the following documentation on geomembrane roll production at least 5 calendar days prior to transporting any geomembrane to the site.

1. Manufacturing certificates for each shift's production of geomembrane, signed by the Manufacturer quality control manager.
2. Certificate shall include roll numbers and identification, sampling procedures and results of Manufacturer quality control tests, including descriptions of the test methods used (the Manufacturer quality control tests to be performed are given in Part 2 of this Section).
3. Cold weather seaming procedures (including manufacturer specifications), which should follow the standards of GRI GM 9.

D. Submit the following information from the Installer to the Engineer for review at least 14 calendar days prior to mobilization of the Installer to the site.

1. Layout drawings showing the installation layout identifying geomembrane panel configurations, dimensions, details, locations of seams, as well as any variance or additional details which deviate from the Contract Drawings. The layout drawings shall be adequate for use as a construction plan and shall include dimensions, details, etc. The layout drawings, as modified and/or approved by the Engineer, shall become part of the contract.
2. Installation schedule.
3. Copy of Installer's letter of approval or license by the Manufacturer.
4. Installation capabilities, including information on equipment proposed for this project, average daily production anticipated for this project and quality control procedures to include quality control organization.
5. A list of 10 completed facilities for which the Installer has installed a minimum of 5,000,000 square feet of polyethylene geomembrane. The following information shall be provided for each facility:
    a. Name and purpose of the facility, its location, and installation dates;
    b. Names of owner, project manager, and geomembrane manufacturer;
    c. Name and qualifications of the supervisor of the installation crew;
    d. Thickness and surface area of installed geomembrane;
    e. Type of seaming and type of seaming apparatus used; and
    f. Duration of installation.

6. Resumes of the Installer Superintendent and quality control chief to be assigned to this project, including dates and duration of employment.
7. Resumes of all personnel who will perform seaming operations on this project, including dates and duration of employment.
8. Evidence that the installation crew has the following experience.
    a. The foreman shall have supervised the installation of a minimum of 50 acres of comparable geosynthetic systems, on a minimum of 5 different projects.
    b. At least one seamer shall have experience seaming a minimum of 500,000 square feet of polyethylene geomembrane using the same type of seaming apparatus to be used at this site. Seamers with such experience will be designated "master seamers" and shall provide direct supervision over less experienced seamers.
    c. All other seaming personnel shall have seamed at least 100,000 square feet of polyethylene geomembrane using the same type of seaming apparatus to be used at this site. Personnel who have seamed less than 100,000 square feet of seams shall be allowed to seam only under the direct supervision of the master seamer or Superintendent.

E. Submit a Certificate of Calibration less than 12 months old for the field tensiometer to the Engineer for review at least 14 days prior to geomembrane cover placement. Tensiometer shall be calibrated within one year of date of test. Calibration shall be traceable to national or industry recognized standards where possible.

F. Submit subgrade acceptance certificates, signed by the Installer, for each area to be covered by the geomembrane prior to geomembrane cover placement in that area.

G. Within 14 calendar days of completion of the geomembrane cover installation, submit a one-year installation warranty to the Engineer.

1.05 AS-BUILT DOCUMENTATION

A. The Contractor shall prepare as-built drawings of the spoil pile, including all engineered materials in accordance with Section SP 60-12 – Submittal Procedure.

1.06 CONSTRUCTION QUALITY ASSURANCE

A. The construction of the geomembrane cover will be monitored as required in the CQA program.

B. The Engineer will perform material conformance testing of geomembrane materials and installation quality assurance testing of the geomembrane cover seams, as required in the CQA program.

C. The Contractor shall be aware of the activities required of the Engineer by the CQA program and shall account for these activities in the construction schedule.

D. The Contractor shall correct all deficiencies and nonconformances identified by the Engineer at no additional cost to the Owner.

PART 2 – PRODUCTS

2.01 RESIN

A. Provide geomembrane manufactured from new, first-quality polyethylene resin. Do not add reclaimed polymer to the resin. The use of polymer recycled during the manufacturing process is permitted if performed with appropriate cleanliness and if the recycled polymer during the manufacturing process does

not exceed 10 percent by weight of the total polymer weight. The percentage of recycled polymer shall not affect the quality of the finished product.

B. Use LLDPE resin having the following properties:

1. Formulated Sheet Density: 0.939 g/ml maximum (ASTM D792 Method B or ASTM D1505)
2. Resin Specific Gravity: 0.926 g/ml minimum (ASTM D792 Method B or ASTM D1505).
3. Melt Flow Index: 1.0 g/10 min., maximum (ASTM D1238 Condition E)

2.02 GEOMEMBRANE COVER PROPERTIES

A. The Contractor shall furnish LLDPE geomembrane having properties that comply with the required values shown in Table 1 for 40-mil LLDPE geomembrane cover.

B. In addition, furnish geomembrane material that:

1. contains a maximum of 1 percent by weight of additives, fillers, or extenders not including carbon black;
2. does not have striations, pinholes, bubbles, blisters, nodules, undispersed raw materials, or any sign of contamination by foreign matter on the surface or in the interior;
3. is manufactured in a single layer (thinner layers shall not be welded together to produce the final required thickness).

2.03 MANUFACTURING QUALITY CONTROL

A. Resin:

1. Sample and test resin at a minimum frequency of one test per rail car to demonstrate that the resin complies with the requirements of this Section. Perform tests on resin after the addition of additives to the virgin resin. Certify in writing that the resin meets the requirements of this Section.
2. Do not use any noncomplying resin.

B. Rolls:

1. Continuously monitor for geomembrane defects during manufacturing.
2. Do not supply geomembrane that exhibits any defects.
3. Regularly monitor for geomembrane thickness during manufacturing.
4. Do not supply geomembrane that fails to meet the specified thickness.
5. Sample and test the geomembrane, to demonstrate that its properties conform to the values specified in Table 1. Perform the following quality control tests at a minimum frequency, as shown:

Test	Procedure	Frequency
thickness	ASTM D 5199 ASTM D 5994	one per 50,000 ft^2
tensile strength	ASTM D 6693	one per 50,000 ft^2
tensile elongation	ASTM D 6693	one per 50,000 ft^2
tear resistance	ASTM D 1004	one per 50,000 ft^2
carbon black content	ASTM D 1603	one per 50,000 ft^2
carbon black dispersion	ASTM D 5596	one per 50,000 ft^2
specific gravity	ASTM D 1505	one per 50,000 ft^2
asperity height	ASTM D 7466	one per 50,000 ft^2
oxidative induction time	ASTM D 3895	one per formulation

6. Provide a geomembrane sample for use in sandwich shear testing (ASTM D 5321) to demonstrate that the geomembrane properties conform to the shear strength parameters specified in Table 1.
7. If a geomembrane sample fails to meet the quality control requirements of this Section, sample and test rolls manufactured, in the same resin batch, or at the same time, as the failing roll. Continue to sample and test the rolls until the extent of the failing rolls are bracketed by passing rolls. Do not supply any failing rolls.

C. Permit the Engineer to visit the manufacturing plant for project specific visits. If possible, such visits will be prior to, or during, the manufacturing of the geomembrane rolls for this project.

2.04 LABELING

A. Label the geomembrane rolls with the following information.

1. thickness of the material;
2. length and width of the roll;
3. name of Manufacturer;
4. product identification;
5. lot number; and

6. roll number.

B. Geomembrane rolls not labeled in accordance with this Section or on which labels are illegible will be rejected and replaced by the Contractor at no additional cost to the Owner.

2.05 TRANSPORTATION, HANDLING, AND STORAGE

A. Deliver geomembranes to the site at least 14 calendar days prior to the planned deployment date to allow the Engineer adequate time to perform conformance testing on the geomembrane samples as described in the CQA program.

B. Provide proper handling and storage of the geomembrane at the site. Protect the geomembrane from excessive heat or cold, dirt, puncture, cutting, or other damaging or deleterious conditions. Provide any additional storage procedures required by the Manufacturer.

C. Store geomembrane rolls on pallets or other elevated structures. Do not store geomembrane rolls directly on the ground surface. Do not store more than 3 rolls high.

PART 3 – EXECUTION

3.01 FAMILIARIZATION

A. Prior to implementing any of the work described in this Section, the Contractor shall become thoroughly familiar with all portions of the work falling within this Section.

B. Inspection:

1. Prior to implementing any of the work in this Section, the Contractor shall carefully inspect the installed work of all other Sections and verify that all work is complete to the point where the installation of this section may properly commence without adverse impact.
2. If the Contractor has any concerns regarding the installed work of other Sections, the Contractor shall immediately notify the Engineer in writing. Failure to inform the Engineer in writing or continuance of installation of the geomembrane cover will be construed as the Contractor's acceptance of the related work of all other Sections.

3.02 SUBGRADE SURFACE PREPARATION

A. The Contractor shall provide certification in writing from the Geomembrane Installer that the surface on which the geomembrane cover will be installed is

acceptable. This certification of acceptance shall be given to the Engineer prior to commencement of geomembrane cover installation in the area under consideration.

B. Special care shall be taken to maintain the prepared leveling layer surface.

C. No geomembrane cover shall be placed onto an area which has been softened by precipitation or which has excessively cracked due to desiccation. The leveling soil layer surface shall be observed daily to evaluate the effects of desiccation cracking and/or softening on the integrity of the subgrade.

D. Any damage to the underlying layer caused by installation activities shall be repaired by the Contractor at no additional cost to the Owner.

3.03 GEOMEMBRANE DEPLOYMENT

A. General:

1. The Contractor shall produce layout drawings prior to geomembrane deployment. These drawings shall indicate the geomembrane configuration, dimensions, details, locations of seams, etc. The layout drawings must be approved by the Engineer prior to the installation of any geomembranes. The layout drawings, as modified and/or approved by the Engineer, shall become part of these specifications.
2. Do not deploy geomembrane until the layout drawings are approved by the Engineer.
3. Do not deploy a geomembrane panel in an area until the Engineer has been provided with a certificate of acceptance for the underlying layer in that area.
4. Do not deploy geomembranes until Engineer completes conformance evaluation of the geomembrane and performance evaluation of previous work, including evaluation of Contractor’s survey results for previous work.
5. Deploy each geomembrane panel in accordance with the approved layout drawings.

B. Field Panel Identification:

1. A geomembrane field panel is a roll or a portion of roll cut in the field.
2. Give each field panel an identification code (number or letter-number). This identification code shall be agreed upon by the Engineer and the Installer.

C. Field Panel Placement:

1. Place each geomembrane panel one at a time and seam each panel immediately after its placement.
2. Use temporary rubsheets as required to prevent displacement or damage to underlying geosynthetics.
3. Do not place geomembrane panels when the ambient temperature is below 32° Fahrenheit (F). For cold weather (>32°F and <40°F) deployment, use the additional procedures authorized in writing by the Engineer. Additional procedures authorized by the engineer for cold weather seaming shall include, more trial welds, deploying panels the night before to maintain consistent temperatures between the panels being seamed, and utilizing temporary enclosed structures with heaters. In addition, all manufacturer specifications for cold weather seaming and panel placement for the selected geomembrane shall be followed.
4. Do not place geomembrane cover during any precipitation, in the presence of heavy fog or dew, in an area of ponded water, or in the presence of wind in excess of 20 miles per hour.
5. Ensure that:
    a. No vehicular traffic drives directly on the geomembrane cover.
    b. Equipment used does not damage the geomembrane cover by handling, trafficking, or leakage of hydrocarbons (i.e., fuels).
    c. Personnel working on the geomembrane cover do not smoke, bring glass onto the geomembrane cover, or engage in other activities that could damage the geomembrane cover.
    d. The method used to unroll the panels does not scratch or crimp the geomembrane cover and does not damage lower geosynthetics or the supporting soil.
    e. The method used to place the panels minimizes wrinkles (especially differential wrinkles between adjacent panels). The method used to place the panels results in intimate contact with the geocomposite drainage layer, where present. Adjust or repair any area of geomembrane cover wrinkles where the wrinkle height causes a concern for wrinkle to fold over during placement of material on top. A wrinkle height of 4 inches measured perpendicular to the slope can be used as a general guide. The method used to place the panels does not cause the panels to lift up or trampoline during the coolest portion of the day.
    f. The geomembrane cover is anchored or weighted with sandbags, or the equivalent, to prevent damage or uplift from wind. Install sufficient anchoring or weighting to prevent uplift and maintain such system until overlying material is placed.

6. Replace any field panel or portion thereof that becomes damaged (torn, twisted, or crimped). Remove from the work area damaged panels or portions of damaged panels.

3.04 FIELD SEAMING

A. Personnel shall be experienced as specified in this Section. Do not perform seaming unless a "master seamer" and the Engineer are on-site.

B. Orient seams parallel to the line of maximum slope (i.e., oriented down, not across, the slope). Minimize the number of seams in corners and at odd-shaped geometric locations. No horizontal seam shall be less than 10 feet from the toe of the slope, except where approved by the Engineer. Do not locate seams at an area of potential stress concentration.

C. Weather Conditions for Seaming:

1. Do not seam geomembrane cover at ambient temperatures below 32°F. Do not seam geomembrane cover at sheet temperatures above 158°F. For cold (>32°F and <40°F) or hot (>104°F) weather seaming, use the additional procedures authorized in writing by the Engineer. Cold weather procedures (including manufacturer specifications) will be a contractor submittal that will be made available to the regulators.
2. Measure ambient temperatures between 0 to 6 inches above the geomembrane cover surface.
3. In all cases the geomembrane cover seam areas shall be dry and protected from wind. Do not seam geomembrane cover during periods of precipitation or if winds are in excess of 20 miles per hour.

D. Overlapping and Temporary Bonding:

1. Sufficiently overlap geomembrane cover panels for welding and to allow peel tests to be performed on the seam. Any seams that cannot be destructively tested because of insufficient overlap are failing seams.
2. Control the temperature of the air at the nozzle of heat bonding apparatus such that the geomembrane cover is not damaged.

E. Seam Preparation:

1. Prior to seaming, clean the seam area and ensure that area to be bonded is free of moisture, dust, dirt, debris of any kind, and foreign material.
2. If seam overlap grinding is required, complete the process according to the Manufacturer's instructions or within 60 minutes of the seaming operation. Do not grind to a depth that exceeds ten percent of the

geomembrane cover thickness. Grinding marks shall not appear beyond 0.25 inch of the extrudate after it is placed.

3. Align seams with the fewest possible number of wrinkles and "fishmouths".

F. General Seaming Requirements:

1. Extend seams to the outside edge of panels to be placed in the anchor trench.
2. If required, place a firm substrate such as a flat board or similar hard surface directly under the seam overlap to achieve proper support.
3. Cut fishmouths or wrinkles at the seam overlaps along the ridge of the wrinkle to achieve a flat overlap. Seam the cut fishmouths or wrinkles and patch any portion where the overlap is less than 6 inches with an oval or round patch of geomembrane that extends a minimum of 6 inches beyond the cut in all directions.
4. Place the electric generator used for power supply to the welding machines outside the area to be lined or mount it on soft tires such that no damage occurs to the geomembrane cover. Properly ground the electric generator. Place a smooth insulating plate or fabric beneath the hot welding apparatus after use.

G. Seaming Process:

1. Approved processes for field seaming are extrusion welding and fusion welding. The primary method of welding shall be fusion. Seaming equipment shall not damage the geomembrane cover. Use only geomembrane Manufacturer-approved equipment.
2. Extrusion Equipment and Procedures:
   a. Maintain at least one spare operable seaming apparatus on site.
   b. Equip extrusion welding apparatus with gauges giving the temperature in the apparatus and at the nozzle.
   c. Prior to beginning a seam, purge the extruder until all heat-degraded extrudate has been removed from the barrel. Whenever the extruder is stopped, purge the barrel of all heat-degraded extrudate.

3. Fusion Equipment and Procedures:
   a. Maintain at least one spare operable seaming apparatus on site.
   b. Fusion-welding apparatus shall be automated self-propelled devices equipped with gauges giving the applicable temperatures and pressures.
   c. Fusion-welding apparatus shall produce a double-track seam.
   d. Abrade the edges of cross seams to a smooth incline (top and bottom) prior to extrusion welding.

H. Trial Seams:

1. Make trial seams on excess pieces of geomembrane to verify that seaming conditions are adequate. Conduct trial seams on the same material to be installed and under similar field conditions as production seams. Conduct trial seaming at the beginning of each seaming period, after every four hours of continuous seaming, every time seaming equipment is changed and if significant changes in geomembrane cover temperature are observed, for each seaming apparatus used that day prior to seaming. In addition, each seamer shall make at least one trial seam each day, for each day that seaming is performed by that seamer. Conduct trial seaming under the same conditions as the actual seaming. Prepare trial seams that are at least 15 feet long by 1 foot wide (after seaming) with the seam centered lengthwise for fusion equipment and at least 3 feet long by 1 foot wide for extrusion equipment. Prepare seam overlap as indicated in the "Overlapping and Temporary Bonding" Article of this Part.
2. Cut four specimens, each 1.0 inch wide, from the trial seam sample. Test two specimens in shear and two in peel, using a field tensiometer. The test specimens shall not fail in the seam. If a specimen fails, repeat the entire operation. If the additional specimen fails, do not accept the seaming apparatus or seamer until the deficiencies are corrected and two consecutive successful trial seams are achieved. A seamer may start production seaming prior to testing of the trial seams. In the event the trial seam fails, all production seams by the seamer are failed seams.

I. Nondestructive Seam Continuity Testing:

1. Nondestructively test for continuity of field seams over their full length. Perform continuity testing as the seaming work progresses, not at the completion of field seaming. Record the location, date, unit number of test apparatus, name of tester and results of testing. Complete any required repairs in accordance with the "Defects and Repairs" Article of this Part. Apply the following procedures:
   a. use vacuum testing for extrusion welds; and
   b. use air pressure testing for double-track fusion seams.

2. Vacuum Testing:
   a. Use the following equipment:
      i. A vacuum box assembly consisting of a stiff housing, a transparent viewing window, a soft neoprene gasket attached to the bottom, port hole or valve assembly, and a vacuum gauge.
      ii. A system for applying 5 pound per square inch (psi) gauge suction to the box.
      iii. A bucket of soapy solution and applicator.

b. Follow these procedures:
    i. Energize the vacuum pump and reduce the tank pressure to 5 ±1 psi gauge.
    ii. Wet an area of the geomembrane seam larger than the vacuum box with the soapy solution.
    iii. Place the box over the wetted area.
    iv. Close the bleed valve and open the vacuum valve.
    v. Ensure that a leak tight seal is created.
    vi. Examine the geomembrane cover through the viewing window for the presence of soap bubbles for not less than 20 seconds.
    vii. If no bubbles appear after 20 seconds, close the vacuum valve and open the bleed valve, move the box over the next adjoining area with a minimum 3 inch overlap, and repeat the process.
    viii. Mark all areas where soap bubbles appear with a marker that will not damage the geomembrane cover and repair in accordance with the "Defects and Repairs" Article of this Part.

3. Air Pressure Testing:
    a. Use the following equipment:
        i. an air pump (manual or motor driven) or air reservoir, equipped with a pressure gauge, capable of generating and sustaining a pressure between 25 and 30 pounds per square inch;
        ii. a rubber hose with fittings and connections; and
        iii. a hollow needle, or other approved pressure feed device.

    b. Follow these procedures:
        i. Seal both ends of the seam to be tested.
        ii. Insert needle, or other approved pressure feed device, into the tunnel created by the fusion weld.
        iii. Insert a protective cushion between the air pump and the geomembrane cover.
        iv. Energize the air pump to a pressure between 25 and 30 pounds per square inch, close valve, and sustain the pressure for not less than 5 minutes.
        v. If loss of pressure exceeds 3 pounds per square inch, or does not stabilize, locate faulty area and repair in accordance with the "Defects and Repairs" Article of this Part.
        vi. Cut opposite end of air channel from pressure gauge and observe release of pressure to ensure air channel is not blocked.
        vii. Remove needle, or other approved pressure feed device, and seal both ends in accordance with the "Defects and Repairs" Article of this Part.

J. Destructive Testing:

1. Destructive testing shall be performed by the CQA Personnel. The Contractor shall provide assistance if requested by the CQA Personnel to obtain samples. Perform destructive seam tests to evaluate seam strength and integrity (see Table 2 for seam properties of 40-mil LLDPE). Perform destructive testing as the seaming work progresses, not at the completion of field seaming.
2. Sampling and Testing:
    a. Collect destructive test samples at a minimum average frequency of one test location per 500 feet of seam length and at additional locations of suspected nonperformance. A minimum of one test sample for each seaming machine operating on a given day is required. The Engineer will select test locations, including locations with evidence of excess geomembrane crystallinity, contamination, offset seams, or any other evidence of inadequate seaming.
    b. Cut samples at the locations designated by the Engineer at the time the locations are designated. Number each sample and identify the sample number and location on the panel layout drawing. Immediately repair all holes in the geomembrane cover resulting from the destructive seam sampling in accordance with the repair procedures described in the "Defects and Repairs" Article of this Part. Test the continuity of the new seams in the repaired areas according to "Nondestructive Seam Continuity Testing" Article of this Part.
    c. Cut two strips 1 inch wide and 12 inch long with the seam centered parallel to the width from either side of the sample location. Test the two 1-inch wide strips in the field tensiometer in the peel mode. The Engineer may request an additional test in the shear mode. If these samples pass the field test, prepare a laboratory sample at least 1 foot wide by 3.5 feet long with the seam centered lengthwise. Cut the laboratory sample into three parts and distribute as follows:

        i. one portion 1 foot long to the Installer;
        ii. one portion 1.5 feet long to the Engineer for testing; and
        iii. one portion 1 foot long to the Engineer for archival storage.

3. In the event of failing field or laboratory test results, the Contractor may reconstruct the entire seam between two passing destructive tests; otherwise, the Engineer will identify the extent of the nonconforming area following the procedures given in the CQA program. Obtain additional samples for testing as requested by the Engineer.

K. Defects and Repairs:

1. Inspect the geomembrane cover before and after seaming for evidence of defects, holes, blisters, undispersed raw materials, and any sign of

contamination by foreign matter. The surface of the geomembrane cover shall be clean at the time of inspection. Sweep or wash the geomembrane cover surface if surface contamination inhibits inspection.

2. Test each suspect location, both in seam and non-seam areas, using the methods described in the "Nondestructive Seam Continuity Testing" Article of this Part. Repair each location that fails nondestructive testing.
3. Cut and reseam wrinkles not conforming with Part 2 of this Section. Test the seams thus produced like any other seam.
4. Repair Procedures:
    a. Repair any portion of the geomembrane cover exhibiting a flaw, or failing a destructive or nondestructive test. Use the most appropriate of the available procedures:
        i. patching, used to repair large holes, tears, undispersed raw materials, and contamination by foreign matter;
        ii. abrading and reseaming, used to repair small sections of extruded seams;
        iii. spot seaming, used to repair minor, localized flaws;
        iv. capping, used to repair long lengths of failed seams;
        v. topping, used to repair areas of inadequate seams, which have an exposed edge less than 4 inches in length; and
        vi. removing bad seam and replacing with a strip of new material seamed into place (used with long lengths of fusion seams).

    b. When making repairs, satisfy the following:
        i. abrade surfaces of the geomembrane cover that are to be repaired no more than 20 minutes prior to the repair;
        ii. clean and dry all geomembrane cover surfaces immediately prior to repair;
        iii. only use approved seaming equipment; and
        iv. extend patches or caps at least 6 inches beyond the edge of the defect, and round corners of patches to a radius of at least 3 inches.
5. Repair Verification:
    a. Test each repair using the methods described in the "Nondestructive Seam Continuity Testing" Article of this Part. Repairs that pass the nondestructive test are adequate unless the Engineer elects to also perform destructive tests. Re-repair and retest failed tests.

3.05 MATERIALS IN CONTACT WITH THE GEOMEMBRANE COVER

A. Take all necessary precautions to prevent damage to the geomembrane cover during the installation of other components of the final cover system.

B. Do not drive equipment directly on the geomembrane cover. Only use low ground pressure equipment above the geomembrane cover.

3.06 SURVEY CONTROL

A. Survey the installed geomembrane cover for preparing the as-built panel layout drawing in accordance with Section C-107 – Survey and Stakeout.

B. Locate panel seams and intersections as requested by the Engineer.

3.07 GEOMEMBRANE COVER ACCEPTANCE

A. The Contractor shall retain all ownership and responsibility for the geomembrane cover until accepted by the Engineer.

B. The geomembrane cover shall be accepted by the Owner when:

1. The installation is finished;
2. All documentation of installation is completed including the Engineer's final report; and
3. Verification of the adequacy of all field seams and repairs, including associated testing, is complete.

3.08 PROTECTION OF WORK

A. The Contractor shall protect all prior work and all materials and completed work of other Sections.

B. In the event of damage, the Contractor shall make all repairs or replacements necessary to be in full compliance with the Contract Documents.

TABLE 1. REQUIRED GEOMEMBRANE PROPERTIES FOR SMOOTH AND TEXTURED 40-MIL LLDPE

Properties	Qualifiers	Units[1]	Specified Values		Test Method
			Smooth	Textured	
Physical Properties					
Thickness	minimum average	Mils	40		ASTM D 5994
Asperity Height [2]	minimum average	Mils	Not Applicable	10	ASTM D 7466
Density	minimum	g/cm^3	0.939		ASTM D 1505
Carbon Black Content	range	%	2.0-3.0		ASTM D 1603 / ASTM D 4218
Carbon Black Dispersion	N/A	None	9 of 10 views in category 1 or 2		ASTM D 5596
Tensile Properties (each direction)					
1. Tensile Strength (force per unit width at break)	minimum	lb/in	152	60	ASTM D 6693
2. Elongation at Break	minimum	%	800	250	ASTM D 6693
Tear Resistance	minimum	Lb	22		ASTM D 1004 Die C Puncture
Puncture Resistance	minimum	Lb	56	44	ASTM D 4833
Shear Strength	minimum		See Note 3		ASTM D 5321
Oxidative Induction Time (OIT)	minimum average	Minutes	100		ASTM D 3895

Notes:

1. mils = milli-inches
   % = percent
   g = grams
   g/cm^3 = grams per cubic centimeter
   lb = pound
   lb/in = pounds per inch
2. Of 10 readings, 8 out of 10 must be greater or equal to 7 mils and the lowest must be greater or equal to 5 mils.
3. The required peak and residual shear strength parameters are included in a figure as part of Section 02235.

TABLE 2. REQUIRED GEOMEMBRANE SEAM PROPERTIES FOR SMOOTH AND TEXTURED 40-MIL LLDPE

Properties	Qualifiers	Units[1]	Specified Values	Test Method
Shear Strength[2]				
Fusion	minimum	lb/in	60	ASTM D 6392
Extrusion	minimum	lb/in	60	ASTM D 6392
Peel Adhesion			FTB[3]	
Fusion	minimum	lb/in	50	ASTM D 6392
Extrusion	minimum	lb/in	44	ASTM D 6392

Notes:

1. lb/in = pounds per inch
2. Also called "Bonded Seam Strength".
3. FTB = Film Tear Bond. (Maximum 10 percent seam separation)

END OF SECTION

SECTION 028200 – ASBESTOS ABATEMENT

PART 1 – GENERAL

1.1 SUMMARY

A. The Asbestos Abatement Contractor, herein referred to as the Contractor, will be responsible for performing all work in strict accordance with the Project Documents and all governing codes, rules, and regulations. Where conflicts occur between the Project Documents and applicable codes, rules, and regulations, the more stringent shall apply. Unless otherwise expressly indicated, the requirements of this specification are solely the Contractor's responsibility.
B. This asbestos abatement Project will consist of the removal and disposal of asbestos containing materials from the former Firehouse structure located at Syracuse Hancock International Airport in Syracuse, New York.
C. The work shall include, but not be limited to, the removal of friable and non-friable asbestos materials located on the exterior and interior surfaces of the subject building.
D. The Contractor shall be aware of all conditions of the Project and is responsible for verifying quantities and locations of all Work to be performed. Failure to do so shall not relieve the Contractor of its obligation to furnish all labor and materials necessary to perform the Work.
E. If suspect asbestos materials are discovered during demolition, work shall stop, and the Owner or Owner's representative shall be notified immediately.
F. The Contractor shall coordinate all work with the work of other trades.
G. The Contractor shall be aware of where the removals will need to occur, the challenges getting to those removals and the difficulty associated with abatement in the areas.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. General Requirements.
B. Asbestos, Lead Paint, and PCB Caulk Survey Report.

1.3 SUBMITTALS

A. Pre-Abatement Submittals: No work shall begin until these submittals are returned with the Government Representative's approved action stamp. The Contractor shall submit the electronic documents listed below:

1. Permits, Licenses, Notifications, and Certifications:
   A. New York State Department of Labor (NYSDOL) Asbestos Contractor License.
   B. NYSDOL Asbestos Handler or Supervisor Certificate for each employee who works on the project.
   C. Copy of DOH-2832 form or equivalent proof of training for each handler or supervisor who works on the project.
   D. NESHAPS Notification (include proof of transmittal i.e., certified mail return receipt), if applicable.

E. Copies of all variances, amendments and re-openings being used for the project, if applicable (all variances proposed require pre-approval by the Government).
F. Any other Notifications: As required by Federal, State, and local regulatory agencies together with proof of transmittal (i.e., certified mail return receipt).
G. NYSDEC Part 364 Waste Haulers Permit
H. NYSDEC Part 360 Solid Waste Disposal Permit (or out of state equivalent)
I. NYSDOH Approved Laboratory Certification for required OSHA air sampling.

2. Equipment: The Contractor shall submit the Manufacturer's information on all the following equipment:
   A. HEPA Vacuums and their accessories (i.e., wire brushes)
   B. Negative Air Pressure Equipment
   C. Manometers. (note: if magnahelic manometers are used, submit calibration certification required semi-annually).
   D. Respirators (including filter cartridges)
   E. Protective Clothing
   F. Polyethylene Sheeting
   G. Duct Tape
   H. Disposal Bags

3. Safety Data Sheets (SDS): The Contractor shall submit copies of SDS for each chemical or material used for projects including but not limited to:
   A. Encapsulants
   B. Remover/Solvents
   C. Cleaner/Disinfectants
   D. Surfactants

4. Preliminary Schedule: The Contractor shall provide an estimate of the workforce to be utilized and the time required for completion of each major work area. Include estimated size and number of crews and work shifts.

5. Abatement Work Plan: The Contractor shall submit a work plan that describes defined work area containments (including the type of containment, i.e., 2 layer tent enclosure, hardwall barriers, etc.), methods of abatement, decontamination unit locations, waste transport routes, dumpster locations, negative air exhaust locations and calculations of negative air machines required.

B. On-Site Information: Refer to Code Rule 56, Subpart 7.3, Asbestos Abatement Contractor Daily Project Logs and Subpart 3.4(a)(2) Project Record.

C. Post Abatement Submittals: The Contractor shall submit electronic copies of the documents listed below:
   1. The name, address, NYS Department of Motor Vehicle Photo Identification Card Number, last four digits of social security number and asbestos certificate number of the person who supervised the asbestos project.
   2. The location and description of the asbestos project.

3. The amount of asbestos or asbestos material (including asbestos contaminated elements) that was abated.
4. The commencement and completion dates of the project.
5. The name, asbestos handling license number, and address of the air sampling asbestos contractor that was used on the project.
6. The name, address and current NYS ELAP registration number of the laboratory that was used for air sample analysis on the project.
7. The name, asbestos handling license number, and address of the project monitoring asbestos contractor that was used on the project.
8. The name and address of the deposit or waste disposal site or sites where the asbestos waste material was deposited or disposed.
9. The name and address of any site(s) that were used for the interim storage of asbestos or asbestos waste materials prior to final deposit or disposal.
10. The name and address of any transporter(s) that were used to transport asbestos or asbestos material.
11. The name, addresses, NYS Department of Motor Vehicle Photo Identification Card number, last four digits of social security number and asbestos license or certificate number of all persons who were engaged on that portion of the asbestos project for which the asbestos contractor has responsibility.
12. A Copy of the asbestos abatement supervisor's daily project log specified in 56-7.3.
13. A Copy of all waste disposal manifests, and disposal logs.

1.4 NOTICES

A. The Contractor shall provide notification for a Large Scale Project of intent to commence asbestos abatement activities as indicated below. In cases where a project is in multiple buildings, notices shall be completed for each building.
   1. At least ten (10) Working days prior to beginning abatement activities, send written notification to:

      U.S. Environmental Protection Agency – Region 2
      National Emissions Standards for Hazardous Air Pollutants (NESHAPS) Coordinator 290 Broadway
      New York, NY 10007-1866

   2. At least ten (10) Calendar days prior to beginning abatement activities send written notification to:

      New York State Department of Labor
      Worker Protection Central Processing
      Asbestos Project Notification- Room
      290B State Campus – Bldg.12
      Albany, NY 12240

B. The Contractor shall post and/or provide Building Occupant Notification at least 10 days prior to beginning abatement activities as required by NYS Industrial Code Rule 56. The posting shall include the following information:
   1. The locations of the abatement Project.
   2. The amounts and types of asbestos containing materials being abated.
   3. The commencement and completion dates of the Project.
   4. The name and asbestos license number of the abatement Contractor.

5. The name and address of the Air Monitoring Firm and laboratory.

1.5 PROJECT MONITORING AND AIR SAMPLING

A. The Government shall engage the services of an independent Air Monitoring Firm.

B. The Government shall engage the services of a Project Monitoring Firm who shall serve as the Government Representative for the performance of the asbestos abatement Project and provide direction as required throughout the entire abatement period.

C. The Contractor is required to ensure cooperation of its personnel with the Air and Project Monitoring Firms for the Air and Project monitoring functions. The Contractor shall comply with all direction given by the Project Monitor during the Project.

D. The Project Monitoring Firm shall staff the Project with a trained and certified person(s) to act on the Government's behalf at the job site. This individual shall be designated as the Abatement Project Monitor.
   1. The Project Monitor shall have the authority to direct the actions of the Contractor verbally and in writing to ensure compliance with the Project documents and all regulations. The Project Monitor shall have the authority to Stop Work when gross Work practice deficiencies or unsafe practices are observed, or when ambient fiber concentrations outside the removal area exceed 0.01f/cc or the background level.
      a. Such a Stop Work order shall be effective immediately and remain in effect until corrective measures have been taken and the situation has been corrected.
      b. Standby time required to resolve the situation shall be at the Contractor's expense.

E. The Independent Air Monitoring Firm, hired by the Government, shall provide abatement air sampling and analysis as required by applicable regulations. Sampling will include background, work area preparation, during-abatement, and clearance sampling per Code Rule 56 requirements. In addition, for tent removals, a minimum of at least one clearance sample inside and outside shall be collected in each tent. Additional samples shall be collected in accordance with small or large Project requirements if cumulative Project quantities exceed those of a minor Project.
   1. If the air sampling during abatement reveals airborne fiber levels at or above 0.01 fibers/cc or the background level (whichever is greater) outside the Work Area, then an immediate Stop Work order shall be issued. The Contractor shall then inspect the barriers for leakage and HEPA vacuum and/or wet clean the surface outside the Work Area. The Contractor shall bear the burden of any and all costs incurred by this delay.
   2. Should air sampling results fail for a work area, the cost associated with the additional air monitoring and technician time shall be borne by the Contractor.

1.6 CONTRACTOR AIR SAMPLING

A. The Contractor shall conduct air sampling that is representative of both the 8-hour TWA and 30-minute short-term exposures to indicate compliance with the permissible exposure and excursion limits. A negative exposure assessment will not relieve the Contractor from wearing respiratory protection.

B. The Contractor's laboratory analysis of air samples shall be conducted by a NYSDOH ELAP approved laboratory, subject to approval of the Government representative.

C. Results of personnel air sample analyses shall be available, verbally, within twenty-four (24) hours of sampling and shall be posted upon receipt. Written laboratory reports shall be delivered and posted at the Work site within five (5) days.

1.7 PROJECT SUPERVISOR

A. The Contractor shall designate a full-time Project Supervisor who shall meet the following qualifications:
   1. The Project Supervisor shall hold New York State certification as an Asbestos Supervisor.
   2. The Project Supervisor shall meet the requirements of a "Competent Person" as defined by OSHA 1926.1101 and shall have a minimum of one year of experience as a supervisor.
   3. Due to the length and size of the project, should the project supervisor need to be replaced, a new project supervisor must obtain written approval by Government Representative before asbestos abatement can continue.

B. If the Project Supervisor is not on-site at any time whatsoever, all Work shall be stopped. The Project Supervisor cannot be removed from the Project without the written consent of the Government Representative. The Project Supervisor shall be removed from the Project and replaced, if requested by the Government.

C. The Project Supervisor shall be responsible for the performance of the Work and shall represent the Contractor in all respects at the Project site. The Supervisor shall be the primary point of contact for the Asbestos Project Monitor.

1.8 SPECIAL JOB CONDITIONS

A. The abatement work shall be completed in compliance with 40 CFR 763, NAVFAC P-502, and New York State Department of Labor Industrial Code Rule 56.

PART 2 – PRODUCTS

2.1 PROJECT LOG BOOK

A. The Project Supervisor shall document all Work performed daily and note all inspections required by NYS Industrial Code Rule 56, i.e., testing and inspection of barriers and enclosures.

2.2 SIGNS AND LABELS

A. Generator identification information shall be affixed to each waste container indicating the following printed in indelible ink:

GENERATOR NAME: Syracuse Hancock International
Airport FACILITY NAME: Former Firehouse Structure
FACILITY ADDRESS: 1000 Col. Eileen Blvd. New York 13212

2.3 HEPA VACUUM EQUIPMENT

A. All vacuuming performed under this contract shall be performed with HEPA filter equipped with industrial vacuums conforming to ANSI Z9.2.

B. Provide tools and specialized equipment including scraping nozzles with integral vacuum hoods connected to a HEPA vacuum with flexible hose.

C. Each HEPA equipped vacuum shall be equipped with a HEPA filter that has never been used and each HEPA equipped vacuum must be inspected and tested prior to being brought on site for the proper operation and performance of the HEPA filter. Inspection and testing shall be in accordance with the manufacturer's recommendations. Proof of inspection and testing for each HEPA equipped vacuum must be made available to the Government Representative upon request. Each HEPA equipped vacuum must be tagged with the date of the last HEPA filter change.

2.4 POWER TOOLS

A. Power tools used to drill, cut into, or otherwise disturb asbestos material shall be equipped with HEPA filtered local exhaust ventilation.

B. Each HEPA equipped power tool shall be equipped with a HEPA filter that has never been used or each HEPA equipped power tool must be inspected and tested prior to being brought and site for the proper operation and performance of the HEPA filter. Inspection and testing shall be in accordance with the manufacturer's recommendations. Proof of inspection and testing for each HEPA equipped power tool must be made available to the Government Representative upon request. Each HEPA equipped power tool must be tagged with the date of the last HEPA filter change.

2.5 HEPA EQUIPPED NEGATIVE AIR UNITS

A. Each HEPA equipped negative air unit shall have a HEPA filter that has never been used or each HEPA equipped negative air unit must be inspected and tested prior to being brought on site for the proper operation and performance of the HEPA filter. Inspection and testing shall be in accordance with the manufacturer's recommendations. Proof of inspection and testing for each HEPA negative air unit must be made available to the Government Representative upon request. Each HEPA equipped negative air unit must be tagged with the date of the last HEPA filter change. At a minimum, the Primary HEPA filter must be replaced every 600 hours.

B. Each negative air unit must be capable of fitting through a standard door or access hatch where required.

PART 3 – EXECUTION

3.1 GENERAL REQUIREMENTS

A. Should the area beyond the Work Area(s) become contaminated with asbestos containing materials or elevated fiber levels, immediately stop Work and institute emergency procedures. Immediate notification is required to the CO, COR, and AFRL/RIOCV (Environmental Office). Contaminated non-Work Areas shall be isolated and decontaminated in accordance with procedures established for asbestos removal. All costs incurred in decontaminating such non-Work Areas and the contents thereof shall be borne by the Contractor, at no additional cost to the Government. Abatement work shall not continue in the work area until satisfactory clearance air samples prove the non-work areas are properly decontaminated.

B. Prior to decontamination enclosure construction and Work Area preparation the Work Area must be vacated by non-certified persons and building occupants.

C. All demolition necessary to access asbestos containing materials for removal must be conducted within negative pressure enclosures by licensed asbestos workers. Demolition debris may be disposed of as construction and demolition debris provided the Asbestos Project Monitor determines that it is not contaminated with asbestos. Demolition debris contaminated with asbestos must be disposed of as asbestos waste.

D. Asbestos waste dumpster location and transport route shall be coordinated with the Government representative. All waste shall be transported in a covered cart.

E. Comply with the rules and regulations referenced in Part 1 of this Section.

3.2 REMOVAL OF ASBESTOS CONTAINING MATERIALS

A. The Contractor shall remove asbestos containing materials in accordance with the Contract Documents and the approved Asbestos Work Plan.

3.3 RESTORATION

A. After final clearance remove locks and restore electrical and HVAC systems. All temporary power shall be disconnected, power lockouts removed, and power restored. All temporary plumbing shall be removed.

B. Finishes damaged by asbestos abatement activities including, but not limited to, plaster/paint damage due to duct tape and spray adhesives, and floor tile lifted due to wet or humid conditions, shall be restored prior to final payment.
   1. Finishes unable to be restored shall be replaced under this Contract.
   2. All foam and expandable foam products and materials used to seal Work Area openings shall be completely removed upon completion of abatement activities.

C. All penetrations (including, but not limited to, pipes, ducts, etc.) through fire rated construction shall be fire stopped using materials and systems tested in accordance with ASTM E814 on projects where re-insulation is part of the required work.

PART 4 – DISPOSAL OF ASBESTOS WASTE

4.1 TRANSPORTATION AND DISPOSAL SITE

A. The Contractor's Hauler and Disposal Site shall be approved by the Government.

B. The Hauler, with the Contractor and the Government Representative, shall inspect all material in the transport container prior to taking possession and signing the Asbestos Waste Manifests.

C. Unless specifically approved by the Government, the Contractor shall not permit any off-site transfers of the waste or allow the waste to be transported or combined with any other off- site asbestos material. The Hauler must travel directly to the disposal site with no unauthorized stops.

4.2 WASTE STORAGE CONTAINERS

A. All waste containers shall be fully enclosed and lockable (i.e., enclosed dumpster, trailer, etc.). No open containers will be permitted on-site (i.e., open dumpster(s) with canvas cover, etc.) unless specifically permitted by an approved site-specific variance.

B. The Government Representative shall verify that the waste storage container tags (license plates) match those listed on the New York State Department of Environmental Conservation Part 364 permit. Any container not listed on the permit shall be removed from the site immediately.

C. The container shall be plasticized and sealed with a minimum of two (2) layer of 6 mil polyethylene on the sides and two (2) layers of 6 mil polyethylene on the floor. Once on site, it shall be kept locked at all times, except during loading.

D. All four (4) sides of the container shall be labeled while on-site with EPA Danger signage:

DANGER
CONTAINS ASBESTOS
FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE
HAZARD

E. The New York State Department of Environmental Conservation Asbestos Hauler's Permit number shall be stenciled on both sides and back of the container.

F. The container is not permitted to be loaded unless it is properly plasticized, has the appropriate danger signage affixed, and has the permit number appropriately stenciled on the container.

G. The waste container(s) shall be located on site in such a location that the waste can be directly carried by hand or covered cart from the waste decontamination enclosure to the waste container(s). Asbestos waste dumpster location and transport route shall be coordinated with the Government representative.

H. The waste shall be removed from site no later than 10 calendar days from project completion. Delay in removing waste from site may prevent the Contractor from obtaining the retainage withheld.

END OF SECTION

SECTION 221119 - DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Backflow preventers.
2. Insulated, heated water enclosure

B. Related sections, specified elsewhere:
1. D-707, Water Main (Ductile Iron Pipe)

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

A. Test and inspection reports.

B. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For domestic water piping specialties to include in emergency, operation, and maintenance manuals.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PIPING SPECIALTIES

A. Domestic water piping specialties intended to convey or dispense water for human consumption are to comply with the SDWA, requirements of authorities having jurisdiction, and NSF 61 and NSF 372, or to be certified in compliance with NSF 61 and NSF 372 by an American National Standards Institute (ANSI)-accredited third-party certification body that the weighted average lead content at wetted surfaces is less than or equal to 0.25 percent.

2.2 PERFORMANCE REQUIREMENTS

A. Minimum Working Pressure for Domestic Water Piping Specialties: 20 psig unless otherwise indicated.

B. Maximum Working Pressure for Domestic Water Piping Specialties: 175 psig unless otherwise indicated.

2.3 BACKFLOW PREVENTERS

A. Reduced-Pressure-Principle Backflow Preventers:

1. Basis-of-Design Product: Subject to compliance with requirements, provide WATTS model LF860 or a comparable product.
2. The assembly shall consist of a main line valve body composed of a pressure differential relief valve located in a zone between two (2) independently acting approved clapper style check modules with replaceable seats and disc rubbers.
3. Standard: ASSE 1013.
4. UL Classified and FM Approved OS&Y gate valves (ANSI/AWWA C515 Compliant)
5. Operation: Continuous-pressure applications.
6. Size: 4 inch NPS.

7. Ductile iron valve body design
8. Coating to protect from corrosion
9. End Connections: Welded, bolted flanges
10. Configuration: Designed for horizontal, straight-through flow.

2.4 INSULATED, HEATED WATER ENCLOSURE

A. Insulated, heated water enclosure, “hot box”:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Safe-T-cover by Hydrocowl
    b. Hubbell

2. Requirements:
    a. ASSE 1060; ASTM B209
    b. Marine grade aluminum enclosure, lockable handles
    c. Drain panel(s) with stainless steel hinge and spring, sized for RPZ maximum discharge
    d. Minimum 9 “R” value in walls, 18 “R” in roof
    e. 110 mph wind rating
    f. (2) Concrete slab mounted UL or ETL listed heaters sized for the box provided. One is considered a backup unit and will be set at a slightly higher temperature point.
        1) Listed for damp and wet conditions, UL-2021 section 49 rain test
        2) 2,000 watts typical, 120/240V single phase
        3) Thermostat controlled to maintain 40° F at an outside temperature of -30° F. Controllable range: 40° F to 100° F.

PART 3 - EXECUTION

3.1 INSTALLATION OF PIPING SPECIALTIES

A. Backflow Preventers: Install in water supply to water system in accordance with the manufactures requirements. Reduced Pressure Zone assembly shall be installed on the potable water supply and at each point of cross-connection to protect against possible backpressure and back siphonage conditions for high hazard/ toxic applications. Comply with authorities having jurisdiction.

1. Locate backflow preventer and service meter in a heated, insulated enclosure.
2. Do not install bypass piping around backflow preventers.

B. Heated, insulated enclosure:
1. Mount on reinforced concrete pad, sized as specified by the enclosure manufacturer using stainless steel expansion anchors.

3.2 PIPING CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. When installing piping specialties adjacent to equipment and machines, allow space for service and maintenance.

3.3 FIELD QUALITY CONTROL

A. Perform the following tests and inspections.

1. Test each reduced-pressure-principle backflow preventer according to authorities having jurisdiction and the device's reference standard.
2. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
3. Operational Test: After electrical circuitry has been energized, start units to confirm unit operation.
4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

B. Domestic water piping specialties will be considered defective if they do not pass tests and inspections.

C. Prepare test and inspection reports and provide for OCWA and NYS DOH approval.

END OF SECTION

SECTION 260533.13 - CONDUITS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Type ERMC duct raceways, elbows, couplings, and nipples.
2. Type LFMC duct raceways.
3. Fittings for conduit, tubing, and cable.
4. Joint compounds.

1.2 REFERENCES

A. Abbreviations and Acronyms for Electrical Raceway Types:

1. EMT: Electrical metallic tubing.
2. EMT-A: Aluminum electrical metallic tubing.
3. EMT-S: Steel electrical metallic tubing.
4. EMT-SS: Stainless steel electrical metallic tubing.
5. ENT: Electrical nonmetallic tubing.
6. EPEC: Electrical HDPE underground conduit (thin wall).
7. EPEC-A: Type A electrical HDPE underground conduit.
8. EPEC-B: Type B electrical HDPE underground conduit.
9. ERMC: Electrical rigid metal conduit.
10. ERMC-A: Aluminum electrical rigid metal conduit.
11. ERMC-S: Steel electrical rigid metal conduit.
12. ERMC-S-G: Galvanized-steel electrical rigid metal conduit.
13. ERMC-S-PVC: PVC-coated-steel electrical rigid metal conduit.
14. ERMC-SS: Stainless steel electrical rigid metal conduit.
15. FMC: Flexible metal conduit.
16. FMC-A: Aluminum flexible metal conduit.
17. FMC-S: Steel flexible metal conduit.
18. FMT: Steel flexible metallic tubing.
19. FNMC: Flexible nonmetallic conduit. See "LFNC."
20. HDPE: HDPE underground conduit (thick wall).
21. HDPE-40: Schedule 40 HDPE underground conduit.
22. HDPE-80: Schedule 80 HDPE underground conduit.
23. IMC: Steel electrical intermediate metal conduit.
24. LFMC: Liquidtight flexible metal conduit.
25. LFMC-A: Aluminum liquidtight flexible metal conduit.
26. LFMC-S: Steel liquidtight flexible metal conduit.
27. LFMC-SS: Stainless steel liquidtight flexible metal conduit.
28. LFNC: Liquidtight flexible nonmetallic conduit.
29. LFNC-A: Layered (Type A) liquidtight flexible nonmetallic conduit.
30. LFNC-B: Integral (Type B) liquidtight flexible nonmetallic conduit.

31. LFNC-C: Corrugated (Type C) liquidtight flexible nonmetallic conduit.
32. PVC: Rigid PVC conduit.
33. PVC-40: Schedule 40 rigid PVC conduit.
34. PVC-80: Schedule 80 rigid PVC Conduit.
35. PVC-A: Type A rigid PVC concrete-encased conduit.
36. PVC-EB: Type EB rigid PVC concrete-encased underground conduit.
37. RGS: See ERMC-S-G.
38. RMC: See ERMC.
39. RTRC: Reinforced thermosetting resin conduit.
40. RTRC-AG: Low-halogen, aboveground reinforced thermosetting resin conduit.
41. RTRC-AG-HW: Heavy wall, low-halogen, aboveground reinforced thermosetting resin conduit.
42. RTRC-AG-SW: Standard wall, low-halogen, aboveground reinforced thermosetting resin conduit.
43. RTRC-AG-XW: Extra heavy wall, low-halogen, aboveground reinforced thermosetting resin conduit.
44. RTRC-BG: Low-halogen, belowground reinforced thermosetting resin conduit.

B. Definitions:

1. Conduit: A structure containing one or more duct raceways.
2. Direct Buried: Installed underground without encasement in concrete or other protective material.
3. Duct Bank: An arrangement of conduit providing one or more continuous duct raceways between two points.
4. Duct Raceway: A single enclosed raceway for conductors or cable.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Field quality-control reports.

1.4 INFORMATIONAL SUBMITTALS

A. Manufacturer's published instructions.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Products or components listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

2.2 TYPE ERMC DUCT RACEWAYS, ELBOWS, COUPLINGS, AND NIPPLES

A. UL DYWV - Stainless Steel Electrical Rigid Metal Conduit (ERMC-SS), Elbows, Couplings, and Nipples:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Allied Tube & Conduit; Atkore International
b. Crouse-Hinds; brand of Eaton, Electrical Sector
c. Patriot Aluminum Products, LLC

2. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following UL product categories:

a. UL CCN DYWV; including UL 6A.

3. Standard Features:

a. Material: Stainless steel.
b. Minimum Trade Size: Metric designator 21 (trade size 3/4).

B. UL DYIX - Galvanized-Steel Electrical Rigid Metal Conduit (ERMC-S-G), Elbows, Couplings, and Nipples:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Allied Tube & Conduit; Atkore International
b. Crouse-Hinds; brand of Eaton, Electrical Sector
c. Patriot Aluminum Products, LLC

2. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following UL product categories:

a. UL CCN DYIX; including UL 6.

3. Standard Features:

a. Exterior Coating: Zinc.
b. Interior Coating: Zinc with organic top coating.
c. Minimum Trade Size: Metric designator 21 (trade size 3/4).

C. UL DYIX - PVC-Coated-Steel Electrical Rigid Metal Conduit (ERMC-S-PVC), Elbows, Couplings, and Nipples:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to,

the following:

a. ABB, Electrification Business
b. Perma-Cote; Robroy Industries
c. Plasti-Bond; Robroy Industries

2. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following UL product categories:

a. UL CCN DYIX; including UL 6.

3. Standard Features:

a. Exterior Coating: PVC complying with NEMA RN 1.
b. Interior Coating: Zinc with organic top coating.
c. Minimum Trade Size: Metric designator 21 (trade size 3/4).

2.3 TYPE LFMC DUCT RACEWAYS

A. UL DXHR - Steel Liquidtight Flexible Metal Conduit (LFMC-S):

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. ABB, Electrification Business
b. Electri-Flex Company
c. International Metal Hose Co

2. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following UL product categories:

a. UL CCN DXHR; including UL 360.

3. Standard Features:

a. Material: Steel.
b. Minimum Trade Size: Metric designator 21 (trade size 3/4).

B. UL DXHR - Stainless Steel Liquidtight Flexible Metal Conduit (LFMC-SS):

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. ABB, Electrification Business
b. Anaconda Sealtite; Anamet Electrical, Inc
c. Electri-Flex Company

2. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following UL product categories:

    a. UL CCN DXHR; including UL 360.

3. Standard Features:

    a. Material: Stainless steel.
    b. Minimum Trade Size: Metric designator 21 (trade size 3/4).

4. Sustainable Design Features:

2.4 FITTINGS FOR CONDUIT, TUBING, AND CABLE

A. UL DWTT - Fittings for Type ERMC Duct Raceways:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. ABB, Electrification Business
    b. Crouse-Hinds; brand of Eaton, Electrical Sector
    c. Southwire Company, LLC

2. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following UL product categories:

    a. UL CCN DWTT; including UL 514B.

3. Standard Features:

    a. Material: Steel.
    b. Coupling Method: Raintight compression coupling with distinctive color gland nut.
    c. Expansion and Deflection Fittings: UL 651 with flexible bonding jumper.

B. UL DXAS - Fittings for Type LFMC Duct Raceways:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Arlington Industries, Inc.
    b. Liquid Tight Connector Co.

2. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following UL product categories:

a. UL CCN DXAS; including UL 514B.

2.5 JOINT COMPOUNDS

A. UL FOIZ - Electrically Conductive Corrosion-Resistant Compound for Threaded Conduit:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. ABB, Electrification Business

2. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following UL product categories:

a. UL CCN FOIZ; including UL Subject 2419.

PART 3 - EXECUTION

3.1 SELECTION OF CONDUITS FOR ELECTRICAL SYSTEMS

A. Unless more stringent requirements are specified in the Contract Documents or manufacturer's published instructions, comply with NFPA 70 for selection of duct raceways. Consult Architect for resolution of conflicting requirements.

B. Outdoors:

1. Exposed and Subject to Severe Physical Damage: ERMC-S-G.
2. Exposed and Subject to Physical Damage: ERMC-S-G.
3. Exposed and Not Subject to Physical Damage: ERMC-S-G.
4. Exposed and Subject to Chemicals within Fluid Storage Area: ERMC-S-PVC
5. Concealed Aboveground: ERMC-S-G.
6. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
7. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment) and Exposed to Chemicals within Fluid Storage Area: LFMC-SS.

3.2 INSTALLATION OF CONDUITS FOR ELECTRICAL SYSTEMS

A. Comply with manufacturer's published instructions.

B. Reference Standards for Installation: Unless more stringent installation requirements are specified in the Contract Documents or manufacturer's published instructions, comply with the following:

1. Electrical Construction: ICC IBC, ICC IFC, NFPA 1, NFPA 70, and NECA NEIS 1.

2. Electrical Safety: NFPA 70E.
3. Commissioning of Active and Passive Fire Protection Features: NFPA 3 and NFPA 4.
4. Grounding and Bonding: NECA NEIS 331 and Article 250 of NFPA 70.
5. Communications Work: BICSI N1.
6. Life Safety and Means of Egress Work: NFPA 101.
7. Emergency and Standby Power Work: NFPA 110, NFPA 111, and NECA NEIS 416.
8. Work in Confined Spaces: NFPA 350.
9. Work in Basements and Other Developed Subterranean Spaces: NFPA 520.
10. Type EMT-A: Article 358 of NFPA 70 and NECA NEIS 102.
11. Type EMT-SS: Article 358 of NFPA 70 and NECA NEIS 101.
12. Type EMT-S: Article 358 of NFPA 70 and NECA NEIS 101.
13. Type ENT: Article 362 of NFPA 70 and NECA NEIS 102.
14. Type HDPE and Type EPEC: Article 353 of NFPA 70 and NECA NEIS 111.
15. Type ERMC-A: Article 344 of NFPA 70 and NECA NEIS 102.
16. Type ERMC-SS: Article 344 of NFPA 70 and NECA NEIS 101.
17. Type ERMC-S: Article 344 of NFPA 70 and NECA NEIS 101.
18. Type FMC-S: Article 348 of NFPA 70 and NECA NEIS 101.
19. Type FMC-A: Article 348 of NFPA 70 and NECA NEIS 102.
20. Type FMT: Article 360 of NFPA 70 and NECA NEIS 101.
21. Type IMC: Article 342 of NFPA 70 and NECA NEIS 101.
22. Type LFMC: Article 350 of NFPA 70 and NECA NEIS 101.
23. Type LFNC: Article 342 of NFPA 70 and NECA NEIS 111.
24. Type PVC: Article 356 of NFPA 70 and NECA NEIS 111.
25. Type RTRC: Article 355 of NFPA 70 and NECA NEIS 111.
26. Expansion Fittings: NEMA FB 2.40.
27. Consult Architect for resolution of conflicting requirements.

C. Special Installation Techniques:

1. General Requirements for Installation of Duct Raceways:

    a. Complete duct raceway installation before starting conductor installation.
    b. Install no more than equivalent of three 90-degree bends in conduit. Support within 12 inch (300 mm) of changes in direction.
    c. Make bends in duct raceway using large-radius preformed ells except for parallel bends. Field bending must be in accordance with NFPA 70 minimum radii requirements. Provide only equipment specifically designed for material and size involved.
    d. Support conduit within 12 inch (300 mm) of enclosures to which attached.
    e. Install duct sealing fittings at accessible locations in accordance with NFPA 70 and fill them with listed sealing compound. For concealed duct raceways, install fitting in flush steel box with blank cover plate having finish similar to that of adjacent plates or surfaces. Install duct sealing fittings in accordance with NFPA 70.
    f. Install devices to seal duct raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments.
    g. Cut conduit perpendicular to the length. For conduits metric designator 53 (trade size 2) and larger, use roll cutter or a guide to make cut straight and perpendicular to the length. Ream inside of conduit to remove burrs.
    h. Install pull wires in empty duct raceways. Provide polypropylene or monofilament plastic line with not less than 200 lb (90 kg) tensile strength. Leave at least 12 inch

(300 mm) of slack at both ends of pull wire. Cap underground duct raceways designated as spare above grade alongside duct raceways in use.

i. Install duct raceways square to the enclosure and terminate at enclosures without hubs with locknuts on both sides of enclosure wall. Install locknuts hand tight, plus one-quarter turn more.

1) Termination fittings with shoulders do not require two locknuts.

j. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to metric designator 35 (trade size 1-1/4) and insulated throat metal bushings on metric designator 41 (trade size 1-1/2) and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.

2. Types ERMC:

a. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound that maintains electrical conductivity to threads of duct raceway and fittings before making up joints. Follow compound manufacturer's published instructions.

3. Type ERMC-S-PVC:

a. Follow manufacturer's installation instructions for clamping, cutting, threading, bending, and assembly.

b. Provide PVC-coated sealing locknut for exposed male threads transitioning into female NPT threads that do not have sealing sleeves, including transitions from PVC couplings/female adapters to Type ERMC-S-PVC elbows in direct-burial applications. PVC-coated sealing locknuts must not be used in place of conduit hub. PVC-coated sealing locknut must cover exposed threads on Type ERMC-S-PVC duct raceway.

c. Coat field-cut threads on PVC-coated duct raceway with manufacturer-approved corrosion-preventing conductive compound prior to assembly.

4. Types LFMC:

a. Provide a maximum of 36 inch (915 mm) of flexible conduit for equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

5. Duct Raceway Terminations at Locations Subject to Moisture or Vibration:

a. Provide insulating bushings to protect conductors, including conductors smaller than 4 AWG. Install insulated throat metal grounding bushings on service conduits.

6. Duct Fittings: Install fittings in accordance with NEMA FB 2.10 guidelines.

a. ERMC-S-PVC: Provide only fittings listed for use with this type of conduit. Patch and seal joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Provide sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.

b. Flexible Conduit: Provide only fittings listed for use with flexible conduit type. Comply with NEMA FB 2.20.

7. Identification: Provide labels for conduit assemblies, duct raceways, and associated electrical equipment.

a. Provide warning signs.

D. Interfaces with Other Work:

1. Firestop penetrations of fire-rated floor and wall assemblies.
2. Provide conduit hangers and supports.

3.3 FIELD QUALITY CONTROL OF CONDUITS FOR ELECTRICAL SYSTEMS

A. Administrant for Electrical Power Tests and Inspections:

1. Administer and perform tests and inspections.

B. Administrant for Communications Tests and Inspections:

1. Administer and perform tests and inspections.

C. Tests and Inspections:

1. Perform manufacturer's recommended tests and inspections.
2. Pull solid aluminum or wood test mandrel through duct to prove joint integrity and adequate bend radii, and test for out-of-round duct. Provide minimum 12 inch (300 mm) long mandrel equal to duct size minus 1/4 inch (6 mm). If obstructions are indicated, remove obstructions and retest.
3. Conduit Placement:

a. Verify that center-line location and offsets are in accordance with the Drawings.
b. Verify that hangers and supports for conduits are attached to structure in accordance with the Drawings.
c. Verify that nuts on bolts or hanger rods are secure.
d. Verify that space between raceways and cored holes are filled with non-shrinking grout or other approved material indicated on the Drawings and the Specifications.
e. Verify that expansion devices are installed at locations indicated on the Drawings and the Specifications.
f. Verify that ends are cut square to provide flush-butting surfaces when spliced and inside edges are free of burrs that could impede installation of cables.
g. Verify minimum separation of utilities, or that approved mechanical protection has been provided to surrounding conduit(s) where minimum separation cannot be achieved.

4. Document all changes on Record Drawings.

D. Nonconforming Work:

1. Conduit will be considered defective if it does not pass tests and inspections.

2. Remove and replace defective units and retest.

E. Field Quality-Control Reports: Collect, assemble, and submit test and inspection reports.

3.4 CLEANING

A. Verify that bentonite or other drilling fluids are contained and removed, and site is restored to its original or improved condition.

3.5 PROTECTION

A. Protect coatings, finishes, and cabinets from damage and deterioration.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION

SECTION 260533.16 - BOXES AND COVERS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metallic outlet boxes, device boxes, rings, and covers.
2. Junction boxes and pull boxes.
3. Cover plates for device boxes.
4. Hoods for outlet boxes.

1.2 DEFINITIONS

A. Communications Outlet: One or more communications jacks, or cables and plugs, mounted in a box or ring, with a suitable protective cover.

B. Enclosure: The case or housing of an apparatus, or the fence or wall(s) surrounding an installation, to prevent personnel from accidentally contacting energized parts or to protect the equipment from physical damage. Types of enclosures and enclosure covers include the following:

1. Cabinet: An enclosure that is designed for either surface mounting or flush mounting and is provided with a frame, mat, or trim in which a swinging door or doors are or can be hung.
2. Concrete Box: A box intended for use in poured concrete.
3. Conduit Body: A means for providing access to the interior of a conduit or tubing system through one or more removable covers at a junction or terminal point. In the United States, conduit bodies are listed in accordance with outlet box requirements.
4. Conduit Box: A box having threaded openings or knockouts for conduit, EMT, or fittings.
5. Cover Plate: A cover designed for protecting wiring devices installed in flush-mounted device boxes while permitting their safe operation; also called a faceplate or wallplate.
6. Cutout Box: An enclosure designed for surface mounting that has swinging doors or covers secured directly to and telescoping with the walls of the enclosure.
7. Device Box: A box with provisions for mounting a wiring device directly to the box.
8. Extension Ring: A ring intended to extend the sides of an outlet box or device box to increase the box depth, volume, or both.
9. Floor Box: A box mounted in the floor intended for use with a floor box cover and other components to complete the floor box enclosure.
10. Floor-Mounted Enclosure: A floor box and floor box cover assembly with means to mount in the floor that is sealed against the entrance of scrub water at the floor level.
11. Floor Nozzle: An enclosure used on a wiring system, intended primarily as a housing for a receptacle, provided with a means, such as a collar, for surface-mounting on a floor, which may or may not include a stem to support it above the floor level, and is sealed against the entrance of scrub water at the floor level.

12. Junction Box: A box with a blank cover that joins different runs of raceway or cable and provides space for connection and branching of the enclosed conductors.
13. Outlet Box: A box that provides access to a wiring system having pryout openings, knockouts, threaded entries, or hubs in either the sides or the back, or both, for the entrance of conduit, conduit or cable fittings, or cables, with provisions for mounting an outlet box cover, but without provisions for mounting a wiring device directly to the box.
14. Pedestal Floor Box Cover: A floor box cover that, when installed as intended, provides a means for typically vertical or near-vertical mounting of receptacle outlets above the floor's finished surface.
15. Pull Box: A box with a blank cover that joins different runs of raceway and provides access for pulling or replacing the enclosed cables or conductors.
16. Raised-Floor Box: A floor box intended for use in raised floors.
17. Recessed Access Floor Box: A floor box with provisions for mounting wiring devices below the floor surface.
18. Recessed Access Floor Box Cover: A floor box cover with provisions for passage of cords to recessed wiring devices mounted within a recessed floor box.
19. Ring: A sleeve, which is not necessarily round, used for positioning a recessed wiring device flush with the plaster, concrete, drywall, or other wall surface.
20. Ring Cover: A box cover, with raised center portion to accommodate a specific wall or ceiling thickness, for mounting wiring devices or luminaires flush with the surface.
21. Termination Box: An enclosure designed for installation of termination base assemblies consisting of bus bars, terminal strips, or terminal blocks with provision for wire connectors to accommodate incoming or outgoing conductors, or both.

C. Receptacle: A fixed connecting device arranged for insertion of a power cord plug. Also called a power jack.

D. Receptacle Outlet: One or more receptacles mounted in a box with a suitable protective cover.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

A. Manufacturer's published instructions.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Products or components listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

B. <Insert additional performance requirements for the Project>.

2.2 METALLIC OUTLET BOXES, DEVICE BOXES, RINGS, AND COVERS

A. Source Quality Control:

1. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following UL product categories:

a. UL CCN QCIT; including UL 514A.

2. Standard Features:

a. Box having pryout openings, knockouts, threaded entries, or hubs in either the sides or the back, or both, for entrance of conduit, conduit or cable fittings, or cables, with provisions for mounting outlet box cover, but without provisions for mounting wiring device directly to box.
b. Material: Cast metal.
c. Cast-Metal Depth: Minimum 2.4 inch (60.3 mm).

B. UL QCIT - Metallic Conduit Bodies:

1. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following UL product categories:

a. UL CCN QCIT; including UL 514A.

2. Standard Features: Means for providing access to interior of conduit or tubing system through one or more removable covers at junction or terminal point. In the United States, conduit bodies are listed in accordance with outlet box requirements.

a.

C. UL QCIT - Metallic Device Boxes:

1. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following UL product categories:

a. UL CCN QCIT; including UL 514A.

2. Standard Features:

a. Box with provisions for mounting wiring device directly to box.
b. Material: Cast metal.
c. Cast-Metal Depth: minimum 2.4 inch (60.3 mm).

D. UL QCIT - Metallic Extension Rings:

1. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following

UL product categories:

a. UL CCN QCIT; including UL 514A.

2. Standard Features: Ring intended to extend sides of outlet box or device box to increase box depth, volume, or both.

2.3 JUNCTION BOXES AND PULL BOXES

A. UL BGUZ - Outdoor Sheet Metal Junction and Pull Boxes:

1. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following UL product categories:

a. UL CCN BGUZ; including UL 50 and UL 50E.

2. Standard Features:

a. Box with a blank cover that serves the purpose of joining different runs of raceway or cable.
b. Degree of Protection: Type 4X.

B. UL BGUZ - Outdoor Cast-Metal Junction and Pull Boxes:

1. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following UL product categories:

a. UL CCN BGUZ; including UL 50 and UL 50E.

2. Standard Features:

a. Box with a blank cover that serves the purpose of joining different runs of raceway or cable.
b. Degree of Protection: Type 4X.

2.4 COVER PLATES FOR DEVICE BOXES

A. UL QCIT or QCMZ - Metallic Cover Plates for Device Boxes:

1. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following UL product categories:

a. UL CCN QCIT or UL CCN QCMZ; including UL 514D.

2. Standard Features:

a. Cover plate-Securing Screws: Metal with head color to match cover plate finish.
b. Damp and Wet Locations: Listed, labeled, and marked for location and use. Provide gaskets and accessories necessary for compliance with listing.
c. Cover Plate Material: Galvanized steel.

2.5 HOODS FOR OUTLET BOXES

A. UL QCIT or QCMZ - Extra-Duty, While-in-Use Hoods for Outlet Boxes:

1. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following UL product categories:

a. UL CCN QCIT or UL CCN QCMZ; including UL 514D.
b. Receptacle, Hood, Cover Plate, Gaskets, and Seals: UL 498 Supplement SA when mated with box or enclosure complying with UL 514A, UL 514C, or UL 50E.

2. Standard Features:

a. Mounts to box using fasteners different from wiring device.
b. Marked "Extra-Duty" in accordance with UL 514D.
c. Provides gray, weatherproof, "while-in-use" cover.
d. Manufacturer may combine nonmetallic device box with hood as extra-duty rated assembly.

PART 3 - EXECUTION

3.1 SELECTION OF BOXES AND COVERS FOR ELECTRICAL SYSTEMS

A. Unless more stringent requirements are specified in Contract Documents or manufacturers' published instructions, comply with NFPA 70 for selection of boxes and enclosures. Consult Architect for resolution of conflicting requirements.

B. Degree of Protection:

1. Outdoors:

a. Type 4X unless otherwise indicated.
b. Locations Exposed to Hosedown: Type 6P.
c. Locations Subject to Potential Flooding: Type 6P.
d. Locations Aboveground Where Mechanism Must Operate When Ice Covered: Type 3S.
e. Locations in-Ground or Exposed to Corrosive Agents: Type 4X.
f. Locations in-Ground or Exposed to Corrosive Agents Where Mechanism Must Operate When Ice Covered: Type 3SX.

3.2 INSTALLATION OF BOXES AND COVERS FOR ELECTRICAL SYSTEMS

A. Comply with manufacturer's published instructions.

B. Reference Standards for Installation: Unless more stringent installation requirements are specified in Contract Documents or manufacturers' published instructions, comply with the following:

1. Electrical Construction: ICC IBC, ICC IFC, NFPA 1, NFPA 70, and NECA NEIS 1.
2. Electrical Safety: NFPA 70E.
3. Commissioning of Active and Passive Fire Protection Features: NFPA 3 and NFPA 4.
4. Grounding and Bonding: NECA NEIS 331 and Article 250 of NFPA 70.
5. Communications Work: BICSI N1.
6. Life Safety and Means of Egress Work: NFPA 101.
7. Emergency and Standby Power Work: NFPA 110, NFPA 111, and NECA NEIS 416.
8. Work in Confined Spaces: NFPA 350.
9. Work in Basements and Other Developed Subterranean Spaces: NFPA 520.
10. Outlet, Device, Pull, and Junction Boxes: Article 314 of NFPA 70.
11. Consult Architect for resolution of conflicting requirements.

C. Special Installation Techniques:

1. Provide boxes in wiring and raceway systems wherever required for pulling of wires, making connections, and mounting of devices or fixtures.
2. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to bottom of box unless otherwise indicated.
3. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
4. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for purpose.
5. Fasten junction and pull boxes to, or support from, building structure. Do not support boxes by conduits.
6. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to ensure a continuous ground path.

D. Interfaces with Other Work:

1. Identification: Provide labels for boxes and associated electrical equipment.

a. Identify field-installed conductors, interconnecting wiring, and components.
b. Label each enclosure with engraved metal or laminated-plastic nameplate.
c. Provide warning signs and arc-flash hazard warning labels for electrical equipment.

3.3 FIELD QUALITY CONTROL OF BOXES AND COVERS

A. Administrant for Electrical Power Tests and Inspections:

1. Administer and perform tests and inspections.

B. Administrant for Communications Tests and Inspections:

1. Administer and perform tests and inspections.

C. Tests and Inspections:

1. Perform manufacturer's recommended tests and inspections.
2. Perform tests and inspections recommended by standards listed in "Reference Standards for Installation" Paragraph.

D. Nonconforming Work:

1. Boxes and covers will be considered defective if they do not pass tests and inspections.
2. Remove and replace defective units and retest.

E. Field Quality-Control Reports: Collect, assemble, and submit test and inspection reports.

3.4 CLEANING

A. Remove construction dust and debris from boxes before installing cover plates, covers, and hoods.

3.5 PROTECTION

A. After installation, protect boxes from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Owner.

END OF SECTION

SECTION 261216 - DRY-TYPE, MEDIUM-VOLTAGE TRANSFORMERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Dry-type, medium-voltage transformers.

1.2 DEFINITIONS

A. VPE: Vacuum Pressure Encapsulation.

B. VPI: Vacuum Pressure Impregnation.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Product Listing: Include copy of unexpired approval letter, on letterhead of qualified electrical testing agency, certifying product's compliance with specified listing criteria.

a. If listed manufacturer differs from selling manufacturer, indicate relationship between entities on submittal. Clearly indicate which entity warrants product performance and fitness for purpose.
b. Listing criteria identified in approval letter must match specified listing criteria. UL label indicating approval of equipment's enclosure is not considered approval of equipment for intended application.
c. Product identification in approval letter must match product branding and model numbers in submittal. Approval letters for discontinued or superseded products are unacceptable for submitted product.

2. Product Certificates: Include product certificate stating compliance with IEEE C57.16, signed by manufacturer or fabricator.

B. Factory test reports.

C. Shop Drawings: Prepare and submit the following:

1. Include plans and elevations showing major components and features.

a. Include plan view and cross section of equipment base, showing clearances, manufacturer's recommended workspace, and locations of penetrations for grounding and conduits.

2. Include details of equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of field connections.
3. Include single-line diagram.
4. Include list of materials.
5. Include nameplate legends.

D. Field quality-control reports.

1.4 INFORMATIONAL SUBMITTALS

A. Manufacturer's published instructions.

B. Field Reports:

1. Manufacturer's field reports for field quality-control support.
2. Field reports for voltage monitoring and adjusting.
3. Field reports for infrared scanning.

1.5 QUALIFICATIONS

A. Electrical Power Testing (EPT) Technician III: Possessing active NICET EPT Level III certification. Able to manage switching procedures, conduct tests of complex equipment, analyze test and equipment data, plan a job, and lead a team. Has experience performing NFPA 70B, IEEE, and NETA electrical tests.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery:

1. Upon delivery of transformers and prior to unloading, inspect equipment for damage that may have occurred during shipment or storage.
2. Verify that tie rods and chains are undamaged and tight, and that blocking and bracing is tight. Verify that there is no evidence of load shifting in transit, and that readings from transportation shock recorders, if equipped, are within manufacturer's recommendations.
3. Verify that there is no indication of external damage and no dents or scratches in doors and sill, tank walls, radiators and fins, or termination provisions.
4. Compare transformers and accessories received with bill of materials to verify that shipment is complete. Verify that transformers and accessories conform with manufacturer's quotation and shop drawings. If shipment is incomplete or does not comply with Project requirements, notify manufacturer in writing immediately.
5. Unload transformers carefully, observing packing label warnings and handling instructions.
6. Open termination compartment doors and inspect components for damage or displaced parts, loose or broken connections, cracked or chipped insulators, bent mounting flanges, dirt or foreign material, and water or moisture.

B. Storage:

1. Store transformers in accordance with manufacturer's recommendations.
2. Transformers may be stored outdoors. If possible, store transformers at final installation locations on concrete pads. If dry concrete surfaces are unavailable, use pallets of adequate strength to protect transformers from direct contact with ground. Ensure transformer is level.
3. Ensure that transformer storage location is clean and protected from severe conditions. Protect transformers from dirt, water, contamination, and physical damage. Do not store transformers in presence of corrosive or explosive gases. Protect transformers from weather when stored for more than three months.
4. Store transformers with compartment doors closed.
5. Regularly inspect transformers while in storage and maintain documentation of storage conditions, noting discrepancies or adverse conditions. Visually check for rust spots.

C. Handling:

1. Handle transformers carefully, in accordance with manufacturer recommendations, to avoid damage to enclosure, termination compartments, base, frame, and internal components. Do not subject transformers to impact, jolting, jarring, or rough handling.
2. Protect transformer against entrance of dust, rain, and snow.
3. Transport transformers upright, to avoid internal stresses on core and coil mounting assembly and transformer case.
4. Verify that transformer weights are within rated capacity of handling equipment.
5. Use only manufacturer-recommended points for lifting, jacking, and pulling. Use lifting lugs when lifting transformers.
6. Use jacks only at corners of base plate of transformer case.
7. Use nylon straps of same length to balance and distribute weight when handling transformers with crane.
8. Use spreaders or lifting beam to obtain vertical lift and to protect transformer from straps bearing against enclosure. Lifting cable pull angles may not be greater than 15 degrees from vertical.
9. Exercise care not to damage base structure of case when handling transformer using skids or rollers. Use skids to distribute stresses over case base when using rollers under large transformers.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Products or components listed and labeled in accordance with NFPA 70, by a qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

B. Comply with IEEE C2.

C. Comply with IEEE C57.12.01.

2.2 MEDIUM-VOLTAGE TRANSFORMERS

A. Source Quality Control:

1. Factory Tests:

a. Factory Tests and Inspections: Perform the following tests and inspections on transformer by, or under supervision of, qualified electrical testing laboratory recognized by authorities having jurisdiction, in accordance with IEEE C57.16 before delivering to site. Affix label with name and date of manufacturer's certification of system compliance.

1) Tests for Transformers 500 kVA and Smaller:

a) Turns ratio, polarity, and phase relation on rated voltage connection.
b) Transformer no-load losses and excitation current at 100 percent of ratings. This test may be based on a statistical sample.
c) Applied voltage and induced voltage.
d) Partial discharge.

2) Tests for Transformers 501 kVA and Larger:

a) Resistance measurements of windings on rated voltage tap and at tap extremes.
b) Turns ratio, polarity, and phase relation on rated voltage connection.
c) Transformer no-load losses and excitation current at 100 percent of ratings.
d) Impedance voltage and load loss at rated current and rated frequency on rated voltage connection and at tap extremes.
e) Applied voltage and induced voltage.
f) Partial discharge.

b. Nonconforming Work:

1) Equipment that does not pass tests and inspections will be considered defective.

c. Factory Test Reports: Compile and submit factory test and inspection reports.

B. Dry-Type, Medium-Voltage Transformers :

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Eaton
b. GE Power; General Electric Company
c. Siemens Industry, Inc., Energy Management Division
d. Square D; Schneider Electric USA

2. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing

laboratory in accordance with guide information and standards specified for the following UL product categories:

a. Transformers, Distribution, Dry Type, Over 600 V: UL CCN XPFS; including UL 1562 or IEEE C57.16.

3. Standard Features:

a. Referenced Standards: IEEE C2 and IEEE C57.16.
b. Windings Material: Copper.
c. Surge Arresters: Comply with IEEE C62.11, Distribution Class; metal-oxide-varistor type, connected in each phase of incoming circuit and ahead of disconnecting device.
d. Cooling Systems: Comply with IEEE C57.12.01 for cooling class.

1) Self-Cooled Rating, Class AA: kVA as indicated on drawings.

e. Coils Insulation Systems:

1) Primary and secondary coil assemblies must be manufactured using polyester VPI system.

f. Winding Connections: Connection of windings and terminal markings must comply with IEEE C57.12.70.
g. Efficiency: Comply with 10 CFR 431, Subpart K.
h. Bushings must comply with IEEE C57.19.01 requirements for impulse and low-frequency insulation levels.
i. Tap Changer: External, for de-energized operation.

1) Taps: Two 2-1/2 percent, full-capacity taps above and two 2-1/2 percent, full-capacity taps below rated voltage. Comply with IEEE C57.12.36 requirements.

j. Enclosure:

1) Provide with provisions for lifting and anchoring frame to concrete pad.
2) With integral skid-mounting frame, suitable to allow skidding or rolling of transformer in any direction.
3) Enclosure Finish:

a) Outdoor Transformer Enclosure Finish: Factory-applied finish in manufacturer's standard color, corrosion resistant complying with IEEE C57.12.28.

k. Sound level must comply with requirements of NEMA TR 1.
l. Capacities and Characteristics:

1) Enclosure: Ventilated power transformer, UL 50E Type 3R enclosure.
2) Additional IEEE Standards: Comply with IEEE C57.12.51.
3) Connections:

a) Primary: Air-filled terminal cabinet for cable connection.
b) Secondary: Air-filled terminal cabinet for cable connection.

4) Transformer Ratings.

a) Impedance: Not less than 5.75 percent.
b) Temperature Rise: 150 deg C.

5) Coils Connection:

a) Line-Side Winding: Delta.
b) Load-Side Winding: Wye.

6) Voltage and BIL Ratings:

a) Nominal primary phase-to-phase voltage and BIL: Dual-rated, 4160 V, 30 kV and 13 800 V, 60 kV.
b) Nominal secondary voltage and BIL: 480Y/277 V, 10 kV.

7) Taps: Two 2-1/2 percent, full-capacity taps above and two 2-1/2 percent, full-capacity taps below rated voltage. Comply with IEEE C57.12.51 requirements.

8) Transformer Accessories:

a) Dial-type analog thermometer with alarm contacts.
b) At least four stainless steel ground connection pads.
c) Provisions for jacking, lifting, and towing.
d) Machine-engraved nameplate made of anodized aluminum or stainless steel.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and space conditions for compliance with requirements for dry-type, medium-voltage transformers and other conditions affecting performance of the Work.

B. Examine roughing-in of conduits and grounding systems to verify the following:

1. Wiring entries comply with layout requirements.
2. Entries are within conduit-entry tolerances specified by manufacturer, and no feeders may cross section barriers to reach load or line lugs.

C. Examine walls, floors, roofs, and concrete bases for suitable conditions for transformer installation.

D. Pre-Installation Checks:

1. Verify removal of shipping bracing after placement.

E. Verify that grounding and bonding connections are in place. Ground (earth) resistance at transformer location may not be greater than 5 Ω.

F. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF TRANSFORMERS

A. Comply with manufacturer's published instructions.

B. Reference Standards for Installation: Unless more stringent installation requirements are specified in the Contract Documents or manufacturer's published instructions, comply with the following:

1. Electrical Construction: ICC IBC, ICC IFC, NFPA 1, NFPA 70, and NECA NEIS 1.
2. Electrical Maintenance: NFPA 70B.
3. Electrical Safety: NFPA 70E.
4. Commissioning of Electrical Systems: NECA NEIS 90.
5. Grounding and Bonding: NECA NEIS 331 and Article 250 of NFPA 70.
6. Communications Work: BICSI N1.
7. Emergency and Standby Power Work: NFPA 110, NFPA 111, and NECA NEIS 416.
8. Work in Confined Spaces: NFPA 350.
9. Work in Basements and Other Developed Subterranean Spaces: NFPA 520.
10. Consult Architect for resolution of conflicting requirements.

C. Special Installation Techniques:

1. Transformer must be installed level and plumb and must tilt less than 1.5 degrees while energized.
2. Maintain minimum clearances and workspace at equipment in accordance with manufacturer's published instructions and NFPA 70.
3. Grounding and Bonding:

    a. At Exterior Locations:

        1) For counterpoise, provide tinned bare copper cable not smaller than 4/0 AWG, buried not less than 30 inch (765 mm) below grade interconnecting grounding electrodes. Bond surge arrester and neutrals directly to transformer enclosure and then to grounding electrode system with bare copper conductors. Keep lead lengths as short as practicable, with no kinks or sharp bends.
        2) Make joints in grounding conductors and loops by exothermic weld or compression connector.

    b. Terminate grounding and bonding conductors on common equipment grounding terminal on transformer enclosure. Install supplemental terminal bars, lugs, and bonding jumpers as required to accommodate number of conductors for termination.
    c. Complete transformer tank grounding and lightning arrester connections prior to making other electrical connections.

4. Connect low-voltage wiring.

    a. Maintain air clearances between energized live parts and between live parts and ground for exposed connections in accordance with manufacturer's published instructions.
    b. Bundle associated phase, neutral, and equipment grounding conductors together within transformer enclosure. Arrange conductors such that there is not excessive strain that could cause loose connections. Allow adequate slack for expansion and contraction of conductors.

5. Terminate medium-voltage cables in incoming section of substations.

D. Interfaces with Other Work:

1. Identification: Provide labels for transformers and associated electrical equipment.

    a. Identify field-installed conductors, interconnecting wiring, and components.
    b. Label each enclosure with engraved metal or laminated-plastic nameplate.
    c. Provide warning signs and arc-flash hazard warning labels for electrical equipment.

2. Install transformers on cast-in-place concrete equipment base(s).
3. Provide vibration isolation devices.

3.3 FIELD QUALITY CONTROL

A. Administrant for Electrical Power Tests and Inspections:

1. Administer and perform tests and inspections with assistance of factory-authorized service representative.

B. Tests and Inspections:

1. General Field-Testing Requirements:

    a. Comply with provisions of "Testing and Test Methods" Chapter in NFPA 70B.
    b. Perform visual and mechanical inspections and electrical tests. Certify compliance with test parameters.
    c. After installing transformer but before primary is energized, verify that grounding system at substation is tested at specified value or less.
    d. After installing transformer and after electrical circuitry has been energized, test for compliance with requirements.
    e. Visual and Mechanical Inspection:

        1) Verify equipment nameplate data complies with Contract Documents.
        2) Inspect bolted electrical connections for high resistance using one of the following two methods:

            a) Use low-resistance ohmmeter to compare bolted-connection resistance values to values of similar connections. Investigate values

that deviate from those of similar bolted connections by more than 50 percent of lowest value.

b) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data or NETA ATS, Table 100.12. Bolt-torque levels must be in accordance with manufacturer's published data. In absence of manufacturer's published data, use NETA ATS, Table 100.12.

2. Medium-Voltage Surge Arrester Field Tests:

   a. Visual and Mechanical Inspection:

      1) Inspect physical and mechanical condition.
      2) Inspect anchorage, alignment, grounding, and clearances.
      3) Verify arresters are clean.
      4) Verify that ground leads on devices are individually attached to ground bus or ground electrode.
      5) Verify that stroke counter is correctly mounted and electrically connected if applicable. Record stroke counter reading.

   b. Electrical Test:

      1) Perform insulation-resistance test on arresters, phase terminal-to-ground. Apply voltage in accordance with manufacturer's published data. In the absence of manufacturer's published data, comply with NETA ATS, Table 100.1. Replace units that fail to meet recommended minimum insulation resistance listed in that table.
      2) Perform watts-loss test. Evaluate watts-loss values by comparison with similar units and test equipment manufacturer's published data.

3. Dry-Type Transformer Field Tests:

   a. Visual and Mechanical Inspection:

      1) Test dew point of tank gases if applicable.
      2) Inspect anchorage, alignment, and grounding.
      3) Verify that resilient mounts are free and that shipping brackets have been removed.
      4) Verify bushings are clean.
      5) Verify that alarm, control, and trip settings on temperature and level indicators are set and operate within manufacturer's recommended settings.
      6) Verify that cooling fans operate correctly and have appropriate overcurrent protection.
      7) Perform specific inspections and mechanical tests recommended by manufacturer.
      8) Verify that as-left tap connections are as specified.

   b. Electrical Tests:

      1) Perform insulation-resistance tests winding-to-winding and each winding-to-ground. Apply voltage in accordance with manufacturer's published data.

In the absence of manufacturer's published data, comply with NETA ATS, Table 100.5. Calculate polarization index; value of index may not be less than 1.0.

2) Perform power-factor or dissipation-factor tests on windings in accordance with test equipment manufacturer's published data.
3) Verify correct secondary voltage, phase-to-phase and phase-to-neutral, after energization and prior to loading.

C. Nonconforming Work:

1. Equipment and devices will be considered defective if they do not pass tests and inspections.
2. Remove and replace malfunctioning units and retest.

D. Field Quality-Control Reports: Collect, assemble, and submit test and inspection reports. Record as-left set points of adjustable devices.

E. Manufacturer Services: Engage factory-authorized service representative to supervise field tests and inspections.

1. Manufacturer's Field Reports for Field Quality-Control Support: Prepare and submit report after each visit by factory-authorized service representative, documenting activities performed at the Project site.

3.4 CLOSEOUT ACTIVITIES

A. Training:

1. Train Owner's maintenance personnel on the following topics:

a. How to adjust, operate, and maintain transformer equipment.

3.5 PROTECTION

A. After installation, protect transformer from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Owner.

3.6 MAINTENANCE

A. Voltage Monitoring and Adjusting: After Substantial Completion, if requested by Owner, but not more than six months after Final Acceptance, perform the following voltage monitoring:

1. During period of normal load cycles as evaluated by Owner, perform seven days of three-phase voltage recording at outgoing section of transformers. Use voltmeters with calibration traceable to National Institute of Science and Technology standards and with chart speed of not less than 1 inch (25 mm) per hour. Voltage unbalance greater than 1 percent between phases, or deviation of phase voltage from nominal value by more than

plus or minus 5 percent during test period, is unacceptable.

2. Corrective Action: If test results are unacceptable, perform the following corrective action, as appropriate:

    a. Adjust transformer taps.
    b. Prepare written request for voltage adjustment by electric utility.

3. Retests: Repeat monitoring, after corrective action is performed, until satisfactory results are obtained.
4. Field Reports for Voltage Monitoring and Adjusting: Prepare written report covering monitoring performed and corrective action taken.

B. Infrared Scanning of Transformers: Perform survey during periods of maximum possible loading. Remove necessary covers prior to inspection.

1. After Substantial Completion, but not more than 60 days after Final Acceptance, perform infrared inspection of transformer's electrical power connections. Remove covers so joints and connections are accessible to portable scanner. Take visible light photographs at same locations and orientations as infrared scans for documentation to ensure follow-on scans match same conditions for valid comparison.
2. Instrument: Inspect distribution systems with imaging equipment capable of detecting a minimum temperature difference of 1 deg C at 30 deg C. Provide documentation of device calibration.
3. Field Reports for Infrared Scanning: Prepare certified report that identifies transformer equipment checked, testing technician, equipment used, and that describes scanning results. Include notation of deficiencies detected, remedial actions taken, and scanning observations after remedial action. List results as follows:

    a. Description of equipment to be tested.
    b. Discrepancies.
    c. Temperature difference between area of concern and reference area.
    d. Probable cause of temperature difference.
    e. Areas inspected. Identify inaccessible and unobservable areas and equipment.
    f. Identify load conditions at time of inspection.
    g. Provide photographs and thermograms of deficient area.

4. Act on inspection results in accordance with recommendations of NETA ATS, Table 100.18. Correct possible and probable deficiencies as soon as Owner's operations permit. Retest until deficiencies are corrected.

END OF SECTION

SECTION 262413 - SWITCHBOARDS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Switchboards.
2. Surge protection devices.
3. Disconnecting and overcurrent protective devices.
4. Instrumentation.
5. Control power.
6. Accessory components and features.

1.2 COORDINATION

A. Coordinate layout and installation of switchboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

B. Coordinate sizes and locations of concrete bases with actual equipment provided.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Switchboards.
2. Overcurrent protective devices.
3. Surge protection devices.
4. Groud-fault protection devices.
5. Accessories.
6. Other components.
7. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.

B. Shop Drawings: For each switchboard and related equipment.

1. Include dimensioned plans, elevations, sections, and details, including required clearances and service space around equipment. Show tabulations of installed devices, equipment features, and ratings.
2. Detail enclosure types for types other than UL 50E, Type 1.
3. Detail bus configuration, current, and voltage ratings.
4. Detail short-circuit current rating of switchboards and overcurrent protective devices.
5. Detail features, characteristics, ratings, and factory settings of individual overcurrent

protective devices and auxiliary components.

6. Include time-current coordination curves for each type and rating of overcurrent protective device included in switchboards. Submit on translucent log-log graft paper; include selectable ranges for each type of overcurrent protective device.
7. Include schematic and wiring diagrams for power, signal, and control wiring.

C. Field Quality-Control Submittals:

1. Field Quality-Control Reports:

a. Test procedures used.
b. Test results that comply with requirements.
c. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

1.4 INFORMATIONAL SUBMITTALS

A. Manufacturers' Published Instructions: Record copy of official installation and testing instructions issued to Installer by manufacturer for the following:

1. Handling, storing, and providing temporary heat.
2. Mounting accessories and anchoring devices.
3. Testing and adjusting overcurrent protective devices.

B. Sample warranties.

1.5 CLOSEOUT SUBMITTALS

A. Warranty documentation.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Spare Parts: Furnish to Owner spare parts, for repairing switchboards, that are packaged with protective covering for storage on-site and identified with labels describing contents. Include the following:

1. Potential Transformer Fuses: Equal to 10 percent of quantity installed for each size and type but no fewer than two of each size and type.
2. Control-Power Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than two of each size and type.
3. Fuses and Fusible Devices for Fused Circuit Breakers: Equal to 10 percent of quantity installed for each size and type but no fewer than three of each size and type.
4. Fuses for Fused Switches: Equal to 10 percent of quantity installed for each size and type but no fewer than three of each size and type.
5. Fuses for Fused Power-Circuit Devices: Equal to 10 percent of quantity installed for each size and type but no fewer than three of each size and type.
6. Indicating Lights: Equal to 10 percent of quantity installed for each size and type but no less than one of each size and type.

B. Special Tools: Furnish to Owner proprietary equipment, keys, and software required to operate, maintain, repair, adjust, or implement future changes to switchboards, that are packaged with protective covering for storage on-site and identified with labels describing contents. Include the following:

1. Portable Test Set: For testing functions of solid-state trip devices without removing from switchboard. Include relay and meter test plugs suitable for testing switchboard meters and switchboard class relays.
2. Portable Circuit-Breaker Lifting Device: Floor-supported, roller-based, elevating carriage arranged for movement of circuit breakers in and out of compartments for present and future circuit breakers.
3. Overhead Circuit-Breaker Lifting Device: Mounted at top front of switchboard, with hoist and lifting yokes matching each drawout circuit breaker.
4. Spare-Fuse Cabinet: Suitably identified, wall-mounted, lockable, compartmented steel box or cabinet. Arrange for wall mounting.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver switchboards in sections or lengths that can be moved past obstructions in delivery path.

B. Remove loose packing and flammable materials from inside switchboards and utilize heater to prevent condensation.

C. Handle and prepare switchboards for installation in accordance with NECA 400.

1.8 WARRANTY

A. Special Installer Extended Warranty: Installer warrants that fabricated and installed switchboard perform in accordance with specified requirements and agrees to repair or replace components that fail to perform as specified within extended-warranty period.

1. Extended-Warranty Period: Two years from date of Substantial Completion; full coverage for labor, materials, and equipment.

B. Special Manufacturer Extended Warranty: Manufacturer warrants that switchboard performs in accordance with specified requirements and agrees to provide repair or replacement of components that fail to perform as specified within extended-warranty period.

1. Extended-Warranty Period: Three years from date of Substantial Completion; full coverage for labor, materials, and equipment.
2. Follow-On Extended-Warranty Period: Five years from date of Substantial Completion; full coverage for materials that failed because of transient voltage surges only, free on board origin, freight prepaid.

PART 2 - PRODUCTS

2.1 SWITCHBOARDS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. ABB, Electrification Business
2. Eaton
3. Siemens Industry, Inc., Energy Management Division
4. Square D; Schneider Electric USA

B. Source Limitations: Obtain switchboards, overcurrent protective devices, components, and accessories from single source from single manufacturer.

C. Electrical Components, Devices, and Accessories: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

D. Comply with NEMA PB 2.

E. Comply with NFPA 70.

F. Comply with UL 891.

G. Front-Connected, Front-Accessible Switchboards:

1. Main Devices: Fixed, individually mounted.
2. Branch Devices: Panel mounted.
3. Sections front and rear aligned.

H. Nominal System Voltage: 480Y/277 V.

I. Main-Bus Continuous: As noted on Drawings.

J. Outdoor Enclosures: Type 3R.

1. Finish: Factory-applied finish in manufacturer's standard color; undersurfaces treated with corrosion-resistant undercoating.
2. Enclosure: Flat roof; bolt-on rear covers for each section, with provisions for padlocking.

K. Barriers: Between adjacent switchboard sections.

L. Insulation and isolation for main bus of main section and main and vertical buses of feeder sections.

M. Space Heaters: Factory-installed electric space heaters of sufficient wattage in each vertical section to maintain enclosure temperature above expected dew point.

1. Space-Heater Control: Thermostats to maintain temperature of each section above expected dew point.

2. Space-Heater Power Source: 120 V external branch circuit.

N. Service Entrance Rating: Switchboards intended for use as service entrance equipment may contain from one to six service disconnecting means with overcurrent protection, neutral bus with disconnecting link, grounding electrode conductor terminal, and main bonding jumper.

O. Bus Transition and Incoming Pull Sections: Matched and aligned with basic switchboard.

P. Hinged Front Panels: Allow access to circuit breaker, metering, accessory, and blank compartments.

Q. Buses and Connections: Three phase, four wire unless otherwise indicated.

1. Provide phase bus arrangement A, B, C from front to back, top to bottom, and left to right when viewed from front of switchboard.
2. Phase- and Neutral-Bus Material:

    a. Hard-drawn copper of 98 percent conductivity, silver-plated.

3. Copper feeder circuit-breaker line connections.
4. Ground Bus: Minimum-size required by UL 891, hard-drawn copper of 98 percent conductivity, equipped with mechanical connectors for feeder and branch-circuit ground conductors.
5. Main-Phase Buses and Equipment-Ground Buses: Uniform capacity for entire length of switchboard's main and distribution sections. Provide for future extensions from both ends.
6. Disconnect Links:

    a. Isolate neutral bus from incoming neutral conductors.
    b. Bond neutral bus to equipment-ground bus for switchboards utilized as service equipment or separately derived systems.

7. Isolation Barrier Access Provisions: Permit checking of bus-bolt tightness.

R. Future Devices: Equip compartments with mounting brackets, supports, bus connections, and appurtenances at full rating of circuit-breaker compartment.

2.2 SURGE PROTECTION DEVICES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. ABB, Electrification Business
2. Eaton
3. Siemens Industry, Inc., Energy Management Division
4. Square D; Schneider Electric USA

B. SPDs: Listed and labeled in accordance with UL 1449, Type 2.

C. Features and Accessories:

1. Internal thermal protection that disconnects SPD before damaging internal suppressor components.
2. Indicator light display for protection status.
3. Form-C contacts rated at 5 A and 250 V(ac), one normally open and one normally closed, for remote monitoring of protection status.
4. Surge counter.

D. Protection modes and UL 1449 VPR for grounded wye circuits with 480Y/277 V, three-phase, four-wire circuits may not exceed the following:

1. Line to Neutral: 1200 V for 480Y/277 V.
2. Line to Ground: 1200 V for 480Y/277 V.
3. Line to Line: 2000 V for 480Y/277 V.

E. Protection modes and UL 1449 VPR for 240/120 V, single-phase, three-wire circuits may not exceed the following:

1. Line to Neutral: 700 V.
2. Line to Ground: 700 V.
3. Line to Line: 1000 V.

F. SCCR: Equal or exceed 100 kA.

G. Nominal Rating: 20 kA.

2.3 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

A. Molded-Case Circuit Breaker (MCCB): Comply with UL 489, with interrupting capacity to meet available fault currents.

1. Electronic trip circuit breakers with RMS sensing; field-replaceable rating plug or field-replicable electronic trip; and the following field-adjustable settings:

    a. Instantaneous trip.
    b. Long- and short-time pickup levels.
    c. Long and short time adjustments.
    d. Ground-fault pickup level, time delay, and I squared t response.

2. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller; let-through ratings less than NEMA FU 1, RK-5.
3. Integrally Fused Circuit Breakers: Thermal-magnetic trip element with integral limiter-style fuse listed for use with circuit breaker; trip activation on fuse opening or on opening of fuse compartment door.
4. GFCI Circuit Breakers: Single- and double-pole configurations with Class A ground-fault protection (6 mA trip).
5. Ground-Fault Equipment Protection (GFEP) Circuit Breakers: Class B ground-fault protection (30 mA trip).
6. MCCB Features and Accessories:

    a. Standard frame sizes, trip ratings, and number of poles.

b. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor material.
c. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge (HID) lighting circuits.
d. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
e. Zone-Selective Interlocking: Integral with electronic trip unit; for interlocking ground-fault protection function.
f. Undervoltage Trip: Set to operate at 35 to 75 percent of rated voltage without intentional time delay.
g. Auxiliary Contacts: One SPDT switch with "a" and "b" contacts; "a" contacts mimic circuit-breaker contacts, "b" contacts operate in reverse of circuit-breaker contacts.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Receive, inspect, handle, and store switchboards in accordance with NECA 400.

1. Lift or move panelboards with spreader bars and manufacturer-supplied lifting straps following manufacturer's published instructions.
2. Use rollers, slings, or other manufacturer-approved methods if lifting straps are not furnished.
3. Protect from moisture, dust, dirt, and debris during storage and installation.
4. Install temporary heating during storage in accordance with manufacturer's published instructions.

B. Examine switchboards before installation. Reject switchboards that are moisture damaged or physically damaged.

C. Examine elements and surfaces to receive switchboards for compliance with installation tolerances and other conditions affecting performance of the Work or that affect performance of equipment.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's published instructions.

B. Reference Standards:

1. Switchboards and Accessories: Unless more stringent requirements are specified in Contract Documents or manufacturers' published instructions, comply with NECA 400.
2. Consult Architect for resolution of conflicting requirements.

C. Special Techniques:

1. Equipment Mounting: Install switchboards as detailed on Drawings.

    a. Install conduits entering underneath switchboard, entering under vertical section where conductors will terminate. Install with couplings flush with concrete base. Extend 2 inch (50 mm) above concrete base after switchboard is anchored in place.
    b. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
    c. Place and secure anchorage devices. Use setting drawings, templates, diagrams, published instructions, and directions furnished with items to be embedded.
    d. Install anchor bolts to elevations required for proper attachment to switchboards.

2. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, straps and brackets, and temporary blocking of moving parts from switchboard units and components.
3. Operating Instructions: Frame and mount printed basic operating instructions for switchboards, including control and key interlocking sequences and emergency procedures. Fabricate frame of finished wood or metal and cover instructions with clear acrylic plastic. Mount on front of switchboards.
4. Install filler plates in unused spaces of panel-mounted sections.
5. Install overcurrent protective devices, surge protection devices, and instrumentation.

    a. Set field-adjustable switches and circuit-breaker trip ranges.

3.3 CONNECTIONS

A. Bond conduits entering underneath switchboard to equipment ground bus with bonding conductor sized in accordance with NFPA 70.

B. Support and secure conductors within switchboard in accordance with NFPA 70.

C. Extend insulated equipment grounding cable to busway ground connection and support cable at intervals in vertical run.

3.4 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with requirements.

B. Switchboard Nameplates: Label each switchboard compartment with nameplate.

C. Device Nameplates: Label each disconnecting and overcurrent protective device and each meter and control device mounted in compartment doors with nameplate.

D. Service Equipment Label: Labeled, by qualified electrical testing laboratory recognized by authorities having jurisdiction, for use as service equipment for switchboards with one or more service disconnecting and overcurrent protective devices.

3.5 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Acceptance Testing:

    a. Test insulation resistance for each switchboard bus, component, connecting supply, feeder, and control circuit. Open control and metering circuits within switchboard, and remove neutral connection to surge protection and other electronic devices prior to insulation test. Reconnect after test.
    b. Test continuity of each circuit.

2. Test ground-fault protection of equipment for service equipment in accordance with NFPA 70.
3. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
4. Correct malfunctioning units on-site where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
5. Perform the following infrared scan tests and inspections, and prepare reports:

    a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform infrared scan of each switchboard. Remove front panels so joints and connections are accessible to portable scanner.
    b. Follow-up Infrared Scanning: Perform additional follow-up infrared scan of each switchboard 11 months after date of Substantial Completion.
    c. Instruments and Equipment:

        1) Use infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

6. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.

B. Nonconforming Work:

1. Switchboard will be considered defective if it does not pass tests and inspections.
2. Remove and replace defective units and retest.

C. Collect, assemble, and submit test and inspection reports, including certified report that identifies switchboards included and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

D. Manufacturer Services:

1. Engage factory-authorized service representative to supervise field tests and inspections.

3.6 ADJUSTING

A. Adjust moving parts and operable components to function smoothly, and lubricate as

recommended by manufacturer.

B. Set field-adjustable circuit-breaker trip ranges.

3.7 PROTECTION

A. Temporary Heating: Apply temporary heat, to maintain temperature in accordance with manufacturer's published instructions, until switchboard is ready to be energized and placed into service.

END OF SECTION

SECTION 271100 –NETWORK PANEL FITTINGS

PART 1- GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this section.

1.2 SECTION INCLUDES

A. This section includes the minimum requirements for equipment and cable installations in Telecommunication Equipment Rooms.

B. Minimum composition requirements and installation methods for the following:

1. Enclosure
2. Category 6A Patch Panels
3. Optical Fiber Patch Panels
4. Telecom Grounding Bar
5. Network Equipment
6. Velcro Hook and Loop Ties

1.3 RELATED REQUIREMENTS

A. 27 13 00 Backbone Cabling

1.4 QUALITY ASSURANCE

A. All equipment rooms shall be installed in a neat and workmanlike manner. All methods of construction that are not specifically described or indicated in the Contract Documents shall be subject to the control and approval of the Owners representative.

B. Equipment and materials shall be of the quality and manufacture indicated. Model numbers, part numbers, and nomenclature for manufacturers listed are used in the specification for the purpose of minimum requirement standards and basis of design.

C. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff

1. Layout Responsibility: Preparation of Shop Drawings, Cabling Administration Drawings, and field testing program development by an RCDD.
2. Installation Supervision: Installation shall be under the direct supervision of BICSI Registered Technician, who shall be present at all times when Work of this Section is performed at Project site
3. Testing Supervisor: Currently certified by BICSI as an RCDD to supervise on-site.

D. Strictly adhere to all Category 6 installation practices when installing UTP cabling.

E. Materials and work specified herein shall comply with the applicable requirements of:

1. EIA/TIA-568-C
2. EIA/TIA-569-A
3. EIA/TIA-606A
4. EIA/TIA-607
5. EIA/TIA-J-STD-607
6. OSHA
7. NECA/BICSI-568
8. Underwriters Laboratory
9. Federal Communications Commission
10. NEC
11. NFPA

1.5 SUBMITTALS

A. Provide product data/manufacturers cut sheets for product specified

B. Provide contractor BICSI certifications.

PART 2 – PRODUCTS

2.1 ENCLOSURE

A. Exterior wall mount enclosure shall meet the following physical specifications

1. Product Description – UL listed NEMA 4x rated

   a. Sized to meet equipment needs.
   b. Wood back board for equipment mounting.
   c. Drip shield top and seam-free sides, front and back.
   d. 16 gauge plated steel continuous hinge with stainless steel pin.
   e. Padlock hasp and staple.
   f. 16 gauge galvanized steel, finished in ANSI 61 gray polyester powder paint inside and out.
   g. Design Make: Nvent/Hoffman or equal

B. Accessories

1. Ground bar, number 6 ground wire and ground rod.
2. 120v double duplex outlet.
3. Heater with thermostat.
4. Enclosure ventilation.

2.2 WALL MOUNT FIBER OPTIC PATCH PANELS

A. Wall mount fiber optic enclosure

1. Dual doors with slam latches.
2. Constructed of 16-guage steel, finished in black.
3. Accepts 12 and 24 port adapter plates
4. Ground lug
5. Removable cable entry /exit grommets.

B. Design Make:

1. Leviton 5WSML-2C or equal.

2.3 CAT6 ENCLOSURE

A. Wall mountable multimedia outlet, with space for 4 cat 6 jacks: Ortronics OR-404HDJ4 or equal.

2.4 PATCH AND JUMPER CABLES

A. Fiber Optic Jumper cables for equipment shall have 2 strands, OFNR rated, connectors to match equipment and patch panels (LC-LC) depending on fiber used. Field verify connector type.

1. Provide quantity to match fiber uplink ports provided and cross connects required.
2. Yellow for single mode
3. Design make: AMP or approved equal

2.5 NETWORK SWITCH/MEDIA CONVERTER

A. Industrial Managed Gigabit PoE+ Ethernet Network Switch.

1. Eight (8) 10/100/1000Base-TX copper ports
2. Two (2) 10/100/1000Base TX/FX combo ports with SFP modules.
3. Hardened -40° to 80°C operating temperature range
4. 22-49 VDC redundant power inputs.
5. Provide power supply.
6. Design make: Comnet CNGE2FE8MSPOE+

B. Surge Protection

1. Point of use surge protector capable of handling power over Ethernet connections.
   a. Service Voltage: <60V
   b. Protection Modes: L-G (All), L-L (All)

c. Clamping Voltage (L-G): 75V
d. Clamping voltage (L-L): 72V
e. Surge Current Rating: 20kA/pair
f. Max. Continuous current: 1.5Amps
g. Power Handling: 144Watts
h. Data Rate: up to 10GbE

2. Mechanical Characteristics
   a. Connection Method: RJ45 in/out
   b. Housing : ABS
   c. Operating Temp: -40F – 158F.
3. All exterior mounted components shall have external surge protection installed.
4. Provide grounding per manufacturer's requirements.
5. Design Make: Ditek DTK-MRJ series for RJ45 devices.

PART 3 – EXECUTION

3.1 WALL MOUNTED ENCLOSURE

A. All enclosures shall be anchored to the wall or backboard using manufacturers recommended methods and hardware.

B. Mount with a minimum of 36 inches of clear access in front of cabinet

C. Provide grounding of cabinets to the TGB with a #6 copper wire.

3.2 CAT 6 PATCH PANELS

A. Install CAT6A patch panels as shown on drawing.

B. Provide printed labels on front of patch panel as indicated on drawings.

C. Wiring labels shall indicate T568A wiring configuration.

3.3 OPTICAL FIBER PATCH PANELS

A. Install fiber optic patch panel and associated adapter panels as shown on drawing

B. Label as specified

3.4 NETWORK HARDWARE

A. Install equipment in racks as shown on drawings

B. Program equipment to completely fit into existing network.

C. Coordinate with owner to develop, Vlan and IP addressing schemes, hardware naming conventions, etc

3.5 CABLE SUPPORTS

A. Install cable runway above racks as shown on the drawings and vertical on the wall above floor sleeves.

B. Utilize hook and loop ties for all category cabling, ty-wraps are not permitted.

3.6 MISCELLANEOUS REQUIREMENTS

A. All cables shall be neatly “dressed out” in equipment rooms.

B. Fire Stop all sleeves and conduit openings after the cable installation is complete.

3.7 GROUNDING AND BONDING

A. Provide a telecommunications grounding bus bar (TGB) in each Telecommunications Room (TR), bonded to the grounding bus bar in the nearest electrical panel board that supplies the ac electrical power. The intent of this system is to provide a grounding system that is equal in potential to the building electrical ground system. Therefore, ground loop current potential is minimized between telecommunications equipment and the electrical system to which it is attached.

B. All racks, metallic backboards, cable sheaths, metallic strength members, splice cases, backbone conduits, cable trays, cable runways, cabinets, etc, entering or residing in the TR shall be grounded to the respective TGB using a minimum #6 AWG stranded copper bonding conductor and compression connectors.

C. All wires used for telecommunications grounding purposes shall be identified with a green insulation. Non-insulated wires shall be identified at each termination point with a wrap of green tape. All cables and bus bars shall be identified and labeled in accordance with drawing details and ANSI/TIA/EIA 606A.

D. All connectors and clamps shall be mechanical type made of tinned copper.

E. Terminals shall be solderless compression type, copper long-barrel NEMA two bolt.

F. Provide bonding of the shield of shielded cables to the TGB in TRs and MTRs.

END OF SECTION

SECTION 271300 – BACKBONE CABLING

PART-1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this section.

1.2 SECTION INCLUDES

A. Backbone cabling includes all optical fiber between termination points.

1.3 RELATED REQUIREMENTS

A. 270528 Communications Pathways Systems

1.4 QUALITY ASSURANCE

A. All cable shall be installed in a neat and workmanlike manner. All methods of construction that are not specifically described or indicated in the contract documents shall be subject to the control and approval of the Owner's Representative

B. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff

1. Layout Responsibility: Preparation of Shop Drawings, Cabling Administration Drawings, and field testing program development by an RCDD.
2. Installation Supervision: Installation shall be under the direct supervision of BICSI Registered Technician, who shall be present at all times when Work of this Section is performed at Project site
3. Testing Supervisor: Currently certified by BICSI as an RCDD to supervise on-site.

C. Equipment and materials shall be of the quality and manufacture indicated or approved equal. Model numbers, part numbers, and nomenclature for manufacturers listed are used in the specification for the purpose of minimum requirement standards and basis of design.

D. Materials and work specified herein shall comply with the applicable requirements of:

1. ANSI/TIA– 568D
2. ANSI/TIA– 569A
3. NFPA 70 - 2002
4. BICSI Telecommunications Distribution Methods Manual , latest edition.
5. FCC 47 CFR 68
6. NEMA - 250
7. NEC - Articles 725,760, 770 and 800
8. IEEE C2 National Electrical Safety Code
9. ISO/IEC 11801

10. ANSI/TIA 607
11. ANSI/TIA 606-A

E. If this document and any of the documents listed above are in conflict, then the more stringent requirement shall apply. All documents listed are believed to be the most current releases of the documents. The Contractor has the responsibility to determine and adhere to the most recent release when developing the proposal for installation.

1.5 SUBMITTALS

A. Manufacturers catalog sheets, specifications and installation instructions

B. Termination details for all cable types.

C. Shop drawing showing all cables, pathways and splice points.

D. List of three (3) installations of equivalent or larger systems that have been installed within the past two (2) years and have been operating satisfactorily for a minimum of one year. (Include names and phone numbers of references).

E. Cable Test Reports (at substantial completion).

F. Cable tension reports for optical fiber backbone pulls over 500 feet.

PART 2 PRODUCTS

2.1 OPTICAL FIBER CABLE

A. Fiber Characteristics

1. All fibers in the cable must be usable fibers and meet required specifications.
2. All optical fibers shall be sufficiently free of surface imperfections and inclusions to meet the optical, mechanical, and environmental requirements of this specification.
3. Each optical fiber shall consist of a doped silica core surrounded by a concentric glass cladding. The fiber shall be a matched clad design.
4. All optical fibers shall be proof tested by the fiber manufacturer at a minimum of 100 kpsi.
5. The fiber shall be coated with a dual layer acrylate protective coating. The coating shall be in physical contact with the cladding surface.
6. The coated fiber shall have a layer of Teflon® placed between the dual layer acrylate coating of the optical fiber and the thermoplastic buffer. The diameter of the thermoplastic buffer coating shall be 900 ± 50 μm.
7. The fiber coating and buffer shall be removable with commercially available stripping tools in a single pass.

B. The non-dispersion shifted single-mode fiber utilized in the cable specified herein shall conform to the following specifications:

1. Typical Core Diameter: 8.3 μm
2. Cladding Diameter: 125.0 ± 1.0 μm
3. Core-to-Cladding Offset: ≤ 0.6 μm
4. Cladding Non-Circularity: ≤ 1.0%
5. Coating Diameter: 245 ± 10 μm
6. Attenuation Uniformity- No point discontinuity greater than 0.1 dB at either 1310 nm or 1550 nm.
7. Attenuation at the Water Peak- The attenuation at 1383 ± 3 nm shall not exceed 2.1 dB/km.
8. Cutoff Wavelength- The cabled fiber cutoff wavelength shall be < 1260 nm.
9. Mode Field Diameter: 9.30 ± 0.50 μm at 1310 nm
   ± 1.00 μm at 1550 nm
10. Zero Dispersion Wavelength (λ_o) - 1301.5 nm ≤ λ_o ≤ 1321.5 nm.
11. Zero Dispersion Slope (S_o) - ≤ 0.092 ps/(nm²•km).
12. Fiber Curl: ≥ 4.0 m radius of curvature.

C. Fiber Parameters
1. (Single-mode) The maximum dispersion shall be ≤ 3.2 ps/(nm•km) from 1285 nm to 1330 nm and shall be < 18 ps/(nm•km) at 1550 nm.
2. All fibers in the cable shall meet the requirements of this specification.
3. The attenuation specification shall be a maximum attenuation for each fiber at 23 ± 5°C.
4. The attenuation of the cabled fiber shall be uniformly distributed throughout its length such that there are no discontinuities greater than 0.1 dB at 1310 nm/1550 nm (single-mode) or 0.2 dB at 850 nm/1300 nm (multimode) in any one kilometer length of fiber.

E. Jacket

1. Outside plant fiber cables shall have the outdoor duct rated outer jacket, loose tube, gel free water blocked.
2. Design make Indoor/outdoor: Corning Freedm LST cables or engineer approved equal

2.2 OPTICAL FIBER CABLE CONNECTORS

A. Connectors shall be of the pre-polished, fusion spliced type, no polishing of the end face will be allowed in the field.

B. Backbone optical fiber connectors shall be LC Connector for singlemode 9 μm, and LC Connectors for multimode 50 um.

C. The terminations shall comply with the following standards:

1. TIA/EIA-604-3 Fiber Optic Connector Intermateability Standard, FOCIS-4 (Type LC)
2. EIA/TIA-4750000B Generic Specifications for Fiber Optic Connectors
3. EIA/TIA-455-A Standard Test Procedures for Optical Fibers, Cables, Transducers, Sensors, Connecting and Terminating Devices, and Other Fiber Optic Components (FOTPs)

D. Connector Characteristics

1. Strain relief: The connector shall provide a strain relief mechanism for installation on a single fiber cable that contains strength elements. The fiber within the body of the connector shall be isolated mechanically from cable tension, bending and twisting.
2. The connector shall have an optical axial pull strength of 2.2 N at 0 degree angle and an optical off axial pull strength of 2.2 N at a 90 degree angle, with a maximum 0.5 dB increase in attenuation for both tests when tested in accordance with ANSI/EIA/TIA-455-6B.
3. The maximum optical attenuation per each mated field installed 568SC connector pair shall not exceed 0.5 dB.
4. Shall have a return loss greater than or equal to 20 dB for multimode fiber and greater than or equal to 26 dB for single mode fiber.

E. The connectors shall sustain a minimum of 500 mating cycles without degrading this performance.

F. Intermateability: The connector shall be designed in compliance with the appropriate TIA FOCIS document.

G. Installation polishing: The connector shall not require polishing of the end face in the field. Connectors shall have a UPC factory-polished fiber stub in the connector ferrule.

H. Installation type: The connector installation shall not require the use of epoxies. Connector shall be fusion spliced.

I. Fiber protection: The connector crimp-on mechanism shall protect the bare fiber from the ingress of air or waterborne contaminants and shall secure the fiber in the ferrule micro-hole.

J. Performance Requirements:

SINGLE MODE TESTING		MAX DELTA CHANGE	FINAL MEASUREMENT
FOTP-171 METHOD B1	INSERTION LOSS	N/A	dB TYP 0.52 dB MAX
FOTP 107	RETURN LOSS	N/A	-44.4 dB TYP -36.2 dB MIN
FOTP-2	IMPACT 8 DROPS/ 1.5 M	N/A	dB IL -40.6 dB RL

FOTP-1	FLEX 0.5 KG	N/A	0.40 dB IL -40.1 dB RL
FOTP-36	TWIST 15 N AT 0 º	N/A	0.37 dB IL -40.2 dB RL
FOTP-6	CABLE RETENTION 66 N AT 90 º	0.20 dB	0.39 dB IL -42.3 dB RL
FOTP-6	CABLE RETENTION 19.4 N AT 90 º	0.11 dB	0.34 dB IL -43.2 dB RL
FOTP-185	COUPLING MECH 33 N AT 0 º	N/A	0.37 dB IL -45.0 dB RL
FOTP-21	DURABILITY 500 CYCLES	N/A	0.35 dB IL -40.5 dB RL
FOTP-4	TEMP LIFE 60ºC/ 14 DAYS	0.24 dB	0.29 dB IL -44.2 dB RL
FOTP-5	HUMIDITY 4 DAYS @95%	0.10 dB	0.30 dB IL -43.9 dB RL
FOTP-188	LOW TEMP. -10 ºC	0.18 dB	0.29 dB IL -44.1 dB RL

K. Design Make:

1. AFL Fuse Connect
2. Sumitomo's Lynx
3. Corning Fuselite

L. Fan out kits, 900um buffer tubes, color coded to match fiber strands.

2.3 OPTICAL FIBER SPLICES

A. Splices are not allowed, except for connector terminations, should a fiber be broken during installation, the entire run shall be replaced.

B. Splices cases shall be fully gasketed to prevent ingress of water, re-enterable, and suitable for underground and manhole use, appropriately sized for the number of strands/cables to be spliced. Provide trays and splice covers. All splices shall be fusion spliced, should a fiber be broken during installation the entire run shall be replaced.

2.4 OPTICAL FIBER CABLE HARDWARE

A. Wall mount fiber optic enclosure:

1. Dual doors with slam latches.
2. Constructed of 16gasteel, finished in black.
3. Accepts 12 or 24 port adapter plates.
4. All patch plates shall be loaded with LC adapters.
5. Each panel shall have integral and adequate cable management
6. Sized to support all strands.

B. Patch Cords: Factory-made, dual-fiber cables in 1 meter lengths.

C. Wall mount fiber panels shall be sized to accommodate the fiber strand count installed, provide 12 port LC adapter plates.

1. Design make: Legrand Q series, Siemon LVW, Leviton

PART 3 EXECUTION

3.1 OPTICAL FIBER CABLE

A. General

1. Interior cable shall be installed in innerduct in all interior areas and on cable tray where possible. Exterior cable including underground areas shall be in conduit.
2. Cable shall be continuous. Splices are not allowed unless called for.

B. Cable Pulling

1. Adhere to all manufacturers' requirements regarding pulling tension, allowable lubricants and bending radius. The use of lubricants shall not be allowed for fiber optic.

2. Provide cable pullers designed to suit field conditions. (i.e. horizontal vault pulls, vertical pulls and 45 degree pulls)
3. Use directional pulling swivels as conditions require.
4. Use Line Tension meter during cable pull to provide accurate measurements of the force exerted on a cable as it is installed. The meter shall have a programmable overload set point with an audible and visual indication of an overload condition. The meter shall have controls to disengage the cable puller if an overload occurs. Provide chart recorded documentation of the cable pull for the owner's records.
5. Provide a minimum 20 foot service loop at the building entrance locations.

END OF SECTION

SECTION 271500 – COMMUNICATIONS COPPER HORIZONTAL CABLING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Horizontal cabling is the portion of the cabling system that extends from the work area outlet to the Telecommunication Room. The horizontal cabling shall be configured in a star topology. The horizontal cabling includes the horizontal cables, the mechanically terminated jacks/inserts, patch panels and the faceplates that the jacks/inserts snap into, in the work area. All voice and data cable will be cat 6 and terminated on a patch panel in the telecom room.

B. This section includes minimum requirements for the following:

1. Cat 6 cable and connectors
2. Faceplates
3. Installation and Termination Methods
4. Station Cords

1.3 RELATED REQUIREMENTS

A. 27 17 00 Identification for Communications Systems

1.4 QUALITY ASSURANCE

A. All cable shall be installed in a neat and workmanlike manner. All methods of construction that are not specifically described or indicated in the contract documents shall be subject to the control and approval of the Owner's Representative. Equipment and materials shall be of the quality and manufacture indicated. The equipment specified is based upon the acceptable manufacturers listed. Where "approved equal" is stated, equipment shall be equivalent in every way to that of the equipment specified and subject to approval.

B. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff

1. Layout Responsibility: Preparation of Shop Drawings, Cabling Administration Drawings, and field testing program development by an RCDD.
2. Installation Supervision: Installation shall be under the direct supervision of BICSI Registered Technician, who shall be present at all times when Work of this Section is performed at Project site
3. Testing Supervisor: Currently certified by BICSI as an RCDD to supervise on-site.

4. Minimum five years experience in the Telecommunications industry.

C. Strictly adhere to all Category 6 installation practices when installing UTP cabling.

D. Materials and work specified herein shall comply with the applicable requirements of:

1. ANSI/TIA/EIA – 568-C series of Telecommunications Cabling Standards
2. ANSI/TIA/EIA – 569B Pathway and Spaces
3. ANSI/TIA/EIA – 606A Administration Standard for Telecommunications Infrastructure of Commercial Buildings
4. EIA/TIA – 607 Commercial Building Grounding and Bonding requirements for Telecommunications
5. ANSI/NECA/BICSI 568
6. NFPA 70 current edition.
7. NFPA 262, CMP
8. BICSI Telecommunications Distribution Methods Manual.
9. FCC 47 CFR 68.
10. NEMA – 250.
11. NEC - Articles 770 and 800.
12. ADA - Americans with Disabilities Act.

1.5 SUBMITTALS

A. Manufacturers catalog sheets, specifications and installation instructions for all specified products.

B. Submit installer/contractor system certification from manufacturer and BICSI certifications.

PART 2 - PRODUCTS

2.1 CATEGORY 6 UNSHIELDED TWISTED PAIR CABLE (UTP)

A. Physical Characteristics:

1. Shall be duct rated for undergound conduit use, water blocked and shielded.
2. The cable jacket shall be round.
3. The diameter of the copper conductor shall be .023 in. maximum.
4. Shall consist of (4) 23 AWG twisted pairs with spiral isolation member
5. Shall be suitable for the environment in which they are to be installed.
6. The color coding of pairs shall be:

Pair 1	W-BL; BL
Pair 2	W-O; O
Pair 3	W-G; G

Pair 4 W-BR; BR

7. The overall diameter of the cable shall be 0.350 inches or less.
8. Cable shall be third party verified to meet ISO/IEC 11801:2002 Category 6.

B. Transmission Characteristics:

1. DC resistance of any conductor shall not exceed 17.0 Ohms per 100m max. Measured in accordance with ASTM D 4566.
2. The propagation delay of any pair at 250MHz shall not exceed 511ns/100m
3. Performance characterized to 600MHz
4. Performance Characteristics as measured at 250MHz
   a) Maximum insertion loss 28.2dB/100m
   b) Minimum NEXT 55.9dB/100m
   c) Minimum PSNEXT 53.3dB/100m
   d) Minimum Return Loss 30.3dB/100m
   e) Minimum ACR 27.6dB/100m
   f) Minimum PSACR 25.4dB/100m.
5. Minimum 3dB NEXT performance above Category 6

C. Design make: Superior Essex DataGain Cat 6+, Berktek LANmark –6 cat 6 OSP, Siemon Cat 6 cable.

2.2 CAT 6 CONNECTORS

A. Transmission Characteristics

1. Shall
   a) Meet all ANSI/TIA/EIA-568-B.2-1 requirements
   b) Be IEEE 802.3ab Gigabit Ethernet verified
   c) UL listed per E131600
   d) Be FCC part 68.5, sub part F compliant.
   e) Meet or exceed all augmented category 6 performance requirements

B. Shall be modular RJ45 jacks that snap into user configurable faceplates meeting durability requirements specified in IEC 603-7.

C. Shall be 110 IDC, RJ45 type suitable for eight 22-26 AWG wires and be ETL certified Category 6 compliant.

D. Wired in accordance with EIA/TIA T568A polarization sequence.

E. Design make: Legrand –Ortronics Clarity Cat6, Leviton eXtreme Cat 6, Siemon Cat 6A.

2.3 CATEGORY 6 UTP PATCH PANELS

A. Shall meet or exceed all Category 6 standards per TIA 568B.2-1.

B. Paired punch down sequence to allow pair twists within ½" of the termination.

C. Modular 24-48 port, High Density 19" Rack mounted, with rear cable support.

D. UL listed.

E. Design Make: Shall match Jack manufacturer.

2.4 CAT 6A PLUG

A. Field terminated modular RJ45 plug shall meet or exceed all Category 6A standards per TIA 568B.2-1.

B. Copper alloy base material with Gold over Nickel contact plating material with a clear polycarbonate shell.

C. Design make: Commscope FT-MP, Siemons

2.5 FACEPLATES

A. Single gang faceplates shall be 2.75" x 4.5". Shall have label field covered with clear plastic insert. Provide number of jack openings as shown for each telecom outlet.

B. Faceplate color to match electrical faceplates.

C. Faceplates shall be UL listed.

D. Faceplates shall accept the modular jacks and shall match the jack manufacturer.

2.6 STATION EQUIPMENT CORDS

A. Cat 6 cables shall have stranded conductors and meet cat 6 performance criteria.

1. Shall be plenum rated, and shall be exterior rated for exterior use. Provide as required to connect all equipment.

2. Patch cable shall match cable manufacturer.

2.7 Hook and Loop Ties

B. Design Make

1. Siemon (VCM 250-06-01, VCM 250-12-02, VCM 250-18-03)
2. Ortronics OR-70700084-00

PART 3 - EXECUTION

3.1 UTP CABLE:

A. All wiring concealed in walls or soffits shall be installed in metal conduits, except when fishing walls is specified on the drawings.

B. Install plenum rated cable to all locations.

C. All exposed wiring shall be installed in surface raceway. Provide sleeves for all wall and floor penetrations, firestop all sleeves and penetrations.

D. All cabling above ceilings shall be installed in conduit, cable tray or open top cable hangers as specified on drawings. At no time shall cabling be attached to ceiling grid or lighting support wires, electrical conduits or HVAC ducting. Open top cable hangers are to be used for short distances, for a few cables only.

E. Cable raceways shall not be filled greater than the NEC maximum fill for the particular raceway type.

F. The cabling system and support hardware shall be installed so that it does not obscure any valves, fire alarm conduit, boxes, HVAC accesses, or other control devices or accesses.

G. Cable above accessible ceilings shall be supported 3' on center from cable support attached to building structure.

H. Do not untwist cable pairs more than 0.25 in. when terminating.

I. Test all cat 6A cables to TIA/BICSI specifications in accordance to spec section 27 05 53. The Contractor shall be responsible for replacing all cables that do not pass CAT 6A requirements.

J. Maximum cable length shall be 90 meters, no splices

K. Unshielded twisted pair cable shall be installed so that there are no bends less than four times the cables outside diameter at any point in the run.

L. Cable shall have no physical defects such as cuts, twists, kinks, tears or bulges in the outer jacket. Cables with defects shall be replaced.

M. Install cable in neat and workmanlike manner. Neatly bundle and tie with velcro all cable in closets. Leave sufficient cable for 90o sweeps at all vertical drops.

N. Provide an 8’ minimum service loop in TRs by routing the cables down the side rails of the equipment rack and looping up to the patch panels. Do not place a service loop for the horizontal cables on the overhead ladder rack.

O. Maintain the following clearances from EMI sources.

1. Power cable - 6 in.
2. Fluorescent/LED Lights - 12 in.
3. Transformers - 36 in.

P. Do not install cable in common cable hangers with speaker cable.

Q. Do not install Category 6A cable with more than 110N (25 lbs) pull force, as specified in EIA/TIA and BICSI TDMM practices. The use of cable lubricants shall not be allowed for horizontal cables. Tensile rated cords (i.e. fishing line) should be used for difficult or questionable pulls to judge the go/no-go condition of the conduit and pulling setup.

R. Cables jackets that are chaffed or burned exposing internal conductor insulation or have any bare copper ("shiners") shall be replaced.

S. Firestop all cable pathways that penetrate through a wall or floor, maintain fire rating on rated walls and floors.

T. Cables shall be identified with self adhesive label in accordance with specification section 27 05 53.

U. The cable label shall be applied to the cable behind the faceplate on a section of cable that can be accessed by removing the cover plate, and in an accessible area behind the patch panel that can be viewed with out removing the bundle support ties.

3.2 CAT 6A UTP STATION EQUIPMENT CORDS

A. Turn over station equipment cords to owner.

3.3 INSERTS, FACEPLATES AND FRAMES

A. All cables shall be terminated with high density modular jacks that snap into a faceplate mounted on a wall outlet box, surface raceways or power pole.

B. Utilize angle faceplates for surface raceway.

C. Outlet boxes shall be secured to building with mechanical fasteners. Adhesive fasteners are not allowed.

D. All extra openings to be filled with blank inserts.

E. All outlets without cabling are to be covered with a blank stainless steel faceplate

F. Terminate cable per EIA/TIA T568A standard pin assignments.

G. Label faceplate per drawing details and as called for in section 27 05 53.

END OF SECTION

SECTION 271700 – TESTING AND IDENTIFICATION

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes the minimum requirements for the testing, certification administration and identification of backbone and horizontal cabling.

B. This section includes minimum requirements for the following:

1. UTP testing and testers
2. Fiber optic testing and testers
3. Labels and Labeling
4. Documentation
5. Cutover Support Requirements
6. Training Requirements

1.2 DEFINITIONS

A. All testing procedures and testers shall comply with applicable requirements of:

1. ANSI/TIA 568.C Commercial Building Telecommunications Cabling Standard, Part 1: General Requirements
2. ANSI/TIA 526-7 Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant.
3. ANSI/TIA 526-14 Measurement of Optical Power Loss of Installed Multimode Fiber Cable Plant.

B. Identification and administration work specified herein shall comply with the applicable requirements of:

1. ANSI/TIA– 606-A Administration Standards.
2. ANSI/TIA– 569-A Pathway and Spaces
3. ANSI/TIA– 568-C Telecommunications Cabling Standard.
4. ANSI/TIA– 758-A Customer Owned Outside Plant Telecommunications Cabling Standard
5. BICSI Telecommunications Cabling Installation Manual
6. BICSI Telecommunications Distribution Methods Manual

1.3 ACTION SUBMITTALS

A. Product Data: Manufacturers catalog sheets and specifications for each cable testers, test heads and adapter cords and latest version of software applicable for each tester planned for use.

B. Provide written factory calibration recommendation letter and factory recommended field calibration intervals with bid.

C. At time of testing, provide a factory calibration certificate for each tester used and include these in each test report binder at the completion of the project.

D. Summary of all reports, full plot data test results, tester software tools required to view and inspect and print any selection of the test reports, spreadsheets, end to end reports and as built drawings called for at the completion of job.

E. Technician certificates for successful completion of training for each of the field testers proposed to be used in this project.

F. As built drawings showing, conditions and labeling for all newly installed, reterminated, and relabeled cables.

PART 2 - PRODUCTS

2.1 OPTICAL FIBER CABLE TESTERS

A. Optical Time Domain Reflectometer (OTDR)

1. Shall be capable of testing to TIA 568.3-D criteria.
2. Shall have a front CRT display
3. Connector types shall include: SC
4. Acceptable Manufacturers:

a) Fluke
b) JDSU
c) EXFO

2.2 100 OHM UTP TESTER

A. Shall be capable of testing to TIA 568.2-D criteria.

B. Physical interface shall be modular RJ-45 connector and a serial port with DB-9 connector.

C. Shall have auto-testing to determine if cable meets the requirements of ANSI/TIA 568.2, ISO Class C, D, 10 Base-T, Token Ring, Fast Ethernet and ATM 1GBase-T, 10GBase-T standards.

D. Acceptable Manufacturers:

1. Fluke DTX-1800
2. Ideal LanTek-II-500
3. Wire Xpert

2.3 LABELS

A. Shall meet the legibility, defacement, exposure and adhesion requirements of UL 969.

B. All labels shall be preprinted or laser printed type.

C. Where used for horizontal cable marking provide vinyl substrate with a white printing area and a clear “tail” that self laminates the printed area when wrapped around the cable. If cable jacket is white, provide cable label with printing area that is any other color than white, preferably orange or yellow so that the labels are easily distinguishable.

D. Where insert type labels are used provide clear plastic cover over label.

E. Acceptable Manufacturers:

1. Brady
2. Panduit
3. Brother

PART 3 - EXECUTION

3.1 OPTICAL FIBER CABLE TESTING

A. Test all fibers in accordance to TIA 568-C

B. Test all fibers with launch and far end cable of sufficient length for the OTDR to be able to see through all installed connectors.

C. Localized attenuation shall not exceed 0.50 dB at any point.

D. Fiber strands shall be tested for Optical Power Loss as well as Attenuation and Optical Return Loss and length measurements.

E. Backbone multimode fiber shall be tested at both 850nm and 1300 nm in accordance with ANSI/EIA/TIA-526-14A method B.

F. Backbone single mode fiber shall be tested at both 1310nm and 1550 nm in accordance with ANSI/EIA/TIA-526-7A method A.1.

G. The Contractor shall test all fiber optic cables with an OTDR and submit all fiber test result data in an electronic and hard copy format as directed in this section

1. Reports shall show circuit ID, cursor marks, total attenuation, date of installation and test used.

a) Contractor shall submit (1) copy of software capable of viewing the electronic test result files.

H. Multimode fiber shall conform to the following: (note: taken at 850nm)

Length (meters)	**Attenuation (dB)**
500	3.25
1000	5.0
1500	6.5
2000	8.5

I. Multimode fiber shall conform to the following: (note: taken at 1300 nm)

Length (meters)	Attenuation (dB)
500	2.2
1000	3.0
1500	3.8
2000	4.5

J. Single Mode Fiber shall conform to the following: (note: taken at 1550nm)

Inside:

Length (meters)	Attenuation (dB)
500	2.0
1000	2.5
1500	3.0
2000	3.5
2500	4.0
3000	4.5

Outside:

Length (meters)	Attenuation (dB)
500	1.8
1000	2.0
1500	2.2
2000	2.5
2500	2.8
3000	3.0

3.2 CATEGORY 6/6A - 100 OHM UTP CABLE TESTING

A. General Requirements

1. Every cabling link in the installation shall be tested in accordance with the field test specifications defined in ANSI/TIA/EIA-568.2-D *"Balanced Twisted Pair Telecommunications Cabling and Components Standard".* This document will be referred to as the "TIA Cat 6 Standard."

2. The installed twisted-pair horizontal links shall be tested from the MTR/ITR to the telecommunication wall outlet in the work area against the "*Permanent Link*" performance limits specification as defined in the TIA Cat 6 Standard.

3. One hundred percent of the installed cabling links must be tested and must pass the requirements of the standards mentioned in I.A.2 above and as further detailed in Section I.B. Any failing link must be diagnosed and corrected. The corrective action shall be followed with a new test to prove that the corrected link meets the performance requirements. The final and passing result of the tests for all links shall be provided in the test results documentation in accordance with Section I.C below.

4. The test equipment (tester) shall comply with the accuracy requirements for level III field testers as defined in the TIA Cat 6 Document. The tester including the appropriate interface adapter must meet the specified accuracy requirements. The accuracy requirements for the permanent link test configuration (baseline accuracy *plus* adapter contribution) are specified in Table B.2 of Annex B of the TIA Cat 6 Standard. (Table B.3 in this TIA document specifies the accuracy requirements for the Channel configuration.)

5. The test plug shall fall within the values specified in E.3.2.2 Modular test plug NEXT loss requirements of the TIA Cat 6 Standard.

6. The tester shall be within the calibration period recommended by the vendor in order to achieve the vendor-specified measurement accuracy.

7. The tester interface adapters must be of high quality and the cable shall not show any twisting or kinking resulting from coiling and storing of the tester interface adapters. In order to deliver optimum accuracy, preference is given to a permanent link interface adapter for the tester that can be calibrated to extend the reference plane of the Return Loss measurement to the permanent link interface. The contractor shall provide proof that the interface has been calibrated within the period recommended by the vendor. To ensure that normal handling on the job does not cause measurable Return Loss change, the adapter cord cable shall not be of twisted-pair construction.

8. The Pass or Fail condition for the link-under-test is determined by the results of the required individual tests (detailed in Section I.B). Any Fail, Fail* or Pass* result yields a Fail for the link-under-test. In order to achieve an overall Pass condition, the results for each individual test parameter must Pass.

9. A Pass or Fail result for each parameter is determined by comparing the measured values with the specified test limits for that parameter. The test result of a parameter shall be marked with an asterisk (*) when the result is closer to the

test limit than the accuracy of the field tester. The field tester manufacturer must provide documentation as an aid to interpret results marked with asterisks.

10. When drawings indicate Category 6 cables are to be installed to existing patch panels, cables are to be tested to the highest standard given the Category rating of the existing patch panel.

B. Performance Test Parameters

1. The test parameters for Cat 6 are defined in TIA Cat 6 standard, which refers to the ANSI/TIA-568.2 standard. The test of each link shall contain all of the following parameters as detailed below. In order to pass the test all measurements (at each frequency in the range from 1 MHz through 250 MHz and 1MHz through 500MHz for cat 6A) must meet or exceed the limit value determined in the above-mentioned standard.

2. Wire Map:

   a) Wire Map shall report Pass if the wiring of each wire-pair from end to end is determined to be correct. The Wire Map results shall include the continuity of the shield connection if present.

3. Length:

   a) The field tester shall be capable of measuring length of all pairs of a basic link or channel based on the propagation delay measurement and the average value for NVP. The physical length of the link shall be calculated using the pair with the shortest electrical delay. This length figure shall be reported and shall be used for making the Pass/Fail decision. The Pass/Fail criteria are based on the maximum length allowed for the Permanent Link configuration (90 meters – 295 feet) plus 10% to allow for the variation and uncertainty of NVP.

4. Insertion Loss (Attenuation)

   a) Insertion Loss is a measure of signal loss in the permanent link or channel. The term “Attenuation” has been used to designate “Insertion Loss.” Insertion Loss shall be tested from 1 MHz through 250 MHz (1MHz through 500MHz for cat 6A) in maximum step size of 1 MHz. It is preferred to measure insertion loss at the same frequency intervals as NEXT Loss in order to provide a more accurate calculation of the Attenuation-to-Crosstalk ratio (ACR) parameter. Minimum test results documentation (summary results): Identify the worst wire pair (1 of 4 possible). The test results for the worst wire pair must show the highest attenuation value measured (worst case), the frequency at which this worst case value occurs, and the test limit value at this frequency.

5. NEXT Loss

   a) Pair-to-pair near-end crosstalk loss (abbreviated as NEXT Loss) shall be tested for each wire pair combination from each end of the link (a total of

12 pair combinations). This parameter is to be measured from 1 through 250 MHz. NEXT Loss measures the crosstalk disturbance on a wire pair at the end from which the disturbance signal is transmitted (near-end) on the disturbing pair. The maximum step size for NEXT Loss measurements shall not exceed the maximum step size defined in the standard as shown in Table 1, column 2. Minimum test results documentation (summary results): Identify the wire pair combination that exhibits the worst case NEXT margin (2) *and* the wire pair combination that exhibits the worst value of NEXT (worst case). NEXT is to be measured from each end of the link-under-test. These wire pair combinations must be identified for the tests performed from each end. Each reported case should include the frequency at which it occurs as well as the test limit value at this frequency.

Frequency Range (MHz)	Maximum Step size (MHz)
1 – 31.25	0.15
31.26 – 100	0.25
100 – 250	0.50
250 – 500	1.00

6. PSNEXT Loss

   a) Power Sum NEXT Loss shall be evaluated and reported for each wire pair from both ends of the link under-test (a total of eight results). PSNEXT Loss captures the combined near-end crosstalk effect (statistical) on a wire pair when all other pairs actively transmit signals. Like NEXT this test parameter must be evaluated from 1 through 250 MHz (1MHz through 500MHz for cat 6A) and the step size may not exceed the maximum step size defined in the standard

   b) Minimum test results documentation (summary results): Identify the wire pair that exhibits the worst-case margin and the wire pair that exhibits the worst value for PSNEXT. These wire pairs must be identified for the tests performed from each end. Each reported case should include the frequency at which it occurs as well as the test limit value at this frequency.

7. ELFEXT Loss, pair-to-pair

   a) Pair-to-pair FEXT Loss shall be measured for each wire-pair combination from both ends of the link under-test. FEXT Loss measures the crosstalk disturbance on a wire pair at the opposite end (far-end) from which the transmitter emits the disturbing signal on the disturbing pair. FEXT is measured to compute ELFEXT Loss that must be evaluated and reported in the test results. ELFEXT measures the relative strength of the

far-end crosstalk disturbance relative to the attenuated signal that arrives at the end of the link. This test yields 24 wire pair combinations. ELFEXT is to be measured from 1 through 250 MHz (1MHz through 500MHz for cat 6A) and the maximum step size for FEXT Loss measurements shall not exceed the maximum step size.

b) Minimum test results documentation (summary results): Identify the wire pair combination that exhibits the worst-case margin and the wire pair combination that exhibits the worst value for ELFEXT. These wire pairs must be identified for the tests performed from each end. Each reported case should include the frequency at which it occurs as well as the test limit value at this frequency.

8. PSELFEXT Loss

a) Power Sum ELFEXT is a calculated parameter that combines the effect of the FEXT disturbance from three wire pairs on the fourth one. This test yields eight wire-pair combinations. Each wire-pair is evaluated from 1 through 250 MHz (1MHz through 500MHz for cat 6A) in frequency increments that do not exceed the maximum step size defined in the standard as shown in Table 1, column 2. Minimum test results documentation (summary results): Identify the wire pair that exhibits the worst pair combinations must be identified for the tests performed from each end. Each reported case should include the frequency at which it occurs as well as the test limit value at this frequency.

9. Return Loss

a) Return Loss (RL) measures the total energy reflected on each wire pair. Return Loss is to be measured from both ends of the link-under-test for each wire pair. This parameter is also to be measured from 1 through 250 MHz (1MHz through 500MHz for cat 6A) in frequency increments that do not exceed the maximum step size defined in the standard as shown in Table 1, column 2.

b) Minimum test results documentation (summary results): Identify the wire pair that exhibits the worst-case margin and the wire pair that exhibits the worst value for Return Loss. These wire pairs must be identified for the tests performed from each end. Each reported case should include the frequency at which it occurs as well as the test limit value at this frequency.

10. ACR (Attenuation to crosstalk ratio)

a) This parameter is not demanded by the standard but may be required in order to obtain the premise wiring manufacturer's warranty. ACR provides an indication of bandwidth for the two wire-pair network applications. ACR is a computed parameter that is analogous to ELFEXT and expresses the signal to noise ratio for a two wire-pair system. This calculation yields 12 combinations – six from each end of the link. Minimum test results documentation (summary results): Identify the wire pair combination that exhibits the worst-case margin and the wire pair combination that exhibits the worst value for ACR. These wire pair

combinations must be identified for the tests performed from each end. Each reported case should include the frequency at which it occurs as well as the test limit value at this frequency.

11. PSACR

    a) This parameter is not required by the standard but may be required in order to obtain the premise wiring vendor's warranty. The Power Sum version of ACR is based on PSNEXT and takes into account the combined NEXT disturbance of all adjacent wire pairs on each individual pair. This calculation yields eight combinations –one for each wire pair from both ends of the link. Minimum test results documentation (summary results): Identify the wire pair that exhibits the worst-case margin and the wire pair that exhibits the worst value for PSACR. These wire pairs must be identified for the tests performed from each end. Each reported case should include the frequency at which it occurs as well as the test limit value at this frequency.

12. Propagation Delay

    a) Propagation delay is the time required for the signal to travel from one end of the link to the other. This measurement is to be performed for each of the four wire pairs. Minimum test results documentation (summary results): Identify the wire pair with the worst-case propagation delay. The report shall include the propagation delay value measured as well as the test limit value.

13. Delay Skew [as defined in ANSI/TIA-568.2]

    a) This parameter shows the difference in propagation delay between the four wire pairs. The pair with the shortest propagation delay is the reference pair with a delay skew value of zero. Minimum test results documentation (summary results): Identify the wire pair with the worst-case propagation delay (the longest propagation delay). The report shall include the delay skew value measured as well as the test limit value.

C. Test Result Documentation

1. The test results information for each link shall be recorded in the memory of the field tester upon completion of the test.
2. The test results records saved by the tester shall be transferred into a Windows™-based database utility that allows for the maintenance, inspection and archiving of these test records. A guarantee must be made that the measurement results are transferred to the PC unaltered, i.e., "as saved in the tester" at the end of each test and that these results cannot be modified at a later time. Superior protection in this regard is offered by testers that transfer the numeric measurement data from the tester to the PC in a non-printable format.
3. The database for the completed job shall be stored and delivered on CD-ROM including the software tools required to view, inspect, and print any selection of test reports.

4. A paper copy of the test results shall be provided that lists all the links that have been tested with the following summary information

    a) The identification of the link in accordance with the naming convention defined in the overall system documentation
    b) The overall Pass/Fail evaluation of the link-under-test including the NEXT Headroom (overall worst case) number
    c) The date and time the test results were saved in the memory of the tester.

5. General Information to be provided in the electronic data base with the test results information for each link:

    a) The identification of the customer site as specified by the end-user
    b) The identification of the link in accordance with the naming convention defined in the overall system documentation
    c) The overall Pass/Fail evaluation of the link-under-test
    d) The name of the standard selected to execute the stored test results
    e) The cable type and the value of NVP used for length calculations
    f) The date and time the test results were saved in the memory of the tester
    g) The brand name, model and serial number of the tester
    h) The identification of the tester interface
    i) The revision of the tester software and the revision of the test standards database in the tester
    j) The test results information must contain information on each of the required test parameters that are listed in Section (3.2-B) and as further detailed below under paragraph (3.2-C.-6

6. The detailed test results data to be provided in the electronic database for each tested link must contain the following information:

    a) For each of the frequency-dependent test parameters, the value measured at every frequency during the test is stored. In this case, the PC-resident database program must be able to process the stored results to display and print a color graph of the measured parameters. The PC-resident software must also provide a summary numeric format in which some critical information is provided numerically as defined by the summary results (minimum numeric test results documentation) as outlined above for each of the test parameters.

        1) Length: Identify the wire-pair with the shortest electrical length, the value of the length rounded to the nearest 0.1 m (1) and the test limit value
        2) Propagation delay: Identify the pair with the shortest propagation delay, the value measured in nanoseconds (ns) and the test limit value
        3) Delay Skew: Identify the pair with the largest value for delay skew, the value calculated in nanoseconds (ns) and the test limit value
        4) Attenuation: Minimum test results documentation as explained in Section I.B for the worst pair

5) Return Loss: Minimum test results documentation as explained in Section I.B for the worst pair as measured from each end of the link
6) NEXT, ELFEXT, ACR: Minimum test results documentation as explained in Section I.B for the worst pair combination as measured from each end of the link
7) PSNEXT, PSELFEXT, and PSACR: Minimum test results documentation as explained in Section I.B for the worst pair as measured from each end of the link

3.3 COPPER BACKBONE CABLES

A. Test all terminated, spliced, relocated or transferred pairs – two weeks before intended cutover. Test all pairs, end-to-end and record hand written results on the test sheet provided on the last page of this section. Correct deficiencies as directed by Owner and provide a minimum of 99% good pairs, for backbone cables.

1. Workman type faults such as split pairs, transposition, and reversed polarity must be tested and corrected. All defective pairs, except as noted defective pairs from the manufacture in accordance with applicable cable specifications, shall be made good by the Contractor. Physical fault correction such as split pair and reversed polarity will be corrected only at the point of failure. All defective pairs not made good shall be reported to owner's representative together with a written report of corrective measures attempted.

B. Shield Continuity

1. Testing and measuring shall be made to assure that cable shields are continuous from end-to-end. Without initiating a time-consuming program of checking each bond and ground along the cable route, a suitable check shall involve just the overall shield effectiveness. Such a check will be necessary for checking each splice location.

a) Select 15-25 pairs in the cable and provide a means for grounding all of the selected pairs simultaneously at both the MTR and the far end of the cable being tested. The resistance of all grouped pairs in parallel from end-to-end shall be approximately equal to the total resistance of the cable shield.

C. The Contractor shall test all high-count copper cables and submit test result information in an electronic format. Acceptable formats are Word or Excel.

D. Provide test results on customer approved test result documentation. Confirm project specific requirements with customer prior to testing.

3.4 TEST RESULT SUBMISSION

A. Provide test report documentation in a hard copy summary report, by MTR/ITR, in a three-ring binder, within 1 week prior to cutover of any phase of the project. Provide full plot data for any Failures and any marginal passes and place yellow posted note affixed to each related printed page of the binder for review with Owner's Representative. Correct any deficiencies as directed by the Owner's Representative.

1. The three-ring binder shall be clearly marked on the outside front cover and spine with the words “Test Results”, the project name, building name, the date of completion (month and year) and the Contractors name and address. A tab shall be provided for each MTR/ITR and the test results organized by MTR/ITR. The test reports in each MTR/ITR tabbed section shall be sorted (before printing) by Patch Panel and port for each MTR/ITR.

B. Provide two CD’s with summary report, full plot data, and test report within 1 week after the completion of the project. The disks shall be placed into CD sleeves and placed into a three-ring binder clearly marked on the outside front cover and spine with the words “Test Results”, the project name, building name, the date of completion (month and year) and the Contractors name and address. The electronic test results shall be sorted by MTR/ITR into proper folders to match the heading of tabs in the tree ring binders. Also include in the binder, the summary information provided in A. above and the full plot data for any previous failures or marginal passes that have been corrected – with an explanation of the corrective action and the signature of the technician and the foreman.

C. The binder and electronic folder/files shall divided by major heading tabs (or in the case of electronic files, be placed into a folders structure similar to the hardcopy tests of this section).

D. Major heading tabs (folders) shall be divided into Horizontal and Backbone (both fiber and copper backbone). Each shall be further sectioned by test type and by MTR/ITR and rack as applicable.

E. Provide updated cable schedules with all deviations, including all change order, field authorizations, moves, adds and changes. Include all cable ID changes, panel and port changes in each MTR/ITR, room number changes, etc.

3.5 IDENTIFICATION & LABELING

A. Confirm specific labeling requirements with customer’s project coordinator prior to cable installation or termination.

B. Existing horizontal cables that are to be relabeled as indicated on the drawings shall conform to the ANSI/EIA/TIA 606A labeling standard consistent with the labeling requirements for new cables.

C. Cables

1. Backbone cables shall be marked at each endpoint and at all intermediate pull/ access points or junction boxes. Label shall indicate origination and destination MTR/ITR ID, sheath ID and strand or pair range.
2. Horizontal cables shall be marked at each end, on the sheath indicating the MTR/ITR, patch panel and panel port to which the cable is wired. Example: 1AA01 = TR 1A, Patch Panel A, Port 01

D. Faceplates and Patch Panels

1. Optical Fiber Patch Panels

a) Fiber patch panels shall be marked using adhesive labels indicating the range of circuits installed to it.

b) Each port shall be labeled with the origination and destination MTR/ITR and the individual strand ID.

2. CAT 6 Patch Panels
   a) Shall be labeled as noted on the drawings, individual ports shall come labeled from the factory with a number designation.

3. Faceplates
   a) Each faceplate shall be labeled with cable ID numbers. Each jack within a faceplate shall be labeled with the Cable ID.

4. Wireless Cable
   a) Each above ceiling wireless cable location shall be labeled on the ceiling grid with the cable ID as well as the faceplate.

5. Voice patch panels
   a) Local Cable, confirm labeling requirements with owner's representative prior to installation,

6. Pull Boxes
   a) Stencil with "COMM ONLY". Coordinate with Owner's Representative for size and color.

3.6 RECORD COPY AND AS - BUILT DRAWINGS

A. Provide record copy drawings periodically through out the project as requested by the project manager and at end of the project. Record copy drawings shall include notations reflecting the as built conditions of any additions to or variation from the drawings provided.

3.7 WARRANTY

A. Horizontal Category 6 cabling
   1. Contractor shall provide a manufacturer certified component warranty for a period of not less than 1-year.

B. Backbone Cabling
   1. Contractor shall provide a system and component warranty for a period of not less than 1-year.

END OF SECTION

SECTION 331000 - WATER UTILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Contractor for this work shall be held to have read all of the Bidding Requirements, the Proposal Forms, the General Conditions of the Contract, the Supplementary General Conditions and Division 1, and in the execution of the work, he will be bound by all of the conditions and requirements therein.

1.2 SUMMARY

A. The work specified shall include all labor, material, equipment, services and incidentals necessary to furnish and install water pipeline, fittings, specials and all appurtenances and to perform interconnections and abandonments as shown on the plans and specified therein.
B. Related Sections, specified elsewhere, include the following:
   1. D-707, Water Main (Ductile Iron Pipe)

1.3 SUBMITTALS:

A. Shop drawings and Product data on pipe and all appurtenances (i.e. joints, fittings, hydrants, etc.). Contractor shall also submit a materials list providing full information for all components of the system, including the materials of construction.
B. Manufacturer's descriptive literature, recommendations for installation and Operation and Maintenance information.
C. Manufacturer's certification that products meet specification requirements and are required for each shipment.
D. Certified copies of all test and disinfection reports.

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING:

A. Unload at the point of delivery, haul to and distribute at the site all pipe and accessories. Equipment for unloading shall be utilized so as to avoid damage to material. Material is not to be dropped, bumped, or damaged. During delivery, handling and storage, all materials shall be braced and protected from any distortion or damage in accordance with the manufacturer's requirements. Any distortion or damage shall be basis for rejection of materials.
B. The Contractor will replace, at his expense, all material found defective in manufacture or during handling.
C. Keep the interior of all pipes and appurtenances free from dirt and foreign matter at all times.
D. All pipe and appurtenances shall be stored in accordance with the manufacturer's recommendations and off the ground unless otherwise stated by the Engineer. Store to prevent distortion of pipe, both linear and round.
E. Store materials in locations that do not cause interference or safety hazards with private or public access traffic.

1.5 JOB CONDITIONS

A. Protection:
   1. At the end of each day or when pipe laying is not in progress, place watertight plugs in the ends of all pipelines and appurtenances to keep dirt and other substances from entering the pipe.

1.6 QUALITY ASSURANCE

A. Reference Standards (Latest Revisions)
   1. AWWA
   2. ASTM
   3. Other agency or local standards applicable to water distribution systems.

B. Parts Interchangeability
   1. Components (pipe and appurtenances) provided under this section shall be the standard product in regular production by manufacturers whose products have proven reliable in similar services for at least two (2) years.
   2. In so far as possible, components shall be product of the same manufacturer.

1.7 REGULATORY REQUIREMENTS

A. Sequence, coordinate and perform all work in accordance with applicable codes and regulations, including those of government and/or local agencies of authority and jurisdiction for all related activity. Any conflict arising from differences between the plans, specifications and applicable codes and regulations shall be immediately brought to the attention of the Engineer and shall be resolved prior to construction.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Pipe (Ductile Iron)
   1. Material shall conform to AWWA C151, Class 52 Ductile Iron Pipe (DIP); Push-on joint per AWWA C111; interior coating of double thickness cement lining per AWWA C104; exterior bituminous coating (standard).

B. Fittings
   1. Material shall be ductile iron mechanical joint type conforming to AWWA C110, AWWA C111 and AWWA C153; interior coating of double thickness cement lining per AWWA C104; exterior bituminous coating (standard). All fittings to be furnished with sufficient accessory quantities.

   2. Hydrant tees shall be anchoring type; Acceptable manufacturers – Mueller Company or approved equal.

C. Tapping Sleeve and Valve
   1. Conforming to AWWA C500
   2. Tapping sleeves and valves shall be designed and size in accordance with the recommendations of the manufacturer.
   3. Service clamps shall be designed for use on the type of pipe to which the connection is being made. All bolts and nuts shall be fluorocarbon coated stainless steel or high strength corrosion resistant alloy steel unless otherwise stated.
   4. The sleeve shall be fabricated in two halves, for assembly around the water main by means of bolts and gaskets to form a watertight mechanical joint. Outlet side of the tapping sleeve shall be flange or mechanical end for attachment to the tapping valve.
   5. Working pressure shall be a minimum of 250 pounds per square inch (psi).
   6. Valves for tapping sleeves shall be designed for the intended service.
   7. Acceptable manufacturers – Mueller Company or approved equal.

D. Gate Valves (Resilient Seat)
   1. Conforming to AWWA C509 and AWWA C111, including working and test pressures for applicable valve sizes
   2. Valves shall have mechanical joint ends. Suitable steel rods shall be installed between the main mechanical joint bell outlet and the valve (and/or fittings) to resist movement under pressure when the valve is closed. All bolts and nuts shall be fluorocarbon coated stainless steel or high strength corrosion resistant alloy steel unless otherwise stated.
   3. The body, bonnet, seal plate, discs and hub nuts shall be iron. Ends shall conform to applicable standards for ductile iron pipe fittings.
   4. Valve shall have non-rising stem. The non-rising valve stem, stem nuts, glands and bushings shall be bronze.
   5. Shaft “O-ring” seals shall be synthetic rubber or Buna-N.
   6. “O-ring” seals and non-rising stems shall withstand a minimum working pressure of 250 psi and a minimum test pressure of 500 psi.
   7. All internal parts shall be accessible without removing the main body from the pressure line.
   8. Operators shall be as specified in AWWA C509 for submerged, buried or in-plant service. Operators shall be equipped with a 2-inch square operating nut and shall be fully gasketed and grease packed for buried service. Operating nuts shall turn counterclockwise to close the valve. Buried operators with the operating nut greater than 8 feet below finished grade will be furnished an extension stem, centering device and operating nut. The extension stem shall come within 3 feet of the finished grade.
   9. Acceptable manufacturers – Mueller Company or approved equal.
   10. Valve shall open in a counter-clockwise direction.

E. Valve Boxes
   1. Adjustable screw type valve box; 2 or 3 piece model with minimum 1 foot adjustment.
   2. Valve box shall have a barrel not less than 5-1/4” inches in diameter with a base to fit the valve on which is to be installed.
   3. The word “WATER” shall be cast in the cover.
   4. Acceptable Manufacturers – Mueller Company or approved equal.

F. Hydrant Assemblies
   1. Conforming to AWWA C502 and AWWA C111.

2. General – Hydrants shall have manufacturer's name cast in raised letters on hydrant body.
3. All bolts required to connect buried valves shall be Type 304 Stainless Steel or fluorocarbon coated, high strength corrosion resistant alloy steel. All other bolts, nuts and studs shall conform to ASTM A 307, Grade B; or ASTM A 354 unless otherwise specified. Bolts and nuts shall have hexagon heads. Gasket material shall conform to manufacturer's recommendations. Hydrant shut-off gate valve shall be resilient seat.
4. Hydrant shall be cast iron body, break-away type barrel, "O-ring" operating stem seal and suitable for 250 psi maximum working pressure and 500 psi minimum test pressure. All operating parts, including brass valve seat, shall remove through the barrel without excavation. Operating nuts and caps shall be 1-1/2" pentagon and shall turn clockwise to close.
5. Hydrant shall be compression type, with valve opening not less than 5-¼ inches and non-rising stems. Valve shall open against pressure and shall close with pressure.
6. Hydrant shall have two 2 National Standard hose connections and one 5-inch pumper connection with National Standard threads and operating nuts.
7. Barrel length shall provide for a minimum of 6 foot bury (extensions to be provided if required by finish grade).
8. Inlet shall be 6-inch mechanical joint unless otherwise specified.
9. Weep holes shall be provided for drainage.
10. Acceptable manufacturers – Mueller Company 5-1/4" barrel or approved equal.
11. Hydrant shall open in a counter-clockwise direction.

F. Freeze Proof Yard Hydrant
1. Shall be of the self-draining sanitary type.
2. 1" standard hose connection with vacuum breaker.
3. Woodford model S4H or equal.

G. Heated water pipe RPZ and meter enclosure
1. Refer to specification 221119.

2.2 STONE BEDDING

A. NYSDOT No. 1 Stone.

2.3 LOCATOR TAPE

A. Mylar encased aluminum foil tape suitable for direct burial. Minimum width of 2 inches with lettering "CAUTION BURIED WATER LINE BELOW."

PART 3 – EXECUTION

3.1 INSPECTION

A. Pipe and Appurtenances
1. All pipe and appurtenances will be inspected by the Engineer prior to installation. Carefully inspect all pipe prior to installation.
2. Do not use damaged components. Remove defective components from site.

4. Any pipe or appurtenance found to be broken or defective after it has been installed, shall be removed and replaced at the Contractor's expense.
5. Pipe to be straight to within 3/8" per length.B. Trench:

1. Prior to work in this section, the Contractor shall inspect the installation area to determine if the work of other trades has progressed to the point where the installation may properly commence.
2. Contractor shall verify that the installation can proceed in accordance with all pertinent codes and regulations, the original design and referenced standards. The Contractor shall immediately notify the Engineer of any discrepancies. The Contractor shall not proceed with the installation in areas of discrepancy until the discrepancy has been resolved.
3. Ensure that trench bottom is to proper line and grade.

3.2 PREPARATION

A. Trench:
   1. Bed all pipe in stone as shown on the drawings.
   2. Dig bell holes sufficiently large to ensure proper mating, checking and bedding of joints.

B. Location, Grade and Cover
   1. Pipelines and appurtenances shall be located as shown on the Contract Drawings or as directed and established from the control survey in accordance with general project requirements. Alignments and grades shall be determined and maintained by methods acceptable to the Engineer. Any section of pipe or appurtenance found to be laid at the wrong grade or to have settled shall be dug up and re-laid to the satisfaction of the Engineer at the Contractor's expense.
   2. Pipeline and appurtenances shall be installed with no less than the minimum cover indicated by the Contract drawings and governing authority. No pipe or appurtenance shall be laid upon a foundation in which frost may exist or develop.

C. Pipe and Appurtenances
   1. Clean pipe and appurtenances thoroughly.
   2. As applicable, apply proper lubricant in accordance with the manufacturer's written instruction.
   3. Insert gasket and seal it if required, in accordance with the manufacturer's written directions.
   4. If field cutting of pipe is necessary, leave a smooth end in accordance with the manufacturer's written instructions.

3.3 EXECUTION

A. General
   1. Excavation, subgrade preparation, pipe bedding and backfilling shall be in accordance with the Contract drawings and Earthwork Specification 312001.
   2. Blocking will not be permitted under pipe or appurtenances, except where the pipe or appurtenance is to be laid with concrete cradle or encasement.
   3. Pipe and appurtenance shall be laid upon a foundation of select material, unless otherwise specified. The top of this layer shall be considered to be the bottom of the trench.
   4. Temporary bulkheads shall be placed in all open ends of the installation (i.e. pipe) whenever

installation activities are not actively in progress. The bulkheads shall be designed to prevent the entrance of dirt, debris or water.

5. Precautions shall be taken to prevent flotation or movement.
6. Installation shall include thrust restraints in the form of thrust blocks, tie rods, anchors, etc. of the size and type specified by the Contract drawings or as required by the pressure and stability of the supporting surface. Thrust restraints shall be installed at all changes in direction, changes in size, dead ends or other locations as shown. Thrust restraints shall be in place and concrete shall have developed the required strength prior to testing.

B. Interconnections and Abandonments
   1. No work shall begin on the interconnections until the Engineer and governing water utility authorize the work. The Contractor shall not operate existing valves. Existing valves will be operated by the governing water utility only. The Contractor is advised that watertight conditions may not exist when existing valves are closed. The Contractor shall consider this in the bid. The maximum allowable shutdown of any existing water system shall be as per the requirements of the governing water utility. The work shall be scheduled through the Engineer and governing water utility to provide a minimum of three (3) days advance notice prior to the work.
   2. Caps (or plugs) on iron pipe shall be mechanically restrained watertight caps (or plugs) compatible with the pipe being capped and suitable to resist thrusts due to operating pressures.
   3. The Contractor shall perform test pits at existing pipes, valves, etc. to assess conditions and determine requirements for construction activity and interconnections.
   4. Removal and/or abandonment of existing pipelines or appurtenances will be carried out as per the requirements of the Engineer and governing water utility.

C. Pipe Installation
   1. Except as otherwise specified, all pipe shall be installed in accordance with the requirements of the governing water utility, AWWA C600 and applicable codes and regulations.
   2. Carefully handle and lower pipe into the trench so as not to damage pipe or coatings.
   3. Lay pipe with bell end facing upstream in respect to design flow direction.
   4. Properly bed and secure each length of pipe prior to bringing next length of pipe into position.
   5. Firmly bed and backfill each pipe for the full length of the barrel, on a solid stone bed as shown on the drawings.
   6. Abut each length against the next in such a manner that there is no shoulder or unevenness of any kind along the inside of the bottom of the pipe.
   7. All joint surfaces shall be clean prior to connection. Use a method to push or pull the joints home appropriate for size of pipe. Joints shall be assembled using gaskets, lubricants, etc. as furnished by the pipe manufacturer and in accordance with the manufacturer's recommendations.
   8. Take appropriate precautions when pushing or pulling the joints home to prevent damage to the pipe or joint. Keep joints straight while pushing home.
   9. Check the position of the gasket in each joint carefully.
   10. Do not walk on the pipe until at least 12 inches of backfill is properly placed over the pipe.
   11. Install pipe with manufacturer's lettering up.

D. Fittings Installation
   1. Installation of fittings shall be in accordance with Section 3.3C Pipe Installation, Contract drawings, approved shop drawings and the manufacturer's recommendations.

E. Tapping Sleeves and Valves
   1. Installation of Tapping Sleeves and Valves shall be to the configuration shown on the Contract drawings, approved shop drawings and in accordance with the manufacturer's recommendations. All activities involving taps of existing mains are to be carried out as per 3.3B Interconnections and Abandonments and coordinated with governing authorities.

F. Gate Valves
   1. Installation of valves shall be to the configuration shown on the Contract drawings, approved shop drawings and in accordance with the manufacturer's recommendations.
   2. Valves shall be installed between the hydrant and the main line at each hydrant installation as shown on the Contract drawings.
   3. Valves shall be set on solid bearing, installed plumb and in a closed position unless otherwise specified.

G. Valve Boxes
   1. Installation of valve boxes shall be to the configuration shown on the Contract drawings, approved shop drawings, in accordance with the manufacturer's recommendations and requirements of the governing water authority.
   2. Valve boxes shall be set plumb, centered over the valve and shall be independently supported so no weight is transmitted to the valve or carrier pipe.

3.4 DISINFECTION AND TESTING

A. The Contractor shall disinfect and perform pressure/leakage tests in the new water distribution system elements in accordance with the AWWA C651 and requirements of governing agencies (i.e. governing water utility, health department, etc.). Related activity will be carried out prior to connection to existing watermains, unless otherwise specified, and witnessed by applicable representatives.
B. Contractor shall obtain permission from the water system owner or governing agency before using water from any existing system. The Contractor shall conform to the requirements of the owner/agency, pay all costs with the taking or use of water for any purpose and provide sufficient advance notice (at least 24 hours) before the use of water for any reason.
C. Upon completion of each disinfection activity, the Contractor will be required to empty and flush the system. Contractor shall adhere to the requirements of governing agencies for disposition of the system contents resulting from disinfection and flushing.
D. After disinfection and flushing, the Contractor shall collect and submit Bacteriological samples for testing by an approved laboratory as per Health Department requirements. Contractor shall repeat the disinfection procedure, at his expense, until safe results are obtained. The Contractor shall submit the test reports directly to the Health Department, Engineer and governing water utility.
E. Contractor shall demonstrate to the satisfaction of the Engineer and governing water utility that all system components operate properly, both individually and as a system, and satisfy related pressure/leakage tests. The Contractor shall provide all testing equipment and material required to perform the tests. Contractor shall, at his expense, correct any component or system deficiencies and repeat the related tests as required. The Contractor shall submit the test reports directly to the

Engineer, governing water utility and other agencies as may be required.

END OF SECTION

SECTION 331419 – VALVES AND HYDRANTS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Specified

The work specified shall include all labor, material, equipment, services and incidentals necessary to furnish and install valves, hydrants, and appurtenances as shown, specified and required.

B. Related Work Specified Elsewhere

1. Section 333123 – Force Main Piping
2. Section 333211 – Submersible Sewage Pump Station and Equipment

1.2 QUALITY ASSURANCE

A. Manufacturer's Qualifications

1. Manufacturer shall have a minimum of 5 years' experience producing valves, hydrants, and appurtenances, and shall show evidence of at least 5 installations in satisfactory operation.
2. Parts Interchangeability: It is the intent of these specifications that all materials furnished herein shall be compatible with similar materials of other manufacturer's.

B. Reference Standards

1. ANSI B16.1, Cast Iron Pipe Flanges and Flanged Fittings
2. ANSI B16.4, Cast Iron Fittings
3. ASTM A48, Standard Specification for Gray Iron Castings
4. ASTM A126, Standard Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings
5. ASTM A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
6. ASTM A354, Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs and Other Externally Threaded Fasteners
7. ASTM A436, Standard Specification for Austenitic Gray Iron Castings
8. ASTM A536, Standard Specification for Ductile Iron Castings
9. ASTM B62, Standard Specification for Composition Bronze or Ounce Metal Castings
10. AWWA C500, Standard for Metal-Seated Gate Valves for Water Supply ServiceAWWA C509, Standard for Resilient Seated Gate Valves for Water Supply Service
11. AWWA C515, Reduced-Wall, Resilient Seated Gate Valves for Water Supply Service
12. AWWA C550, Protective Interior Coatings for Valves and Hydrants
13. AWWA C800, Underground Service Line Valves and Fittings
14. American Gear Manufacturers Association (AGMA) Standards

15. NEMA, National Electrical Manufacturer's Association
16. NEC, National Electrical Code

1.3 SUBMITTALS

A. Shop Drawings: Submit for approval the following:
   1. Manufacturer's literature, illustrations, specifications, detailed drawings, data and descriptive literature on all valves, hydrants, and appurtenances.
   2. Deviations from Drawings and Specifications.
   3. Engineering data including dimensions, materials, size and weight.
   4. Fabrication, assembly, installation and wiring diagrams.

B. Operation and Maintenance Data: Submit complete manuals including:
   1. Copies of all Shop Drawings, test reports, maintenance data and schedules, description of operation, and spare parts information.

C. Shop Tests: Submit for approval the following:
   1. Hydrostatic tests for each valve when required by the valve specifications included herein.
   2. Each gate valve shall have the leakage test required by Section 5 of AWWA C509 performed with the pressure differential applied in both directions.

D. Certificates:
   1. Where specified or otherwise required by Engineer, submit test certificates.
   2. The Contractor shall submit certificates of compliance with the applicable referenced standards.

E. Delivery Tickets:
   1. Furnish delivery tickets indicating the manufacturer, type and class, identifying that the valves and/or hydrants are new and from a manufacturer that has been submitted and approved.

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. During delivery and handling, all materials shall be braced and protected from any distortion or damage; any such distortion or damage shall be basis for rejection of the materials.

B. Equipment used for unloading shall be covered with wood or rubber to avoid damage to the exterior of the valves, hydrants, and accessories. Do not drop or roll materials off trucks. All valves, hydrants, and appurtenances shall be handled with padded slings or other appropriate equipment. The use of cables, hooks or chains will not be permitted.

C. The materials shall be inspected before and after unloading. Materials that are found to be cracked, gouged, chipped, dented or otherwise damaged will not be accepted.

D. Interiors of valves, hydrants, and appurtenances shall be kept free from dirt and foreign

matter.

E. Store valves, hydrants, and appurtenances on heavy wood blocking or platforms so they are not in contact with the ground.

F. Valves, hydrants, and appurtenances shall be unloaded opposite to or as close to the place where they are to be used as is practical to avoid unnecessary handling.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General
1. All products, including interior coatings, shall be suitable for wastewater use.
2. Valves shall have manufacturer's name and working pressure cast in raised letters on valve body. Valves shall be suitable for test pressures specified in the Contract Documents.
3. Manual valve operators shall open counterclockwise unless otherwise specified. Valves shall indicate the direction of operation.
4. Valve shall be treated as a bulkhead (dead end) condition and pipe joints shall be restrained on both sides of the valve for the lengths as shown, specified, or required.
5. All valves, operators, and appurtenances shall be designed to withstand the working and hydrostatic test pressures as specified in the Contract Documents.
6. Unless otherwise specified all flanged valves shall have ends conforming to ANSI B16.1, Class 125.
7. All bolts, nuts and studs shall, unless otherwise approved, shall conform to ASTM A307, Grade B; or ASTM A354. All bolts, nuts and studs on or required to connect submerged or buried valves shall be fluorocarbon coated.
8. Bolts and nuts shall have hexagon heads and nuts.
9. Gasket material and installation shall conform to manufacturer's recommendations.
10. Identify each valve 4 inches and larger with a brass or stainless steel nameplate stamped with the approved designation. Nameplate shall be permanently fastened to valve body at the factory. Stenciled designations are acceptable for buried valves.
11. All valves, hydrants, and appurtenances must be new materials in first-class condition. Used or recycled materials will not be allowed, regardless of condition.

B. Resilient Seat Gate Valves
1. General
   a. The design working pressure and test pressure for valve sizes 2" – 12" shall be as described in AWWA C509 and materials conforming to C509. Valves sizes 14" and larger shall conform to AWWA C515. All valves shall be designed to operate vertically in a horizontal pipeline.
   b. The valve disc shall be fully encapsulated with a synthetic elastomer and shall seat against a corrosion-resistant surface.

c. Valves for buried applications shall have mechanical joint ends and be restrained by use of a mechanical joint wedge action retainer gland to resist movement.

d. All bolts and nuts, including bonnet assembly and seal plate hold- down, shall be fluorocarbon coated high strength, corrosion resistant low alloy steel.

e. Valves for exposed applications shall have flanged ends conforming to ANSI B16.1, Class 125 conforming to ANSI A21.11.

2. Gate Valve

a. The body, bonnet, seal plate, disc and hub nut shall be iron.

b. Non-rising valve stem, stem nuts, glands and bushings shall be bronze.

c. Shaft "O"-ring seals shall be synthetic rubber or Buna-N and shall be capable of being replaced under pressure.

d. All internal parts shall be accessible without removing the main body from the pressurized line.

3. Operators

a. Operator shall be suitable for above-ground/in-plant service and rated for cold climates including exposure to precipitation, humidity, snow, ice, road salt and freeze- thaw conditions.

b. Operators shall be as specified in AWWA C509 for submerged, buried, or in-plant service as specified.

c. Operators shall be manual handwheel, gear-operated handwheel, or actuator type as indicated on the plans. Handwheels shall be sized to permit operation under maximum differential pressure.

d. Operators shall be fully enclosed and weatherproof, with seals and gaskets suitable for outdoor exposure. Grease packing shall be provided where required by the manufacturer.

e. Valves shall open counterclockwise. An integral, cast or permanently affixed arrow indicating direction of opening shall be provided and clearly visible.

4. Manufacturer:

a. Kennedy Valve Company,

b. Mueller Company,

c. Or approved equal.

C. Check Valves

1. General:

a. Check valves shall absolutely prevent the return of wastewater back through the valve when the upstream pressure decreases below the downstream pressure. The valve shall be tight seating.

2. 3-Inch Diameter and Larger: Valves shall be cast iron, flanged ends suitable for 150 psi service.

a. Manufacturer:

1) GA Industries,

2) Cla-Val,

3) Or approved equal.

D. Combination Air and Vacuum Release Valves
   1. Combination air release valves shall be designed to relieve entrapped air and to break a siphon in a pipeline regardless of flow direction.
   2. All internal valve components shall be corrosion-resistant.
   3. Manufacturer
      a. Val-Matic
      b. GA Industries,
      c. Or approved equal.

2.2 PAINTING

A. Shop Painting
   1. Clean and prime coat ferrous metal surfaces.
   2. All interior wetted ferrous surfaces of valves, hydrants, and appurtenances except finished or bearing surfaces shall be shop-painted with an approved epoxy paint system and applied in accordance with the paint system manufacturer's recommendations.
   3. Coat machined, polished and non-ferrous surfaces including gears, bearing surfaces and similar unpainted surfaces with corrosion prevention compound and applied in accordance with the manufacturer's recommendations. Maintain coating during storage and until equipment begins operation.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install valves, hydrants, and appurtenances as shown on the Drawings and in accordance with the manufacturer's recommendations.

B. All valves shall be kept in the closed position until otherwise directed by the Engineer.

C. Install all valves so that handwheels, levers, or wrenches can be conveniently turned from operating area and as approved by the Engineer.

D. Install all valves plumb and level unless otherwise approved. Valves shall be installed free from distortion and strain caused by misaligned piping, equipment, or other causes.

E. Contractor shall operate each valve full open to full close in the presence of Engineer. The number of turns shall be recorded and provided to Owner with the Record Drawings.

END OF SECTION

SECTION 333123 – FORCE MAIN PIPING

PART 1 – GENERAL

1.1 SECTION INCLUDED

A. Glycol system force main piping, fittings, and accessories.

1.2 DEFINITIONS

A. Bedding, Fill placed under, beside and directly over pipe, prior to subsequent backfill operations.

1.3 REFERENCE STANDARDS

A. AASHTO HB - Standard Specifications for Highway Bridges; 2005, with Errata.
B. ASME B1.20.1 - Pipe Threads, General Purpose, Inch; 2013 (Reaffirmed 2018).
C. ASME B1.20.2M - Pipe Threads, 60 Deg, General Purpose; 2006 (Reaffirmed 2011).
D. ASTM D3350 - Standard Specification for Polyethylene Plastics Pipe and Fittings Materials; 2021.
E. ASTM F2620 - Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings; 2024.

1.4 SUBMITTALS

A. Product Data: Provide data indicating pipe, pipe accessories.
B. Product Data: Manufacturer's data sheets for each item of equipment and material provided, showing compliance with requirements; include materials, pressure ratings, seats and seals, clearances for operation and maintenance, and other characteristics.
C. Manufacturer’s Certification: Certify that products meet or exceed specified requirements.
D. Manufacturer’s Installation Instructions: Indicate special procedures required to install Products specified.
E. Hydrostatic Test Report: Document results of field quality control testing. Submit copies of all reports of field tests.

1.5 DELIVERY, STORAGE AND HANDLING

A. Do not damage pipe, fittings and accessories, and pipe coatings during delivery, handling, and storage.
B. Do not place materials on private property without written permission of property owner.

1.6 RELATED SECTIONS

A. Related Sections, specified elsewhere, include the following:
    a. D-701, Pipe for Storm Drains and Culverts
    b. D-751, Manholes, Catch Basins, Inlets and Inspection Holes
    c. 331419, Valves and Hydrants
    d. 333211, Submersible Sewage Pump Station and Equipment

PART 2 – PRODUCTS

2.1 FORCE MAIN PIPE MATERIALS

A. Forcemain shall be DR 11 ASTM D2241 PE Pipe and fittings.
    a. Acceptable Manufacturers: National Pipe, Performance Pipe, or equal
    b. Utilize DR 11-fused polyethylene pipe for sanitary sewer pressure pipe meeting ASTM D3035, Butt Fused Joints meeting ASTM D3261, Fittings ASTM D3261 and D2513, ASTM F714 Polyethylene Pipe.
    c. Restrained Mechanical Joint (MJ) Adapters shall be used to connect polyethylene pipe to mechanical joint fittings and appurtenances meeting AWWA C111/ANSI A21.11.
    d. Tracer wire for direct bury installation shall be #12 AWG Copper Clad Steel, High Strength with minimum 450 lb. break load, with minimum 30 mil HDPE insulation thickness.
    e. Tracer wire for HDD installation shall be #12 AWG Copper Clad Steel, Extra High Strength with minimum 1,150 lb. break load, with minimum 30 mil HDPE insulation thickness.

B. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations required.

2.2 DUCTILE IRON SANITARY SEWER PIPE

A. The section of forcemain from the pump station through the valve vault and meter pit shall be Class 52 ductile iron pipe. Pipe interior shall have applied Protecto 401 (or approved equal) coating.
B. Buried ductile iron pipe shall have an exterior metallic zinc coating meeting ISO 8179 and be wrapped with one layer of 8 mil. polywrap.

2.3 VALVES AND AIR RELEASE VALVES

A. Refer to specification 331419.

2.4 VALVE MANHOLE

A. Precast Concrete, refer to specification D-751.

PART 3 – EXECUTION

3.1 EXCAVATION, TRENCHING AND BACKFILLING

A. Hand trim excavation for accurate placement of pipe to elevations indicated.
B. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling. Correct over-excavation.

3.2 PREPARATION

A. Cut pipe ends square with mechanical cutters. Use wheel cutters where practicable. Remove burrs, sharp and rough edges and grind smooth. Remove loose material from pipe before laying.

3.3 INSTALLATION – PIPE

A. Maintain horizontal separation of force main from water main piping of at least 10 feet (3.05 m) in all horizontal directions.
B. Maintain vertical separation of force main from water main piping of at least 18 inches (1.5 m) in all vertical directions.
C. Verify trench cut is ready to receive work and excavations, dimensions, and elevations are as indicated on layout drawings.
D. Before lowering and while suspended, inspect pipe and each fitting for defects. Installation of defective material is not permitted.
E. Where pipe, fittings or joint materials have been soiled by earth in handling, thoroughly clean soiled surfaces by wire brushing and wiping until all traces of earth are removed before joining pipe.
F. Maintain interior of all pipes thoroughly clean. After each line of pipe has been laid, carefully inspect, identify and remove dirt, trash, rags and other foreign matter from interior. Protect completed work.
G. Install force mains with a minimum grade of one-half (0.50) percent downhill slope away from sewage air release valve to force entrapped air to accumulate at air release valve, unless otherwise shown on layout drawings.
H. Install pipe, fittings, and accessories at the locations indicated on layout drawings and in accordance with manufacturer's instructions. Seal watertight.
    a. Polyethylene (HDPE) Plastic Pipe: Comply with ASTM D2774.
I. Route piping in straight, true line.
J. Backfill trenches immediately after the pipe has been installed. Do not displace or damage pipe when compacting.

3.4 JOINTING

A. Polyethylene (HDPE) Pipe:
    a. Heat Fusion Joints: Comply with manufacturer's instructions concerning equipment, temperature, melt time, heat coat, and joining time.

3.5 INSTALLATION – VALVES

A. Install in accordance with manufacturer's instructions.
B. Clean valves of foreign matter prior to installation and inspect for damage. Fully open and close valves to verify parts are properly operating.
C. Install valves in valve manholes as indicated on layout drawings.

3.6 INSTALLATION – VALVE VAULTS

A. Establish elevations and pipe inverts for inlets and outlets as indicated on layout drawings.
B. Form bottom of excavation clean and smooth to correct elevation.
C. Mount lid and frame level in grout, secured to top cone section to elevation as indicated on layout drawings.

3.7 FIELD QUALITY CONTROL

A. Perform field inspection and testing.
    a. If tests indicate Work does not meet specified requirements, remove defective Work, replace and retest at no cost to Owner.

b. Schedule tests to allow the Owner to witness the event.

B. Hydrostatic Tests:
   a. Pipeline testing includes both a pressure test and a leakage test.
      i. Submit proposed method for disposal of waste water from hydrostatic tests to Owner for approval.
      ii. Testing is the responsibility of the Contractor.
      iii. Notify Owner at least seven days in advance of test date.
      iv. Deliver the final test report to the Owner within 30 days of the test.

C. Pressure Tests:
   a. After the pipe has been installed, joints completed, thrust restraints have been in place for at least five days, and the trench has been partially backfilled, leaving the joints exposed for examination, fill pipe with water to expel all air.
   b. Subject pipeline to a test pressure of 100 psi (690 kPa) or 150 percent of the working pressure, whichever is greater, for a period of at least one hour.
   c. Examine exposed pipe, joints, fitting, and valves for leaks.
   d. Stop visible leaks or replace the defective pipe, fitting, joints, or valve.

D. Leakage Tests:
   a. Conduct leakage test subsequent to, or concurrently with, the pressure test.
   b. Place the volume of water permitted as leakage for the line in a sealed container attached to the supply side of the test pump.
   c. No other source of supply is permitted to be applied to the pump or line under test.
   d. Pump water into line by test pump, as required, to maintain the specified test pressure as described for pressure test for a three hour period.
   e. Exhaustion of the supply or the inability to maintain the required pressure is considered test failure.
   f. Anticipate the issue HDPE pipe can experience diametric expansion and pressure elongation during initial testing. Under no circumstance the test on the system shall exceed 8 hours under a pressure of 1.5 times the system design pressure. If the test is not complete within the time frame, the test section shall be permitted to "relax" for 8 hours prior to the next test sequence.
   g. Consult manufacturer prior to testing for special testing considerations.
   h. Allowable leakage shall be determined by following I-P formula; L = NDP/K.
      Where letters in formula are equivalent to the following:
      L = Allowable leakage in gallons per hour.
      N = Number of joints in length of pipeline tested.
      D = Nominal diameter of the pipe in inches.
      P = Square root of the test pressure in psig.
      K = 7400 for pipe materials.
      At conclusion of test, measure amount of water remaining in container and record results in test report.

E. Retesting:
   a. If any deficiencies are revealed during any test, identify and correct deficiencies and reconduct tests and correct new deficiencies revealed until the results of the tests are within specified allowances, without additional cost to the Owner.

3.8 PROTECTION

A. Water is not permitted to run or stand in trench while pipe laying is in progress, before the joints are completely set, or before trench has been backfilled.

B. Protect pipe and bedding cover from damage or displacement until backfilling operation is in progress.

END OF SECTION

SECTION 333211- SUBMERSIBLE SEWAGE PUMP STATION AND EQUIPMENT

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work under this section includes, but is not limited to, installing two (2) submersible non-clog sewage pumps at the two pump locations, discharge connection elbows, stainless steel guiderails and brackets, stainless steel lift chains and pump relays. The Contractor shall be responsible for furnishing and installing all equipment, controls and start up requirements of this specification and others pertaining to the complete operation of the pump station. Access hatches with safety grates, level controls, wet wells, piping and valves, valve vaults, control boards, site work and all appurtenances as indicated on the Contract Drawings, as herein specified, or as needed for the complete operating system.

B. Pumps shall be products of a single manufacturer to provide for interchangeability and standardization.

1.2 QUALITY ASSURANCE

A. The equipment covered in this section shall be a product of reputable, qualified, and successful manufacturers who are of proven ability and have experience in the production of such equipment.

B. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
1. American Society of Testing and Materials (ASTM)
2. National Electric Code (NEC)
3. AGMA Standards
4. Standards of National Electrical Manufacturing Association (NEMA)
5. American National Standards Institute (ANSI)
6. Standards of the Hydraulic Institute

C. Shop Tests: Pumps shall be operated from zero to maximum capacity as shown on the approved pump curve. Results of the test shall be shown in a plot of pump curves showing head, flow, horsepower, efficiency and current. A minimum of seven (7) equally spaced capacity points, including shutoff, design point, and minimum head and speed for which the pump is designed to operate, shall be used. Certified testing shall be provided.

1.3 SUBMITTALS

A. Shop Drawings: Submit the following for approval:

1. Manufacturer's literature, illustrations, specifications and engineering data including dimensions, materials, sizes, weights, performance data, pump efficiency curves showing overall pump efficiency, flow rates, head, brake horsepower, motor horsepower, speed and required net positive suction head.

2. Fabrication, assembly, installation, and writing diagrams.

3. Setting drawings, templates and instructions for the installation of anchor bolts.

4. Heavy duty aluminum doors for pump station shall be supplied by the general contractor. Hinges shall be stainless steel.

5. Control diagrams.

B. Operation and Maintenance Manuals: Submit complete operation and maintenance manuals including copies of all approved Shop Drawings.

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the site to prevent interruption of the work. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete, in ample time to avoid delays.

B. The Contractor upon delivery to the site shall inspect all materials. The Contractor shall notify the Engineer of any loss or damage to equipment or components. Replace loss or repair damage to new condition at the Contractor's expense.

C. Store materials to allow easy access for inspection and identification.

PART 2 - PRODUCTS

2.1 GENERAL

A. Material Criteria: Conform to the following unless otherwise specified.
1. Structural Steel: ASTM A 36
2. Welding: AWS D1.1, Structural Welding Code
3. Anchor Bolts and Appurtenances: Stainless Steel, Type 304
4. Steel: ASTM A36
5. Iron Castings: ASTM A48
6. Pump and Controls

2.2 MATERIALS

A. Manufacturer: To ensure equipment compatibility of all items specified herein, unless otherwise noted, are to be provided by one (1) manufacturer. If contractor proposes an equal pump it shall be understood that the proposed pump meets or exceeds the specified performance and construction. The approved manufacturers shall be:
1. Sulzer ABS
2. Flygt
3. Or approved equal

B. Design Criteria: Pumps supplied shall meet the following design criteria

No. of Pumps	2
Static Head	10.5 ft
Type	Submersible
Capacity at Rated Head	1197 gpm
Rated Head	119 ft
Speed at Rated Head	1783 rpm
Efficiency at Rated Head	65.5%
Motor Size	57.7 hp
Voltage	460V
Motor Frequency	60 Hz

No. of Pumps	2
Static Head	10.5 ft
Type	Submersible
Capacity at Rated Head	1203 gpm
Rated Head	89.4 ft
Speed at Rated Head	1187 rpm
Efficiency at Rated Head	73.3%
Motor Size	46.9 hp
Voltage	460V
Motor Frequency	60 Hz

C. General:

1. Corresponding parts of multiple units shall be interchangeable.

2. Design of the equipment shall permit continuous operation without excessive wear, and shall permit development of maximum operating stresses without damage to, or failure of, the equipment.

D. Pumps:

1. Pumps shall be vertical submersible non-clog type centrifugal pumps.

2. The volutes shall be single piece gray cast iron, ASTM A48, CL35B with smooth passages large enough to pass 3-inch solids that may enter the impeller. Minimum discharge size shall be as specified and shown on the Drawings.

3. Impellers shall be single stage, end suction of gray cast iron ASTM A48, CL35B, dynamically balanced, double shrouded non-clogging design. The impeller shall be capable of handling solids, sludge and other matter found in wastewater. Impellers shall be of the fully vaned design. Impellers shall be attached to the shaft with a 416 SS key and locked with 316 SS bolt. Impeller installation with compression type washers and tapered shaft designs shall not be considered equal to positively driven keyed shafts and shall not be acceptable.

4. Pump and motor shafts shall be same unit; couplings shall not be acceptable. The shaft shall be type AISI type 416 stainless steel. Stainless steel sleeves will not be considered equal to stainless steel shafts.

5. A wear ring system shall be used to provide efficient sealing between the volute and impeller. Each pump shall be equipped with a stainless steel ring insert that is drive fitted to the volute inlet and onto the impeller. Softer materials such as brass and rubber wear rings will not be acceptable.

6. The pump shaft shall rotate on two bearings. Motor bearings shall be permanently grease lubricated. The upper bearing shall be single deep groove ball bearing. On pumps 15 Hp and less the lower bearing shall be a two row angular bearing to compensate for axial thrust. Single row lower bearings will not be acceptable. A minimum bearing life of 50,000 hours based on continuous operation of 65% BEP is required. Pumps 20 Hp and above shall be provided with tapered roller lower bearings with a minimum life of 100,000 hours. Bearing life calculations shall be based on continuous operation of 65% BEP and calculations shall be supplied with submittal data.

7. Each pump shall be provided with double mechanical seals. Each seal shall operate independently of each other. The seals shall be readily available from a seal manufacturer and shall not require sole source supply from the pump manufacturer. The seals shall rotate in a lubricant reservoir. The lower seal shall be silicon-carbide and upper seal shall be carbon/ceramic. Tungsten carbine faces shall not be considered equal to silicon carbine faces. Seal faces shall require no adjustment or depend on direct of rotation. Cartridge type seals and seals containing a common spring between the upper and lower faces shall not be considered equal to the dual seal design.

8. Pumps shall automatically and firmly connect to the discharge connections. There shall be no need for personnel to enter the wet well for pump removal. Sealing of pump to discharge connection shall be by metal-to-metal contact. Sealing by gasket, o-rings or other secondary means will not be acceptable. No portion of the pump shall bear directly on sump floor.

9. Pumps shall be guided by no less than two guide bars extending from the top of the wet well to the discharge connection. Guide bars shall not bear the pump weight after lowering of pump onto the discharge connection. A bolted ductile iron sliding bracket shall be utilized between the pump volute and the discharge base. The slide bracket shall be designed to be replaceable, pumps without replaceable slide brackets will not be considered equal.

10. All exposed nuts or bolts shall be 316 stainless steel. Sealing design shall incorporate metal-to-metal contact between machined surfaces. Critical mating surfaces where watertight sealing is required shall be fitted with Buna-N or Viton O-rings. Gaskets shall not be considered equal to o-rings. Specific torque requirements shall not be required.

11. Each pump shall be fitted with an oil chamber that acts as a barrier between the pumped media and the motor. The chamber shall be accessible from the exterior and filled with environmentally safe oil. A moisture probe shall be installed in the oil chamber to detect moisture. A relay shall be provided in the control panel to detect moisture in conjunction with the probe to provide an alarm and shutdown the pump. Moisture detectors, which are located in the motor housing and do provide measurement of the moisture in the oil chamber, shall not be acceptable.

E. Motors:

1. Motors shall be induction type with squirrel cage rotor, air filled, watertight chamber NEMA B type. Oil filled motors will not be acceptable. Motors shall be premium efficient and meet published EPACT ratings for standard motors to improve efficiency; motors that do not meet this requirement shall not be acceptable. Motors shall be compatible with controls under spec item 2.3.. This shall apply regardless of the specific control system of section 2.3 for added winding life. Motors that do not utilize inverter spike resistant windings or require added rating margin to provide for protection shall not be considered equal.

2. Motor insulation shall be Class H design to improve protection from hot spots and voltage imbalances and spikes and heat-shrink fitted into the stator housing. Motors utilizing either Class B or F insulation systems shall not be considered equal. The use of bolts, pins or other fastening devices shall not acceptable.

3. Motors shall be rated for continuous operation in pumped media, either submerged or unsubmerged, of 150 degrees F and capable of up to 15 evenly spaced starts per hour. Motors requiring submergence for continuous operation shall not be acceptable.

4. Motors 57 HP and less shall be cooled by the surrounding environment. The internal cooling system shall utilize a cast iron cooling jacket encircling the stator housing. The internal cooling system shall be independent of the installation and shall not utilize the pumped media though the cooling system. Pumps utilizing pumped media for cooling shall not be acceptable.

5. Thermal switches shall be embedded in each phase of the windings and set to open at 275 degrees F and connected to the control system to stop the pump as a supplement to external motor overload protection.

6. The cable entry shall be sealed by a stacked elastomer system providing cable strain relief. System shall not require replacement during changing of the cable. Epoxies, silicones or other secondary sealing systems shall be acceptable.

7. Motors shall be of sufficient size so that there will be no overload on the motor above rate nameplate horsepower under any condition of operation from shut-off to zero head.

8. Motor cable shall be sized according to NEC standards and shall be of sufficient length to reach terminal point without need of splices. Contractor shall be responsible for all field verification of required cable length. Cable shall be capable of continuous submergence of 65 feet without loss of watertight integrity. Multi-conductor cable assembly for power and signaling from pump to controller shall be encased in RGS conduit sized to NEC standards.

9. Motors shall be listed by Factory Mutual as rated for explosion-proof service in Class 1, Division 1, Group C and D hazardous locations and have a T code rating of T4. This requires that a maximum external motor temperature of the motor of 135 degrees C or less be achieved. Motors with a T code that allow for higher external temperatures shall not be considered equal.

10. The submersible pump and motor assembly shall be covered by a five (5) year pro rated warranty. Shorter-term warranty shall not be acceptable.

2.3 CONTROLS

A. General: The control system shall be designed to operate the required number of pumps specified on the contract drawings (or herein) at the power characteristics shown. A wet well indicator shall be provided and cover mounted on the control panel. Further requirements can be found in Division 40 for additional information.

i. The control function shall provide for the operation of the pumps under normal conditions and shall alternate the pumps on each pump down cycle to equalize the run times. In the event the incoming flow exceeds the pumping capacity of the lead pump, subsequent pumps shall automatically start to handle the increased flow. As the flow decreases, the pumps shall cut off at the elevations shown on the plans.

ii. The control shall function as described below. The equipment listed below is a guide and does not relieve the supplier from supplying a system that will function as required.

B. Enclosure: The enclosure shall be a NEMA 4x rated enclosure. The door gasket shall be rubber composition with a retainer to assure a positive weatherproof seal. The door shall open a minimum of 180 degrees.

C. Inner Dead Front Door: A steel, enamel coated dead front shall be mounted on a continuous aircraft type hinge, contain cutouts for mounted equipment, and provide protection of personnel from live internal wiring. Cutouts for breaker handles shall be provided to allow operation of breakers without entering the compartment. All control switches, indicator pilot lights, elapsed time meters, duplex receptacle and other operational devices shall be mounted on the external surface of the dead front. The dead front shall open a minimum of 150 degrees to allow access to equipment for maintenance. A 3/4" break shall be formed around the perimeter of the dead front to provide rigidity.

D. Back Plate: The back plate shall be manufactured of 12-gauge sheet steel and be finished with a primer coat and two (2) coats of baked on white enamel. All hardware mounted to the subpanel shall be accomplished with machine thread tapped holes. Sheet metal screws are not acceptable. All devices shall be permanently identified.

E. Power Distribution: The panel power distribution shall include all necessary components and be wired with stranded copper conductors rated at a minimum of 90 degrees C. All conductor terminations shall be as recommended by the device manufacturer.

F. Circuit Breakers: All circuit breakers shall be heavy-duty thermal magnetic or motor circuit protectors similar and equal to Square D type FAL. Each motor breaker shall be adequately sized to meet the pump motor operating characteristics. The control circuit and the duplex receptacle shall individually be controlled by heavy-duty breakers.

i. Circuit breakers shall be indicating type, providing "ON-OFF-TRIP" positions of the operating handle. When the breaker is tripped automatically, the handle shall assume a middle position indicating 'TRIP".

ii. Thermal magnetic breakers shall be quick-make and quick-break on both manual and automatic operation and have inverse time characteristics secured through the use of bimetallic tripping elements supplemented by a magnetic trip.

iii. Breakers shall be designed so that an overload on one pole automatically trips and opens all legs. Field installed handle ties shall not be acceptable. Breakers shall be lockable in the off position.

G. Lightning-Transient Protection: A lightning-transient protector with telltale warning lights on each phase to indicate loss of protection on the individual phases shall be provided. The device shall be solid state with a response time of less than 5 nanoseconds withstanding surge capacity of 6500 amperes. Unit shall be instant recovery, long life and have no holdover currents.

H. Seal Leakage and Thermal Measurement: A solid-state relay that will differentiate between a seal leak and an over temperature condition occurring in the pump shall be supplied. In the event of a seal leak condition the pump shall remain in operation and an alarm activated. In the event of a thermal over temperature the pump shall shutdown and an alarm activated. The alarm shall require manual resetting to clear.

I. Pump GFR Protection: Motor GFR protection shall be provided in the control panel. System shall measure for faults to ground by current measurement on the power leads during pump operation and shutdown the motor and provide an alarm during abnormal conditions. Use of pump ground cable measurement type of devices shall not be considered equal to the motor GFR protection system

J. The control system shall provide for both automatic and manual control and alternation of the pumps to maintain a pumped down condition of the wet well. Float switches shall be SPDT non mercury type. Floats shall be provided with intrinsically safe wiring.

i. The controller shall sense the "OFF", and "ALARM" levels. As the level in the wet well rises the lead pump, as determined by the controller, shall start at the minimum speed as determined during startup, and pump the station to the "OFF" position. In the event the incoming flow exceeds the capacity of the lead pump, the lag pump shall start at the minimum speed and both pumps shall run to the off level. VFDs will increase the speed of the lag pump as necessary based on the incoming flow. In the event both the lead and lag pumps are operating at the same time, both pumps shall operate at the same speed. The alternator shall switch when the off level is reached. If the level continues to rise, alarm functions shall be activated. The level set points shall be easily adjustable at the controller by the operator.

K. Equipment List: The following equipment list is provided to supply a listing of parts that should be included in the control system. It does not relieve the supplier from providing a system that will meet the intended purpose and operation of the system.

i. Motor Breakers
ii. Main Circuit Breaker
iii. Control Circuit Breaker
iv. Motor Starters
v. Surge Protection
vi. Moisture Relay
vii. Relays
viii. Fuses

Elapsed Time Meters
Control transformer
Alarm Light
Flasher
Terminal Strips
Panel Heater
Run Lights
Pump Controller

ix. HOA NEMA 4 Switches Dry Alarm Contacts

L. HOA Switches: A three-position HOA switch shall be provided for each pump. The switch shall be NEMA 4X rated with 10 amp contacts. A position indicating legend plate shall be provided. The HOA switches shall be mounted on the inner dead front door.

M. Run Indicators: A red run pilot indicator shall be mounted on the dead front door.

N. Elapsed Time Meter: An elapsed time meter shall be mounted on the dead front door. The meter shall operate on 120 VAC, indicate in hours (6 digits) and tenths, and be non-resettable.

O. Drawings: A final as built drawing encapsulated in Mylar shall be attached to the inside of the front door. A list of all legends shall be included.

P. Panel Markings: All component parts in the control panel shall be permanently marked and identified as they are indicated on the drawing. Marking shall be on the back plate adjacent to the component. All control conductors shall be identified with wire markers as close as practical to each end of conductors.

Q. Testing: All panels shall be tested to the power requirements as shown on the plans to assure proper operation of all the components. Each control function shall be activated to check for proper operation and indication.

R. Guarantee: All equipment shall be guaranteed for a period of five (5) years from date of shipment. The guarantee is effective against all defects in workmanship and/or defective components. The warranty is limited to replacement or repair of the defective equipment.

S. Manufacturer: The manufacturer shall be a UL listed shop for industrial control systems and shall provide evidence of such on request from the engineer or using authority.

T. The pump manufacturer shall provide certification of a factory authorized service facility within 150 miles of the project.

U. Manufacturer to perform factory tests on the pumps per standards of the Hydraulic Institute. Manufacturer shall provide six certified copies of all tests, pump curves and warranties.

2.4 PAINTING

A. Surface Preparation and Shop Painting:

1. The manufacturer shall apply a coating of alkyd primer with an acrylic dispersion zinc phosphate primer with polyester resin paint finish on the exterior of the pump.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation shall be in accordance with the Drawings, Shop Drawings and manufacturer's instructions and recommendations.

3.2 START-UP AND TESTING

A. Preliminary Field Tests. Pumps shall be given a preliminary field test by Contractor after installation for proper operation, efficiency, and capacity. Contractor's test operation shall continue for not less than 8 hours without interruption. All equipment shall be tested continuously under actual or simulated operating conditions. All parts shall operate satisfactorily in all respects, under continuous full load and in accordance with the specified requirements, for the full duration of the 8 hour test period. If any part of the system shows evidence of unsatisfactory or improper operation during the 8 hour test period, correction or repairs shall be made and the full 8 hour test operation, as specified, shall be completed after all parts operate satisfactorily.

B. Tests of all process and pumping equipment, drive motors, including auxiliaries shall be made in accordance with the appropriate and approved test codes such as the American Society of Mechanical Engineers, Hydraulic Institute Standards, and IEEE.

C. Field System Operation Test. After all equipment is installed and the entire system is ready to operate, Contractor shall conduct a field system operation test. The test period shall be at least 7 days, and each system shall operate under actual or simulated operating conditions before a certificate of Substantial Completion of the Work is issued. All defects of material, workmanship, or equipment which appear during this test period shall be corrected by Contractor. After such corrections are made, the 7 day test shall be repeated before a certificate of Substantial Completion of Work is issued, unless waived by Owner’s Representative.

D. A manufacturer’s representative shall check and approve the installation before operation. He shall test operate the system in the presence of the Engineer and verify that the pumps conform to requirements and instruct Owner personnel on care and maintenance of the equipment. He shall revisit the job site as often as necessary until all trouble is corrected and the installation is entirely satisfactory.

E. Operation and Maintenance Manuals in accordance with Section 440003 shall be turned over to the owner and operator two weeks prior to training on operation of pump station. Training shall be provided as specified in Section 440002.

F. At time of pump start up and testing, representatives of the pump manufacturer shall be present to troubleshoot any issues that may arise during the start-up process. System will be verified to operate properly by manufacturer.

G. Upon completion of startup and testing, the Contractor shall provide the following documentation to the Owner and Engineer.

1. Startup checklist supplied by each manufacturer’s representative.
2. Troubleshooting log complete with resolution to all issues encountered during startup.
3. As-built control schematics by System Integrator.

H. The pump and controls supplier shall provide a training session for Owner staff and maintenance personnel in accordance with Section 440002.

END OF SECTION

SECTION 405000 - INSTRUMENTATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. This section includes the general work description and requirements for instrumentation provided by this Contract.

1.2 GENERAL REQUIREMENTS

A. It is a requirement of this specification that all Division 40 specifications be provided by a single supplier. This supplier shall have total responsibility for the entire system performance and compatibility of this Section, as well as all other Division 40 specifications.

1.3 RELATED SECTIONS

The specifications sections listed below are an integral part of this equipment specification and the Contractor shall be responsible for providing these sections to the equipment suppliers:

A. General Provisions.

B. Additional Technical Specifications.

C. All- Division 40 specifications.

1.4 REFERENCES

A. NEMA ICS I - General Standards for Industrial Control and Systems.

B. NEMA ICS 3 - Industrial Systems.

C. NEMA ICS 6 - Enclosures for Industrial Controls and Systems.

D. NFPA 70 - National Electrical Code (NEC).

E. NFPA 79 - NEC (Labeling)

F. ISA - Standards 5.1 and 5.4.

G. IEC 1131-3 - Programming Standards

1.5 SHOP DRAWINGS

A. All Division 40 specifications shall be submitted in one shop drawing. Requirements of individual specification sections shall be contained within a single section in the shop drawing submittal. Indicate individual specification sections with a bookmark. Submit material in the format and order as described herein.

B. Shop Drawing Submittal Format

1. Shop drawings shall be in PDF format.

2. Provide title page with submittal. Title page shall include job name, job number, Contractor(s) job number(s), date, "Division 40 Shop Drawing", Contractor and supplier(s) names, addresses, contact persons, and contact numbers.

3. Contents shall be organized accordingly.

   a. Table of Contents - List of each section. Provide bookmarks labeled with the pertinent heading for each section listed in the Table of Contents.

   b. For each Division 40 specification section provide the following within the respective sections:

      1) Performance Affidavit - In format set forth in the General Provisions and General Specifications.
      2) Date Dependency Affidavit - Affidavit shall certify that the equipment furnished in that specific section is fully 2000 compliant and will not pose any operational or internal time clock malfunction prior to the year 2100. Affidavit shall be signed by an officer of the equipment manufacturer and be notarized.
      3) Table of Conformance.
      4) Training itinerary.
      5) Bill of Materials (BOM) for installed equipment, BOM for spare parts, and BOM for extra materials. Each BOM shall be grouped and identified separately.
      6) Equipment information satisfying specifications. Provide bookmarks for each piece of equipment. Label each bookmark with the equipment manufacturer.

   c. AutoCAD drawings — Include title block, border, page numbers, and supplier job number. CD containing all Division 40 AutoCAD 2018, or higher, *.dwg files. Sheet/drawing titles shall utilize three lines in the title block and are subject to approval, and instructed change, by the Engineer.

4. AutoCAD drawings shall be 11-inch by 17-inch.

5. Shop drawings not containing the appropriate performance affidavit(s), date dependency affidavit(s), or format will be returned without further review.

C. Shop Drawing Submittal Contents - The following requirements pertain to all of Division 40 specifications and are intended to complement the requirements of the General Provisions. Refer to individual Division 40 specifications for additional requirements.

1. Performance affidavits for all equipment.

2. Date Dependency affidavits for all equipment.

3. Include a complete Table of Conformance to each paragraph, or part, of Part II in the respective specification. Use a Microsoft Word table format with four columns labeled as "Specification Section", "Equipment Manufacturer", "Equipment Model", "Compliant (Y/N). If No, specify". As a minimum, identify equipment compliance in the "Compliant (Y/N). If No, specify" column for each article (i.e. 2.02), letter heading (i.e. A, B, C), and each number heading (i.e. l, 2, 3). For exceptions or deviations, include a narrative description as to how the deviation or exception can benefit the system over that which is specified.

4. Training Itinerary — Detailed itinerary for the training to be provided in table format. Itemize the day of training ("Day 1", "Day 2", or "Hour 1 ", "Hour 2", etc.) and the lessons to be taught during that period. Further discuss the equipment to be used during training and the proposed location of training for that day. Account for all days of specified training. Provide one training itinerary sheet for each training period. At the top of each sheet provide a header description of the training session and duration of training to be provided.

5. Detailed Bill of Materials in table format identifying component name, manufacturer, model number, and quantity supplied. Typical Bills of Materials are not acceptable.

6. Descriptive lists of spare parts and extra materials provided in the same tabular format as the Bill of Materials. Lists shall be exclusive to the spare parts and extra materials requested by the specification section, hence separate from the Bill of Materials for installed equipment. Lists shall be intuitive and specifically created for this project.

7. For individual equipment, submit information satisfying every item discussed in Part 2 of that specification section. Additionally, submit on all supporting accessories including, but not limited to, terminal blocks, surge and lightning suppression, UPS, fuses, and cabling.

8. AutoCAD 2018 (or newer AutoCAD version) drawings - Provide loop and block diagrams. Symbols used and nomenclature shall be in accordance to ISA Standard 5.4. Diagrams shall be specific to the equipment submitted with the options and features specified or otherwise provided. The inclusion of options not specified or provided is unacceptable. Terminal points depicted shall be the terminal points provided with identical terminal point designations as the supplied equipment. Illustrate all available terminals that are not utilized.

9. Proposed nameplate wording. Scaled illustrations for each nameplate provided.

10. Manufacturer's literature and Web site printouts are independent of the above requests for information and, hence do not satisfy the above shop drawing requirements. All catalog cuts, Web site printouts, manufacturer's specifications, and drawings shall be clearly marked to allow identification of the specific products used. Cross-out all options and functions not supplied with the equipment.

11. Electrical power requirements, connection requirements, interconnecting cabling, and environmental limitations/restrictions.

12. Dimensions and weights of the equipment with the specified options.

1.6 OPERATION AND MAINTENANCE DATA

A. The following requirements pertain to all of Division 40 specifications and are intended to complement the requirements of the General Provisions and General Specifications as well as individual Division 40 specifications.

B. Submit under provisions of the General Provisions and General Specifications.

C. Provide complete sets of Operation and Maintenance (O&M) Manuals in PDF format. In addition to "As-Built" system drawings, the manuals shall include internal wiring diagrams and operating and maintenance literature for all components provided under Division 40.

D. Utilize a Table of Contents listing major headings and sub-major headings. Provide bookmarks labeled with the pertinent heading for each item listed in the Table of Contents. Otherwise, utilize the same format as specified for shop drawing submittals.

E. Contractor shall create the following documents specifically for this project and shall submit them in the Operation and Maintenance manual.

1. Operation Description - In Microsoft Word discuss the operational procedure of the equipment as supplied per the specification section. Examples of operational procedures may include "normal operation" and "automated operation". Automated operation may be broken down for some equipment/systems to include "flow paced control", "storage tank level based control", "timed control", "tank level control", etc. For systems that are supplied, identify where flows are coming from, pumped to, valves that may operate, and adjoining systems.

2. Troubleshooting — In table format utilize columns entitled "Problem", "Possible Causes", and "Corrective Action". Under the "Problem" column, identify possible errors that may occur with the equipment including, but not limited to, alarm LEDs, panel alarm lights, digital display error messages, and all other visually or audibly operational problems. Under the "Possible Causes" column, identify the manufacturer suggested causes that may be the root of each "Problem". Under the "Corrective Action" column, provide direction to verify and rectify/repair the "Problem". Problems, possible causes, and corrective actions shall be in complete sentences and shall not reference manufacturer literature for their diagnosis or corrective action.

3. Preventative Maintenance - Provide "Daily", "Weekly", "Monthly", and "Annually" headers in bulleted or numbered format. Under each header, indicate visual inspections, procedural inspections, calibration routines, and all other relevant preventative maintenance information.

F. Submitted literature shall be in sufficient detail to facilitate the operation, removal, installation, programming and configuration, adjustment, calibration, testing, and maintenance of each component and/or instrument. Indicate application conditions and limitations of use stipulated by the product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of product.

G. In a separate document, include the configuration settings for each instrument provided in Division 40. Provide a Table of Contents with bookmarks for each instrument. Indicate the value of all configuration parameters and set points, including those that are not utilized in the equipment field configuration.

H. Contractor shall review all submitted literature and cross out all options, functions, warranties, etc. not part of the supplied equipment.

1.7 PROJECT RECORD DOCUMENTS

A. The following requirements pertain to all of Division 40 specifications and are intended to complement the requirements of the General Provisions and General Specifications as well as individual Division 40 specifications..

B. Submit under provisions of the General Provisions and General Specifications..

C. Record actual locations of controller cabinets and input and output devices connected to system. Include interconnection wiring and cabling information. Include terminal block layouts in controller cabinets.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of the General Provisions and General Specifications.

B. Accept products on site in factory containers unless system is completely integrated into a pre-manufactured panel that has been factory tested. Inspect for damage.

C. Store products in clean, dry area; maintain temperature to NEMA ICS I requirements.

1.9 COORDINATION

A. Refer to Contract Drawings for designations and verify with Owner.

B. Coordinate demonstration to Owner with the Contractor and the Owner.

1.10 TRAINING

A. Contractor shall video-record all training sessions. Provide a video recording of each training session on a single thumb drive. Provide two duplicate thumb drives for each training session, and distribute one copy to the Owner and one to the Engineer. Provide computer generated adhesive labels on each thumb drive. Label each thumb drive with the training session description, date training occurred, attendees, trainer, contact information, the equipment covered during the training session, and the project title.

B. Engineer will review their copy for video quality including, but not limited to, picture quality, use of camera angles, and sound recording quality. Video recording must be clearly audible. If the Engineer deems the video or audio quality as poor, the Contractor shall conduct the training session again (with original attendees present), and re-record the session at no additional cost to the Owner.

C. Provide a thumb drive case to hold all training videos provided for Division 40 specifications.

1.11 METHOD OF MEASUREMENT AND BASIS OF PAYMENT

A. Method of Measurement

All work in this section shall have no separate measurement and be included with the lump sum cost of item D-751 Stormwater Pump Station Structure, Pumps, Controls and all Appurtenances.

B. Basis of Payment

All work in this section shall have no separate basis of payment and be included with the lump sum cost of item D-751 Stormwater Pump Station Structure, Pumps, Controls and all Appurtenances.

PART 2 – PRODUCTS

2.1 ACCESSORIES

A. Electrical Identification

1. Laminated plastic nameplates shall be provided for each instrument in Division 40.
2. Nameplates shall have 1/16-inch high capital, black letters on white background machine engraved. Hang nameplates from process-mounted instruments via metallic chains. Nameplates shall be hung within 12-inches of the equipment.
3. Final wording on nameplate shall be submitted during the shop drawing phase and approved by the engineer.
4. Nameplates shall be uniformly mounted and shall be of identical form-factor for all equipment. Once a nameplate format has been selected, the format shall be utilized for all equipment throughout, thereby excluding providing original equipment manufacturer (OEM) nameplates.
5. Where wire labeling is not conducive to nameplate tagging as specified above, such as in MCC compartments or inside the control panel enclosure, provide wire labeling on computer-printed adhesive tape and wrap around wiring. Printing that is capable of being rubbed off the wire label is not acceptable.
6. Text on nameplates shall be as follows.
    a. First Line - Equipment name. Equipment name shall be as listed on the Contract Drawings.
    b. Second Line Equipment designation. Designation shall be in accordance with ISA Standards 5.1 and 5.4 and as listed on the Contract Drawings.
    c. Third Line - Wiring destination. Indicate the destination of the wiring.

B. Electrical Enclosures

1. Electrical enclosures shall have degree of protection ratings suitable for the intended application (e.g., watertight, dust-tight, explosion-proof) and environmental conditions. Electrical equipment enclosures shall at a minimum have the following ratings and materials of construction:
    a. Outdoor enclosures: NEMA 4X stainless steel, except Hazardous (Classified) Areas.
    b. Indoor Enclosures: NEMA 12 in clean, dry electrical rooms and control rooms. All other areas except Hazardous (Classified) Locations shall be NEMA 4X stainless steel.
    c. Hazardous (Classified) Areas: epoxy powder-coated cast aluminum NEMA 7 and/or 9 with UL listing for the hazard classification.

C. Electromagnetic Interference

1. Power conversion equipment, including computer power supplies and Uninterruptible Power Supplies, shall be fitted with EMI (electromagnetic interference), RFI (radio frequency interference) and telephone interference filters to limit interference effects on other equipment in the area in accordance with IEEE standards and recommendations applicable to the equipment.

D. Lightning and Surge Protection (TVSS)

1. Provide lightning and surge protection on the power supply of each instrument provided under Division 40.

2. Provide lightning and surge protection on all analog input and output signal circuits that pass out-of-doors or are terminated to metallic piping that passes out-of-doors.

3. TVSS devices mounted on the analog output signal wiring of field-mounted transmitters shall be conduit-mounted utilizing a common chamber, three element gas tube and clamp, reducing incoming transients to a level acceptable for the transmitter it is protecting. Manufacturer shall be as stated on the instrumentation plan, or equal.

4. TVSS devices protecting analog circuits entering the control enclosure shall be DIN rail-mounted with removable terminal blocks on each side of the device with no interruption of the incoming signal by unplugging the TVSS device. Device shall possess the capability of discharging 1000 Amps evaluated on an 8x20-microsecond waveform. Device shall have an LED to indicate the unit is functioning properly. TVSS device shall be manufactured by M-System Co, Model MDP-24-l, or equal.

E. Signal Devices

1. Signal isolator/duplicator(s) shall be used for the retransmission of signals to other areas, other locations, other loops, and especially when leaving the building.

2. Signal isolator/duplicator(s) shall be provided as required to ensure adjacent component impedance match where feedback paths may be generated or to maintain loop integrity during the removal of a loop component.

3. Signal conditioners and converters shall be provided where required to resolve any signal level incompatibilities or to provide required functions.

4. For Hazardous (Classified) areas, intrinsic safety barriers (ISB) and conduit with filled seal-offs shall be used for both power and signal wiring - isolating the hazardous area from the safe area electrically.

F. Wiring/Conduit/Mounting

1. The Contractor shall provide all power wiring and conduit to each instrument specified in Division 40.

2. The Contractor shall provide all signal wiring and conduit from the PLC control cabinet to new equipment as specified in the Contract Documents.

3. The Contractor shall provide all other wiring necessary for supplied equipment to achieve the specified system performance as discussed in individual Division 40 specification sections.

4. The Contractor shall mount all equipment specified in Division 40 in locations discussed/shown in the Contract Documents.

2.2 GENERAL

A. Instruments providing similar function shall be of the same manufacturer and, as much as possible, the same model/series for purposes of parts interchangeability.

B. Instruments shall be new, of the latest design, original, free from defects, and shall have a new warranty.

C. Unless otherwise specified, each instrument shall be accurate within 1% of full-scale reading over the calibrated range. This accuracy requirement shall apply to each overall system, including any transmitters, re-transmitters, receivers, etc. that are required.

D. Indicating transmitters or switches are designated by the letter "I" in the Tag ID (e.g. LIT, FIT, TIS) and shall have an integral digital display for indication of real-time process values in scaled Engineering Units (W).

2.3 MATERIALS AND CONSTRUCTION

A. Materials of construction shall be suitable for the intended application and environment and shall be fully compatible with the process being measured.

B. Instruments shall have NEMA 4 rated housings, except in Hazardous (Classified) locations where NEMA 7 and/or 9 with UL listing for the hazard classification is required.

C. Instruments located in areas where they may become temporarily submerged in water shall have a NEMA 6P rated housing. Instruments with permanent submergence shall have NEMA 6P rating.

D. Instruments located in unheated environments shall be provided with heating as required to prevent freezing and improper operation.

2.4 SPARE PARTS

A. All instruments shall be provided with one (1) year of supplies (i.e. charts, pens, ribbons, filaments, sensors, reagents, etc.), Spare parts (bulbs, fuses, etc.), and calibration solutions necessary for continuous and accurate operation.

B. Spare parts shall include all parts normally provided by the manufacturer for systems of similar size, construction, and purpose.

C. All spare parts shall be packaged in separate containers with the part name and number clearly marked. These parts shall be included in the base bid.

D. Provide 25% spare fuses of each type supplied with the instrument.

E. Package spare parts in wooden boxes, labeled with the manufacturer's name, address and telephone number; local representative's name, address and telephone number; name of equipment the parts are for and list of parts contained therein.

F. All spare parts shall be included in the base bid.

2.5 EQUIPMENT

A. Level Switch - Float (mechanical)
   1. Mercury-free.
   2. Mechanical tilt float level switch with a sealed cable and an impact & corrosion resistant ABS or PVC shell.
   3. Float switch cable shall be provided with sensor as an integral assembly. The cord shall be 16 gauge, 2 or 3 conductor SJOW oil resistant CPE of sufficient length to allow connection at junction box (without splices unless otherwise shown).
   4. The contact rating shall be 10 amp at 120 VAC.
   5. Install float with cable restraints and weights as necessary for proper operation at the correct level and location.
   6. Cables shall be of sufficient length to mount the float switches at the locations shown on the Contract Drawings, plus an additional 10 feet (minimum) of cable. Cables shall be provided in continuous lengths between the float and the associated junction box or control panel. Excess cable shall be coiled and tie-wrapped to the cable mounting supports.
   7. Manufacturer/Model:
      a. Sulzur XFP 150E CB1
      b. Or equal

D. Flow Meter
   1. Refer to Plans.

PART 3 - EXECUTION

3.1 EQUIPMENT MOUNTING

A. All mounted equipment shall have sufficient clearance from other equipment provided and existing obstructions (including walls, pipes, conduit, and other instruments) to facilitate removal, adjustment, inspection, and calibration of the installed device. Any device that is mounted without sufficient clearance to perform these functions with standard manufacturer-recommended tools shall be removed and remounted at no additional cost to the Owner.

B. Rotate equipment heads as directed by the Engineer in the punch list for final completion.

C. Field Instruments shall be factory calibrated to minimize field adjustments and to ensure proper operation.

D. Process instrumentation and control equipment shall be installed as shown on the Drawings and shall be installed in accordance with manufacturer's installation instructions and recommendations.

E. AC power and 4-20 mADC signal cables shall be installed in separate conduit systems and shall be physically separated by a minimum of 12 inches.

F Electronic low-level signals (analog, discrete, and communications) shall be properly isolated, bundled and supported. These signals shall be routed and separated from AC power wiring.

G. All equipment furnished under this Contract shall be installed with such accessories as surge protection, power line conditioners, UPS, or other means as may be required for equipment to function correctly in this noisy electrical environment.

H. Grounding

1. Equipment shall be solidly grounded with an equipment grounding conductor and as recommended by the Manufacturer. Control panels and instruments shall be grounded at the power supply end using a ground wire pulled with the power wires.

2. The shield in twisted-shielded pair cables shall be grounded at the transmitter end only.

I. Furnish and install all mounting stands, supports structures, brackets and accessories as required or detailed for the installation of the instruments furnished. Unless otherwise specified or required, supports shall be galvanized steel. All mounting hardware shall be stainless steel.

J. Cutting and drilling of existing panels for new instrumentation as shown, specified, or required, shall include repair and touch up painting of panel after installation.

K. Loop Isolators and Converters: Signal isolators shall be provided as required to ensure matching of adjacent component impedance where feedback paths may be generated, or to maintain loop integrity during the removal of a loop component. Dropping precision wire wound resistors shall be installed at all field-side terminations in the control panels to ensure loop integrity. Signal conditioners and converters shall be provided where required to resolve any signal level incompatibilities or to provide required functions.

END OF SECTION

SECTION 405001 - CONTROL SYSTEMS INTEGRATOR

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the requirements for the Contractor to obtain the services of an Instrumentation and Controls subcontractor who shall be responsible for the coordination and integration of the instrumentation and control systems. This subcontractor shall be referred to as the Control Systems Integrator (CSI). The CSI shall have total responsibility for the design, fabrication, configuration, programming, testing, start-up, and implementation of controls and instrumentation as shown on the Contract Drawings, as specified herein, and as indicated in related specification sections. The CSI shall ultimately be responsible for providing a fully functioning system as specified.

B. The CSI shall supply, configure, and commission all instrumentation and instrumentation equipment as shown on the drawings and as described in related specification sections.

1.2 RELATED SECTIONS

A. General Provisions

B. All Division 40 Specifications

1.3 REFERENCES

A. ANSI - American National Standards Institute

B. ASME - The American Society of Mechanical Engineers

C. ASTM - The American Society for Testing Materials

D. NEMA - National Electric Manufacturers Association

E. UL - Underwriters Laboratories, Inc.

F. ISA - Instrument Society of America

G. IEEE - Institute of Electrical and Electronic Engineers

H. NEC - National Electrical Code

1.4 QUALITY ASSURANCE

A. The CSI shall be regularly engaged in the business of instrumentation and controls and shall be responsible for the furnishing, coordination, and installation of the equipment specified herein.

B. The CSI shall demonstrate the requisite resources of in-house staff, facilities and finances to complete the project in the schedule specified. These resources shall include personnel who are direct payroll employees of the CSI to engineer, design, implement, fabricate, stage, and test the entire integrated hardware and software system at the CSI's facilities.

In-house personnel shall include all disciplines associated with system manufacture, fabrication, and integration to include but not be limited to engineering, drafting, analog and digital control systems, wiring design, construction, wiring, labeling, software

configuration, programming, project management, quality control, field engineering and training.

C. The CSI shall assign a qualified person to be the CSI Project Manager for this project. The Project Manager shall be a direct employee of the CSI, shall be assigned to this specific project, and shall be skilled and experienced in project management and in the type of work described herein. The Project Manager shall be assigned for the duration of the Contract. Should it become necessary to replace the CSI project manager, the Contractor shall submit to the Engineer the credentials of the qualified person assigned as a replacement.

D. The CSI shall maintain a UL 508 and 508A fabrication shop located at the CSI facility for the manufacturing of control panels, cabinets, consoles, instrument racks, enclosures, and wiring required for this project. This shop shall be available for inspection by the Engineer to observe quality control and workmanship. The CSI facilities shall include hardware and software owned by the CSI Subcontractor for development and support of any system software and any testing and demonstration equipment to be utilized on the project.

1.4 METHOD OF MEASUREMENT AND BASIS OF PAYMENT

A. Method of Measurement

1. All work in this section shall have no separate measurement and be included with the lump sum cost of item D-751 Stormwater Pump Station Structure, Pumps, Controls and all Appurtenances.

B. Basis of Payment

1 All work in this section shall have no separate basis of payment and be included with the lump sum cost of item D-751 Stormwater Pump Station Structure, Pumps, Controls and all Appurtenances.

.

1.5 SUBMITTALS

A. Submittals shall be in accordance with the General Provisions and Division 40 specifications.

B. Submit a CSI qualifications package for the proposed CSI for this project. The qualifications package shall include the following information which shall be organized and formatted as follows:

1. Company Background - Provide a brief company overview detailing CSI's experience, capabilities, and available resources. Description of available resources shall include labor categories, staffing, equipment, material availability, testing equipment, and training staff and aids.

2. Experience in Wastewater Applications - Provide a list and detailed description of recent (last 7 years) projects involving Wastewater Facilities that the CSI has successfully performed. Each project shall be provided with the project duration and date of completion. At the Engineers discretion, the CSI shall provide as-built project documentation for complete system integration service experience for a minimum of three completed projects comparable in size, scope, and complexity.

3. Project Personnel Plan - Provide a brief project task list detailing the personnel to be utilized for engineering and design, fabrication, installation, startup, demonstration, and training for this project. Include personnel resumes for all personnel which will be performing services for this project. Provide name and resume for the proposed project manager for this project.

4. Quality Assurance Plan - Provide a brief summary of the CSI's in-place quality assurance plans for performing work from engineering through startup and training.

5. Facilities and Equipment - Provide a detailed list of office and fabrication space, location where fabrication of panels will take place, and available meeting facilities. List numbers and types of Computer Aided Drafting software and OITs that are available for this project.

6. Maintenance — The CSI shall respond to a maintenance call within 4 hours, providing onsite normal maintenance services within 24 hours following a maintenance request, and emergency service within eight hours following an emergency service request. Maintenance call issues shall be resolved within 7 days, Normal and emergency maintenance service shall be made available 24 hours every day on a call basis for the warranty period. A point of contact and telephone number(s) shall be provided.

C. Prior to obtaining any material in connection with this Section, detailed shop drawings on all material shall be submitted. Submittal requirements for equipment are listed in individual equipment specification sections; Requirements listed in this specification section are in addition to requirements listed in other specification sections.

D. Submittal Coordination with Equipment Manufacturers

1) The CSI shall obtain certain specific submittal information pertaining to control equipment required to be furnished by equipment manufacturers. This information shall include catalog data, field specific wiring diagrams and shop drawings that shall be included in the CSI's shop drawing submittals. Control panel shop drawings submitted without the information on the specific controls will be rejected. Therefore, it is the responsibility of the Contractor, the CSI, and the specific manufacturers of equipment listed to coordinate the submittals for the equipment. Where specified, panels shall be fabricated by, furnished by, and shall be the responsibility of the CSI. Pertinent information on controls shall be submitted with both the equipment submittals and the control panel shop drawings.

E. Operation & Maintenance (O&M) Manuals

1. Operations and Maintenance Manuals shall be in accordance with the General Provisions and Division 40 specifications.

F. Factory Test Schedule and Report

1. Submit a testing schedule and test report for factory testing of panels and associated programming. The schedule shall list the location of panel fabrication,

the location where the test will be conducted, and the date the test will be conducted. Schedule shall be submitted a minimum of 14 days prior to conducting actual testing. Where revisions to the dates contained in the schedule become necessary, the CSI shall submit revised dates a minimum of seven calendar days prior to conducting actual tests in order to allow the Owner time to plan for witnessing the test. All tests shall be subject to observation by the Owner and/or designated representative. Factory testing is described in Part 2 of this specification section.

2. A panel factory test report shall be submitted for each panel furnished by the CSI. Test report shall include date and time of test, personnel conducting test, personnel witnessing test, name of panel and fabricator, location of test, test equipment utilized, and a detailed description of the actual tests performed.

G. Field Testing and Demonstration Plan

1. Submit a testing and demonstration plan for the equipment and instrumentation that is furnished by the CSI. The plan shall consist of two main components, l) testing and 2) demonstration. Both testing and demonstration shall include individual field devices, individual pieces of equipment, and systems.
2. Testing and demonstration of the components, equipment, and systems shall include details of staff to be used, testing equipment to be used, listing of equipment and systems to be tested, and a detailed description for testing. Testing shall include final testing of calibrated ranges and actuation settings of instrumentation and field devices, testing of panel mounted controls and control stations, and testing of interlocks, status indication, and alarms between panels and systems.
3. For the purposes of preparing the plan, the CSI shall assume that a minimum of six persons employed by the Owner will be witnessing the tests. The Contractor shall notify the Owner in writing a minimum of seven (7) calendar days prior to performing demonstration of operation of the equipment and systems.
4. Requirements for testing and demonstration of operation of equipment described herein shall incorporate the requirements for testing and demonstration as specified in other Division 40 Sections.
5. Plan shall include CSI's participation in the system testing described in the Special Provisions.
6. Provide a training syllabus for training the Owner's personnel in the use, function, and operation of the panels and control systems. Syllabus shall include equipment to be covered by the training, description of the training to be provided, training aids and materials to be provided, duration of each training session, and proposed schedule for training. Training syllabus shall incorporate the training requirements outlined in the other Division 40 Sections.

H. As-built markups of control panels following installation and startup.

PART 2 - PRODUCTS

2.1 GENERAL

A. The CSI shall furnish equipment, programming, labor, materials, and appurtenances in accordance with the requirements of technical specifications listed in Division 40.

B. The CSI shall coordinate with the Contractor and equipment manufacturers as required to obtain information, submittals, materials, and equipment from manufacturers, and shall provide information, submittals, materials, and equipment to the Contractor and equipment manufacturers as required to execute the Work in accordance with the Contract Documents.

2.2 INSTRUMENTATION

A. All non-vendor supplied instrumentation equipment and components shall be supplied, mounted, installed, and wired by the Contractor.

B. All non-vendor supplied instrumentation configuration shall be performed by the Control Systems Integrator (CSI).

2.3 PANELS AND CONTROL SYSTEMS

A. The CSI shall furnish or fabricate control panels, annunciator panels, relay panels and display panels, with all equipment and materials, in accordance with the requirements of the Section entitled "Control Panels".

B. The specific requirements for each panel are indicated on the Contract Drawings, and in specific technical specification sections referenced herein.

C. Source Quality Control

1. The CSI shall conduct factory acceptance tests (FAT) for control panels and systems prior to shipment. The factory tests shall demonstrate that the equipment performs in accordance with the Contract Documents.
2. Each control panel furnished by the CSI shall be assembled and wired so that it functions as a complete system for the factory test. Inputs to the control panels from field instruments and devices may be simulated during the test.
3. The factory acceptance test shall demonstrate the proper operation of the control logic described or indicated on the Contract Drawings.
4. Factory Acceptance Test (FAT) for PLC and PCS
    a. The CSI shall set up a factory test, to be witnessed by the Engineer, to demonstrate the Control Panel functionality. I/O shall be simulated to allow testing of the control logic. Demonstration of alarm, trending, and status displays shall be provided, if required.
    b. The CSI shall schedule two (2) one-day periods to conduct the Factory Acceptance Test for testing and demonstration of the I/O interface. The Contractor shall notify the Engineer in writing a minimum of 14 calendar days prior to the desired date of the Factory Acceptance Test.

c. The Engineer will not need to witness control panel testing other than for the Factory Acceptance Test for the PLC programming and related hardware and software. However, the Engineer reserves the right to witness such testing when scheduled with the Contractor and CSI.

d. Each of the two one-day periods shall also be used to make modifications to the Control Panel, based on input from the Engineer, during the factory testing of the system. The CSI shall provide the changes required to make modifications during the testing.

e. Factory test shall be scheduled a minimum of 14 calendar days in advance of testing via written communication to the Engineer. Scheduling of factory test shall coincide with scheduling of submittal requirements and submittal review.

PART 3 - EXECUTION

3.1 CSI COORDINATION REQUIREMENTS

A. GENERAL

1. The CSI shall perform the detailed integration and coordination of the control systems and instrumentation equipment furnished in accordance with this specification. Work shall be performed by the CSI's own staff and related equipment manufacturer's engineers where applicable, including submittal drawings, operations and maintenance manuals, record drawings, equipment testing, operational demonstrations, and other applicable documentation.
2. The CSI shall be responsible for coordinating with process mechanical equipment manufacturers in order to obtain control system requirements and special control components. The CSI shall review and coordinate with the equipment manufacturer's submittals.
3. Coordinate installation with other contracts, disciplines or trades for process and utility services piping (air, water, etc.) to and away from equipment.
4. New The Supervisory Control and Data Acquisition (SCADA) system shall be compatible with the Owner’s existing monitoring and control platform. The Contractor/System Integrator (CSI) shall coordinate with the Owner and/or facility operator (e.g., airport authority or designated utility operator) to confirm requirements for new PLC controls, communications infrastructure, and SCADA integration.
5. All control system components, including PLCs, RTUs, and communication interfaces, shall be fully compatible with the existing SCADA architecture and protocols in use at the facility. The CSI shall ensure seamless integration into the existing system, including real-time monitoring, alarm reporting, data logging, and remote control capabilities.
6. Design and installation shall conform to all applicable local, state, and federal standards, as well as any facility-specific SCADA guidelines or standards in effect at the time of design. The CSI shall coordinate all points, tagging conventions, communication methods, and cybersecurity requirements with the Owner prior to implementation.

7. CSI shall be responsible for coordinating with other contracts, disciplines or trades that may be under construction as part of or concurrent with this contract.
8. Verify process connection(s), electrical connection(s), and ranges for both process and electrical.
9. Materials of construction shall be suitable for the intended application and environment.
10. Install, wire, and configure per the manufacturer's recommendations.

3.2 CONTROL PANELS

A. Control Panels shall be fabricated and installed in accordance with the Section entitled "Control Panels".

3.3 FIELD QUALITY CONTROL

A. Installation

1. The CSI shall coordinate and supervise the installation of instrumentation equipment. Instrumentation shall be installed in accordance with the requirements of Section "Instrumentation" and manufacturer's written instructions.
2. Control panels shall be furnished with all internal wiring completed.

B. Inspections & Field Calibrations

1. Any and all testing equipment required for this project shall be owned by the CSI so as to be immediately available for this project.
2. The use of specific equipment manufacturer's startup, calibration, and troubleshooting personnel to assist the CSI shall be provided.
3. Calibrate instrumentation, and place each system into operation. The commissioning of each system shall include the overall calibration and tuning of all control loops and sequences to provide stable control of the process. The validity of all process inputs and outputs for each system shall be checked and corrected during the system commissioning. Final adjustment and calibration shall be performed for all equipment prior to initiation of final testing.

C. System Testing

1. Testing of each system shall be scheduled and performed in an orderly sequence and shall be conducted in the presence of, and to the satisfaction of, the Engineer. Testing shall be conducted for each component and system in accordance with the CSI's submitted plan that has been reviewed and approved by the Engineer.
2. Testing shall include the operation of all hardware, software, process control logic, and custom control features.
3. The CSI shall provide an onsite presence for the length of time necessary for system installation, start-up, and commissioning.
4. Testing requirements described herein shall be performed as specified in other Division 40 Sections.

D. Field Demonstrations

1. Demonstrate the control features of each panel and associated field-mounted instrumentation and control equipment to verify that each panel performs the required control functions and logic as shown on the Contract Drawings or as specified. Control features shall include relay energization, initiation of alarm conditions, resets, interlocks, set point activation, and other functions of the control panels.
2. Equipment shall be field-demonstrated to operate satisfactorily in the presence of the Owner and shall be conducted in accordance with the CSI's testing and demonstration plan that has been reviewed and approved by the Engineer. Field demonstrations shall be performed after successful installation, calibration, and testing of each control panel.
3. In addition to demonstrating the operation of standard control features, special control panel functions shall be demonstrated for each panel as specified below.
4. The Contractor/CSI shall provide the necessary test equipment, process media, materials, supplies, and qualified test personnel to perform the field demonstrations as specified herein.
5. Field instrumentation control signals that are required to demonstrate the operation of associated control panels may be simulated upon approval of the Engineer.
6. In the event of failure of the field demonstration, the Contractor/CSI shall perform the necessary corrections and. re-demonstrate, at his own cost and expense, the equipment as directed by the Engineer.
7. The CSI shall provide competent personnel (minimum of two persons) to participate in the dry system tests, clean water system tests, process water system tests, and plant integrated I/O tests, as set forth in the Test Plan and as specified in General Provisions.

3.4 TRAINING

A. After the successful completion of the field tests, demonstrations, and system testing, the CSI shall arrange for the instruction and training of Owner selected personnel at the site in the operational procedures of each instrument, panel, and control system provided by the CSI. The general training requirement shall be two days per item unless specifically stated otherwise in other Division 40 Sections.

END OF SECTION

SECTION 405300 - PROGRAMMABLE LOGIC CONTROLLERS

PART 1 – GENERAL

1.1 SUMMARY

A. This Section includes general requirements for all Programmable Logic Controllers (PLC), power supplies, I/O cards, control & communications networks, control panel wiring guidelines, and associated equipment as specified and as shown on the Contract Drawings.

B. The Electrical Contractor shall obtain the services of an Instrumentation and Controls subcontractor, as specified in Section "Control Systems Integrator", who shall be responsible for the coordination, supply, and integration of the equipment specified herein. This subcontractor shall be referred to as the Control Systems Integrator (CSI). The CSI shall have total responsibility for the design, fabrication, configuration, programming, testing, start-up, and implementation of all equipment specified herein and as shown on the Contract Drawings.

1.2 REFERENCES

A. Comply with the latest revision of the following codes, standards and specifications, except where more stringent requirements have been specified herein:

1. American National Standards Institute (ANSI).
2. Institute of Electrical and Electronics Owner's Representatives (IEEE).
3. International Society of Automation (ISA).
4. National Electric Manufacturers Association (NEMA).
5. National Electrical Code (NEC).
6. National Electrical Testing Association (NETA).
7. Underwriters Laboratories, Inc. (UL)

B. Related Specification Sections

1. All Electrical sections
2. "Instrumentation"
3. "Control Panels"
4. "Control Systems Integrator"
5. "General Provisions"

1.3 COORDINATION REQUIREMENTS

A. Enclosures shall be located, installed, and wired as shown in the Contract Drawings.

B. Coordinate installation with General Contractor. General Contractor shall be responsible for process and utility services piping (air, water, etc.) to and away from equipment.

C. Verify process connection(s), electrical connection(s), and ranges for both process and electrical.

D. Coordinate with Owner exact requirements for incorporating Airport-supplied communications equipment into PLC control panel enclosure.

E. Materials of construction shall be suitable for the intended application and environment.

F. Install, wire, and configure per the manufacturer's recommendations.

1.4 SUBMITTALS

A. Submit the following in accordance with the General Provisions.

B. Product Data: "Catalog cuts" and spec sheets marked to specifically indicate the equipment and materials proposed for this project. Indicate selections with arrows, and cross out irrelevant data. Label each data sheet with the tag ID assigned to the instrument. Include communications equipment, supplied by Owner, to be incorporated into control panel enclosure.

C. Shop Drawings: Electrical wiring diagrams/schematics, control panel and subpanel layout details (to scale), Bill of Materials, terminal block details, SCADA (communications networking) One-Line diagram(s). Include communications equipment, supplied by Owner, to be incorporated into control panel enclosure.

D. Manufacturer's installation instructions.

E. Closeout Submittals

1. Operation and Maintenance Manuals: Installation instructions, Configuration and setup instructions, Quick start guides, User Manuals, and screen shots with explanatory notes and navigation free(s).
2. Warranty Documentation: Start date, duration, conditions, manufacturer contact information, local vendor or support representative contact information.
3. Sustainable Design Closeout Documentation:
4. Software: Vendor, Manufacturer, and Contractor supplied.

1.5 QUALITY ASSURANCE

A. Manufacturer's Factory Qualifications: Manufacturing facilities shall have accreditation to ISO 9000:2000 or an equivalent quality management system acceptable to the Owner's Representative.

B. Equipment not specifically described or identified by manufacturer's catalog numbers shall be designed in conformity with ANSI, IEEE, ISA, JIC, NEMA, and other applicable technical standards. The work shall have neat and finished appearance.

1.6 DELIVERY, STORAGE AND HANDLING

A. Temporary storage of equipment shall be in clean dry indoor rooms with a temporary dehumidifier and electric heating to maintain the storeroom between 5 and 40° C, with humidity less than 90%. Comply with manufacturer's additional written instructions for storing and periodic inspection and testing.

B. Handle equipment in conformance with the manufacturer's written instructions.

1.7 WARRANTY

A. Provide parts and labor warranty in accordance with the General Conditions.

B. Provide an on-site parts and labor warranty for a minimum period of one year after Substantial Completion for all equipment. In cases where the manufacturer offers a longer warranty period, the longer warranty period shall apply as described by the manufacturer.

C. All equipment that are not fully functional at the time of Substantial Completion shall have warranties extended to provide minimum one year coverage after making the instrument operational, unless otherwise approved by the Owner's Representative.

1.8 METHOD OF MEASUREMENT AND BASIS OF PAYMENT

A. Method of Measurement
All work in this section shall have no separate measurement and be included with the lump sum cost of item D-751 Stormwater Pump Station Structure, Pumps, Controls and all Appurtenances.

B. Basis of Payment
All work in this section shall have no separate basis of payment and be included with the lump sum cost of item D-751 Stormwater Pump Station Structure, Pumps, Controls and all Appurtenances.

PART 2 - PRODUCTS

2.1 ELECTRICAL IDENTIFICATION

A. Equipment, wires and cables shall be marked in the field in accordance with Electrical Specifications.

2.2 ELECTRICAL ENCLOSURES

A. Electrical enclosures shall have degree of protection ratings suitable for the intended application (e.g., watertight, dust-tight, explosion-proof) and environmental conditions. Electrical equipment enclosures shall at a minimum have the following ratings and materials of construction:

1. Indoor enclosures: NEMA 12 in clean, dry electrical and control rooms. All other areas, except Hazardous (Classified) locations, shall be NEMA 4X stainless steel or FRP.
2. Outdoor enclosures: NEMA 4X stainless steel or FRP, except Hazardous (Classified) locations.
3. Hazardous (Classified) areas: Epoxy powder-coated cast aluminum NEMA 7 and/or 9 with UL listing for the hazard classification.

2.3 ELECTROMAGNETIC INTERFERENCE

A. Power conversion equipment, including PLC power supplies and Uninterruptible Power Supplies (UPS), shall be fitted with EMI (electromagnetic interference), RFI (radio

frequency interference), and telephone interference filters to limit interference effects on other equipment in the surrounding area, in accordance with IEEE standards and recommendations applicable to the equipment.

B. Equipment may be powered from electrical sources that may include harmonic distortion, surges, sags, and other electrical noise under normal operating conditions. Equipment furnished under this Contract shall be installed with such accessories, surge protection, power line conditioners, UPS, and/or other means as may be required for it to function properly in this noisy electrical environment.

2.4 SURGE PROTECTION

A. Power and signal wiring of all equipment located outside of buildings and inline equipment (e.g. magnetic flow meters) shall be protected with surge arresting devices.

2.5 SIGNAL DEVICES

A. Signal isolator/duplicator(s) shall be used for the retransmission of signals to other areas, other locations, other loops, and when leaving the building.

B. Signal isolator/duplicator(s) shall be provided as required to ensure adjacent component impedance match where feedback paths may be generated, or to maintain loop integrity during the removal of a loop component.

C. Signal conditioners and converters shall be provided where required to resolve any signal level incompatibilities and to provide required functions. .

D. For wiring extending into Hazardous (Classified) areas, intrinsic safety barriers (ISB) and conduit with filled seal-offs shall be used for both power and signal wiring - isolating the hazardous area from the safe area electrically. Refer to Electrical Drawings for areas designated as Hazardous areas.

2.6 GENERAL

A. Equipment providing similar function shall be of the same manufacturer, and as much as possible, the same model/series for purposes of parts interchangeability.

B. Equipment shall be new, of the latest design, original, free from defects, and shall have a new warranty.

C. All "or equal" alternates shall meet and/or exceed all specified requirements, features, and capabilities of the listed equipment and shall be submitted in accordance with the General Provisions.

D. All cables, software, mounting kits shall be included, compatible with the PLC and other equipment, and manufactured specifically for the associated hardware.

2.7 PERFORMANCE REQUIREMENTS

A. PLCs shall perform process control and monitoring function. General requirements include:

B. Receive analog data (via 4-20mA hardwired I/O), convert to Engineering Units (EU), process for alarms and reasonability checks and store.

C. Receive digital data (hardwired I/O), check for alarm and status change and store.

D. Perform control calculations; including software, PID control based on system parameters and real-time data and output properly conditioned control commands.

E. Perform sequential control functions and timing functions.

F. Respond to operator requests for displays, control commands and data.

G. Communicate process data to cellular communications equipment/data station via Ethernet/IP.

2.8 MATERIALS AND CONSTRUCTION

A. Materials of construction shall be suitable for the intended application and environment and fully compatible with the process being measured (especially chemicals).

B. Equipment located outside of enclosures shall have NEMA 4 or 4X rated housings, except in Hazardous (Classified) locations where NEMA 7 and/or 9 with UL listing for the hazard classification is required.

C. Provide an acceptable environment for all enclosed equipment, utilizing cooling and heating devices, humidity control, and power conditioners as needed.

2.9 ACCESSORIES

A. Equipment shall be provided with accessories recommended by the manufacturer for proper operation.

B. Any devices, equipment, interfaces, hand-held devices, cables, connectors, necessary to configure, modify, analyze, and calibrate supplied equipment shall be provided with the equipment and be turned over to the Owner after successful commissioning.

C. Where recommended by the manufacturer, power converters, reactors, or power supplies shall be provided integral with the instrument.

2.10 SOURCE QUALITY CONTROL

A. Submit copy of factory quality assurance certificate.

B. Equipment shall be manufactured and assembled in accordance with the factory quality certification documents.

C. Factory Testing and Calibration

1. Each instrument shall be factory tested in accordance with manufacturer's standard inspections and tests over the calibrated range.

2. Instruments shall be factory calibrated to minimize field adjustments and ensure proper operation.

3. Submit factory calibration certificate with instrument shipment.

2.11 SHOP FINISHES

A. With the exception of those parts and components customarily furnished unpainted, prepare and coat all metal surfaces with rust inhibitive shop paint. Shop paint shall be fully compatible with the field paint specified.

B. Protect machined surfaces against damage and corrosion by other means.

2.12 SPARE PARTS

A. Provide the following spare parts for each pump station location, packaged in their original unopened boxes, for use by the Owner.

1. 1 - Processor (CPU) of each type supplied.
2. 1 - EEPROM with final, debugged program stored on it for the PLC.
3. 1 - Power supply of each type supplied.
4. 1 - Communication interface card of each type supplied.
5. 2 - I/O modules of each type supplied.
6. 25% spare fuses of each type used.
7. 1 - Surge Suppression Device as used to protect incoming analog signals.
8. 1 - Surge Suppression Device as used to protect incoming discrete signals.
9. 1 - Transient Voltage Surge Suppression Device (TVSS) as used to protect the incoming power to the PLC control panel.
10. 1 - Antenna Transient Voltage Surge Suppression Device (TVSS).

B. All equipment shall be provided with one (1) year of required supplies (paper, ink, cartridges, recordable media, etc.), spare parts (bulbs, fuses, etc.), and other apparatus necessary for continuous and accurate operation.

C. Spare parts shall include all parts normally provided by the manufacturer for systems of similar size, construction, and purpose.

D. All spare parts shall be packaged in separate containers with the part name and number clearly marked.

E. Package spare parts in boxes, labeled with the manufacturer's name, address and telephone number; local representative's name, address and telephone number; name of equipment the parts are for and list of parts contained therein.

F. All spare parts shall be included in the base bid.

2.13 EQUIPMENT

A. PLC hardware

1. The pump control panel shall be provided with a Programmable Logic Controller (PLC). The PLC shall be factory programmed, tested and debugged to meet all project requirements. The PLC shall as a minimum, include the following features:
   a. Built-in Communication Ports:
      i Two (2) EtherNet/IP

ii One (1) USB

b. Communications Options:

i EtherNet/IP

ii USB for firmware download and programming

c. EtherNet/IP Nodes: 32 Maximum

d. Controller Connections:

i 256 EtherNet/IP

ii 120 TCP

e. Programming Software Support: RSLogix5000

f. User Memory: Three (3) MB

g. Memory Storage

i Non-volatile: 1784-SD1 card with 1GB available memory (shipped with controller)

ii Optional: 1784-SD2 card with 2 GB available memory

h. Local I/O expansion Modules

i Up to Sixteen (16) 1769 Compact I/O Modules

ii Provide all I/O modules to meet site specific I/O requirements, plus 10% spare I/O points of each type used

i. I/O Module Banks: Three (3) maximum

j. Module Location: DIN Rail or Panel Mount

k. Embedded Power Supply: By use of 1769-PA4

l. Real Time Clock: Embedded

m. Manufacturer/Model:

i Allen-Bradley CompactLogix model 1769-L33ER with 1769 I/O modules

ii Or approved equal.

B. Firmware

1. All PLC hardware, communication modules, I/O modules, and networking hardware containing "flashable" firmware shall be flashed with the latest and most compatible firmware version before startup and checkout.

C. Uninterruptible Power Supply (UPS)

1. An Uninterruptible Power Supply (UPS) shall provide reliable, clean power, the UPS shall be installed within the pump control panel. The UPS shall be of the true online type, offline or line interactive units will not be accepted. The UPS shall have the following features as a minimum.

a. VA/Watt Rating: 1000VA / 1000 Watt

b. Dimensions: 16.9” x 15.7” x 3.4” (W x D x H)

c. Weight: lbs. (kg) 37 lbs.

d. Input AC Parameters

i Voltage Range: 120 VAC nominal, Variable based on output load

ii Frequency: 40 - 70 Hz; Auto Sensing

iii Input Power Cord: 10 ft. attached, w/ NEMA 5-15 plug

e. Output AC Parameters
   i Output Receptacles: (6) NEMA 5-15R
   ii Voltage: 100/110/115/125 (user configurable) VAC; ±3%
   iii Waveform: Sinewave

f. Battery: Valve-regulated, nonspillable, lead acid

g. Agency Approvals
   i UL 1778 4th Edition and CSA 22.2 No. 107.1
   ii Emissions: FCC Part 15 (Class A) - CISPR22 Class A (RFI)
   iii Surge Immunity: ANSI C62.41 Category B
   iv Environmental: WEEE and ROHS2 REACH

h. The UPS shall be Liebert GXT5-1000LVRT2UXL series or approved equal

D. Miscellaneous Networking Hardware

1. Provide and install all necessary networking hardware (cables, boxes, cabinets, tees, taps, terminators, drop cables, connectors, converters, etc.).

E. Software

1. Provide one (l) retail package (box and manuals included) of the PLC manufacturer's most current "Professional Edition" PLC offline/online programming software for use in conjunction- with the PLC equipment supplied (to become the property of the Owner). The software provided must be fully compatible with the firmware level of all PLC hardware supplied. Provide all communication cables necessary for a laptop computer to upload/download and modify/monitor the PLC program offline/online.

2. All software licenses shall not expire and support shall be renewable.

3. All software provided shall be fully compatible with all the devices and equipment it will be connected to. Hardware firmware levels and versions shall also be fully compatible.

4. All software shall be provided in retail boxes with full documentation, manuals, media, and information cards.

5. Provide all necessary communication cables and miscellaneous hardware required by the software, to be turned over to Owner.

6. Any additional software or drivers required by the PLC shall be provided at no additional cost to the Owner.

7. All software, licensing, and support shall be registered to the CSI until time of substantial startup completion. At this time, the CSI shall transfer registration and Ownership of all supplied software, licensing, and support to the Owner and provide written proof of transfer.

8. The CSI shall maintain, install, configure, and deliver all software updates, patches, and revisions until proof of transfer of registration and ownership to the Owner has been received.

9. The CSI shall pay up registration and technical support (in the Owner's name) with the software manufacturers for the entire duration of the project warranty period so that there's no lapse in software support or coverage for the Owner. Project

warranty period starts from the day of Owner acceptance, not the completion of startup, or when the software was purchased.

10. The CSI shall also provide the Owner two (2) identical DVDs, each containing the same "fully-documented" CSI developed software applications for the PLC, containing all program files (source code), cross references, data tables, document export files, initial setpoint/startup values, configurations, driver setups, applications, and all other files developed and used by the CSI during development, debug, and successful startup.

PART 3 - EXECUTION

1.1 EXAMINATION

A. Examine areas and conditions for compliance with manufacturer's installation recommendations and requirements.

B. Examine roughing-in of equipment to verify the following:

1. Environmental conditions are within the limitations established by the manufacturer.

2. Each utility pipe and conduit is in the correct location.

C. Examine walls, floors, roofs, and concrete bases for suitable conditions for installation, for example, all overhead work of other trades is complete.

D. Verify that ground connections are in place and that installation of grounding described in Section "Grounding" is complete.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

1.2 INSTALLATION

A. Install equipment as shown on the Contract Drawings and in accordance with the manufacturer's installation instructions and recommendations.

B. Erect equipment in neat and workmanlike manner; align, level and adjust for satisfactory operation. Install so that parts are easily accessible for inspection, operation, maintenance and repair. Equipment shall be mounted upright, vertical, at eye level, and in locations easily and safely accessible. Minor deviations from indicated arrangements may be made, but only after obtaining approval from the Owner's Representative.

C. AC power, DC power/signal, and communication cables shall be installed in separate raceway systems, and shall be physically separated by a minimum of 2 inches.

D. Electronic low-level signals (analog, discrete, and communications) shall be properly isolated, bundled and supported. These signals shall be routed and separated from AC power wiring.

E. All "intrinsically safe" wires and cables shall be kept isolated and installed in separate wire channels and conduit systems from normal power and signal wires by at least two inches of space. Label wire channels and conduits "Intrinsically Safe Wiring."

F. Grounding

1. Equipment shall be solidly grounded with an equipment grounding conductor as specified in Section "Grounding" and as recommended by the manufacturer. Control panels and instruments shall be grounded at the power supply end using a ground wire pulled with the power wires.
2. All instruments and transmitters shall be grounded at the device's power source by the CSI using a ground wire pulled with the power wires. Metal cases of loop-powered instruments shall be grounded at the control panel powering the loop using a ground wired pulled with the twisted-shielded pair of wires. All transmitters and metal cases shall be grounded at the control panel with a ground wire. Grounding through conduit and fittings and to grounds other than that of the control panel are not acceptable.
3. The shield in twisted-shielded pairs shall be grounded at the power supply end. Meaning, 4-wire transmitters = ground at transmitter end, 3-wire transmitters = ground at power source end, 2-wire transmitters = ground at loop power source end.

G. Furnish and install all mounting stands, supports structures, brackets and accessories as required or detailed for the installation of the equipment furnished. Unless otherwise specified or required, supports shall be galvanized steel. All mounting hardware shall be stainless steel. Equipment mounted on walls in contact with soil or water shall be mounted offset from the wall a minimum of ¼-inch.

H. Cutting and drilling of existing panels for new equipment as shown, specified, or required, shall include repair and touch up painting of panel after installation.

1.3 FIELD QUALITY CONTROL

A. Prepare for Acceptance Tests as follows:
1. After installing equipment but before power supply is energized, verify that grounding system is completed.
2. Verify that equipment is installed and connected according to the Contract Documents.
3. Verify that electrical wiring installation complies with manufacturer's submittal by means of point-to-point continuity testing.
4. Verify that field-installed power and control wiring complies with the Electrical Specification requirements.
5. Confirm that each field device is properly identified or tagged per the instrument specifications.
6. Confirm that field wiring is terminated to the proper device, on the proper terminal, and identified with the appropriate wire number according to the drawings.
7. Verify that equipment is ready for pre-commissioning checks in accordance with manufacturer's written instructions.

B. Acceptance Tests: After installing equipment and after electrical circuitry has been energized, demonstrate product capability and compliance with requirements as follows:
1. Verify the proper voltage at each powered circuit and each device.

2. Verify that the PLC input and output modules in each panel are functional and configured correctly in the PLC program. Each PLC input and output channel, including spares, is to be tested.

3. IO testing procedure will encompass the entire loop, from field devices to the PLC to the SCADA system, using manual control functionality.

   a. Digital inputs (push buttons, selector switches, position switches, etc.) will be actuated in the field and confirmed at the PLC input as well as change in state (color or text) on the remote SCADA.

   b. Digital outputs (motors, relays, solenoids, etc.) will be energized and confirmed via proper change in state of the final control element in the field, as well as change in state (color or text) on the remote SCADA.

   c. Analog inputs (transmitters) will be tested using actual process conditions, whenever possible. Verify that scaling is correct and the appropriate value is displayed on remote SCADA.

   d. Analog outputs (valve position, VFD speed control, etc.) will be ramped from 0-100% or a step change output of 50% and 100%. Response will be confirmed via proper change in state of the final control element in the field, as well as displaying the proper feedback on the remote SCADA.

4. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

3.4 PROGRAMMING

A. The CSI shall be responsible for the complete and satisfactory programming of all items under their source of supply.

B. All control logic shall reside in the PLC.

C. All scaling of analog values and alarm/action set points to Engineering Units (EU) shall be done in the PLC.

D. PLC control logic shall be developed in accordance with the "Pump Control Sequence of Operation" specified herein.

E. PLCs shall be programmed substantially in RLL (Relay Ladder Logic) language. Programming shall be fully documented with descriptive names and explicit line by line code comments.

F. PLC Programming

1. General

   a. The Programmer shall maintain Syracuse AirportSCADA Standards to the extent possible. Deviation from this scheme is prohibited, without the written approval from the Engineer or Airport.

   b. I/O Point configuration shall be consistent with existing County SCADA standards and shall be used to all physical points within the PLC.

      Device point and virtual points shall be configured in accordance with New Castle County standards.Virtual points are internal derived points (from PLC) that collect data from pre-identified physical points that cannot physically be

generated by field equipment. Points such as "pump over speed", "total flow", "totalized run hours", etc. are derived from PLC logic as defined by a pre-determined range or calculation. (A point that refers back to physical I/O or direct representation of that I/O is considered to be a device point.)

G. Pump Control Sequence of Operations

1. Monitoring

a. Water level in the wet well is continuously displayed and totalized on the SCADA System. "High-high and "low-low" levels are continuously monitored for alarming on the SCADA System and interlocking process control logic. Pump motor "run", "fault", "failure to start", "in auto mode", "high motor temp", "seal leak" and "speed feedback" are continuously displayed on the SCADA System with status and alarm indication/annunciation.

2. Control

a. The pumps shall operate as follows:

1) From the SCADA, the Operator selects "Lead" and "Lag" from Pumps No. 1 and No. 2. When set for automatic, the pump designation/sequence shall advance automatically every 24 hours at 10:00 am (Operator changeable) in the morning, when Operators are likely present.

2) The "Lead" pump starts automatically, at minimum speed, when the wet well level rises and remains above a predetermined elevation (Operator adjustable) for an adjustable time delay. Its speed is automatically adjusted to maintain the desired wet well level as measured by the radar level sensor via a PLC programmed PID level controller.

3) If the "Lead" pump is not capable of maintaining level and has been operating at 90% speed (Operator adjustable), the "Lag" pump will start and both pumps will operate at the same speed (via the level control PID loop output). With the increase in pumping capacity, both pumps will arrive at the same speed, which will be lower than the speed of the "Lead" pump by itself. Both pumps will continue to operate in unison to maintain the desired level.

4) At times of low demand, the speed of the operating pumps ("Lead" and "Lag") will slow because of the extra pumping capacity. When the "Lead" and "Lag" pumps have been operating below 20% speed (Operator adjustable) for more than ten minutes (Operator adjustable), the "Lag" pump will stop and the "Lead" pump will continue to maintain level.

5) When the wet well level drops to and remains below predetermined elevation (Operator adjustable) for an adjustable time delay, all operating pumps will stop.

3. Alarms

a. Alarm set points are Operator adjustable from SCADA (with security clearance). Indicate/annunciate the following alarms on SCADA: "High-

high"" levels in wet well; pump "fault", pump "failure to start", pump not "in auto mode", pump "motor high temperature alarm" and "seal leak".

4. Interlocks

   a. "Low-low" level in wet well will stop and disable all associated pumps.

   b. Pump "fault" including motor temperature switches, seal leak and/or "failure to run" will stop and disable pump.

3.5 OPERATION & MAINTENANCE MANUALS

A. The CSI shall prepare four (4) Operation & Maintenance Manuals as specified in the General Specifications, consisting of equipment manufacturers' O&M manuals, user manuals, installation instructions, configuration instructions, etc., and specified hereinafter. Each shall include:

   1. Index and tabbed section dividers.
   2. Reviewed submittals.
   3. Wiring diagrams.
   4. Field adjustable settings (e.g. set points, ranges, spans current alarm trips).
   5. Manufacturer's instructions on care and operation of equipment.
   6. Warranty certificates.
   7. Spare parts list.
   8. Complete typewritten operating instructions, covering all systems descriptions and operation, emergency operating instructions and precautions.
   9. Name, address and telephone number of supplier and representative of manufacturer for each item of equipment in Contract.

B. Bind above items (all unused, clean, and legible) in three ring binders and submit to the Owner's Representative for review and approval. Provide all required copies of reviewed and approved portfolios before request for final acceptance.

C. Provide one (1) thumb drive containing all of the above data in pdf format. This file shall be tabbed (bookmarked) in the same order as the bound copy.

3.6 DEMONSTRATION AND TRAINING

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain the equipment.

   1. Train Owner's maintenance personnel for a minimum of 4 hours on procedures and schedules for energizing and de-energizing, troubleshooting, servicing, and maintaining equipment and schedules.
   2. Review data in Operation and Maintenance manuals.
   3. Schedule training with Owner, with at least 14 days advance notice.

3.7 FOLLOW-UP SERVICE

A. Monitoring and Adjusting: After Substantial Completion, but not more than twelve months after Final Acceptance, perform the following monitoring and adjusting tasks:

1. Replace failed and defective equipment (under warranty).
2. Recalibrate and reconfigure as necessary.
3. Retest and adjust as necessary.

END OF SECTION

SECTION 409070 - CONTROL PANELS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. This Section includes specific requirements for the Control Panel as shown on the Contract Drawings and as specified herein.

1.2 RELATED SECTIONS

A. General Provisions
B. All Division 26 Specifications
C. All Division 40 Specifications
D. All Division 44 Specifications

1.3 QUALITY ASSURANCE

A. The cabinet and control panel manufacturer shall have quality certification to ISO 9000:2000, or an equivalent quality management system acceptable to the Engineer.
B. The cabinet and control panel manufacturer shall be capable of obtaining UL508A listing and labeling for the equipment furnished under this Contract.

1.4 REFERENCES

A. Electronic Industries Association (EIA).
B. Federal Communication Commission (FCC).
C. CCITT (International Telegraph and Telephone Consultative Committee), V.32, V.42, and V.42bis.
D. Institute of Electrical and Electronic Engineers (IEEE), IEEE C62.41.
E. IEEE 802.3 — Ethernet standards.
F. NEMA ICS 1 - General Standards for Industrial Control and Systems.
IA/EIA-568-B.
G. UL 508A - Standard for Industrial Control Panels

1.5 SUBMITTALS

A. Shop Drawings — Submit under provisions of the General Provisions.

1. In addition, panel shop drawings shall contain:

a. Panel cut-out location and sizes.
b. Back panel instrument location.

c. Electrical point-to-point wiring diagrams to show detailed internal wiring and outgoing wiring to field devices. Device tag numbers and descriptions shall be used where shown on the Contract Drawings and elsewhere in the Contract Documents.

d. Heat gain calculations showing adequate cooling capacity.

e. Power requirement calculations for DC power supplies and UPS.

f. Nameplate Schedule..

g. NEMA type designation and manufacturer data describing the enclosure and showing its compliance with specifications and associated standards.

h. Samples of any material shall be submitted upon Engineer's request.

B. Operation and Maintenance Manual - Submit under provisions of Section 440003 Operation and Maintenance Data.

1. Refer to Section 440003 Operation and Maintenance Data and 405000 for operation and maintenance manual format and content.

C. Project Record Documents - Submit under provisions of the General Provisions and General Specifications.

1. Refer to Section 405000 for project record documents format and content.

PART 2 - PRODUCTS

2.1 GENERAL

A. Control Panel shall conform to the following unless otherwise indicated:

1. Totally enclosed NEMA 12 wall-mounted cabinet not larger than 24" deep.
2. Continuous piano-style door hinge(s) with removable pin.
3. Provided with engraved nameplates having black lettering on a white background and having a minimum width of 1/2 inch. Lettering shall be in capitals except as shown. Lettering shall be as shown or scheduled.
4. Devices and operators shall be provided as indicated on the Drawings.
5. Panels shall include:
   a. Manually switched fluorescent lamp complete with non-yellowing safety lens.
   b. Large print pockets mounted to the interior face of the door.
   c. 120 VAC, 15 ampere GFI utility outlet (non-UPS backed).
   d. Single-pole, 15 ampere, 120 VAC circuit breakers as shown on the Contract Drawings.
   e. Additional temperature conditioning devices shall be provided if necessary to keep the ambient temperature inside the panel within the

acceptable operating temperature range of ALL internally housed components.

f. Terminal blocks - located in the bottom of the rear panel or on side panels as required. Minimum spacing between terminal blocks shall be 1 inch and a minimum of 1.5 inches all around. Duplicate terminals shall be used to limit the number of wires at a single terminal to two. 25% (installed) spare terminals shall be provided. These are in addition to the installed terminal blocks required for spare I/O (Refer to Paragraph 2.13.A.6 in Section "Programmable Logic Controllers".) and are also in addition to the uninstalled spare terminal blocks listed in Article 2.2 herein.

g. Uninterruptible Power Supply (UPS) as shown on the Contract drawings. UPS must provide true sine wave output. Each UPS shall maintain power for at least thirty (30) minutes under full-load. Utility lights, utility receptacles, and motors are excluded. All computer equipment shall operate on 120VAC, 60Hz power. UPS shall be mounted in such a way as to allow replacement without significant disruption to the other components or wiring within the box. UPS shall be located in such a way that it physically does not impede access to any terminal, component or wiring in panel. Minimum UPS size shall be 750VA.

1. Provide 2 discrete outputs to the Wireless I/O to monitor: supply power status and battery health.
2. Acceptable UPS manufacturers are: APC, Liebelt, Powerware, or Equal.

h. 24-Volt DC Power Supply adequately sized to provide power to field instruments and cabinet components as required with an additional 50% spare capacity.

2.2 SPARE PARTS

A. Provide the following spare parts, packaged in their original unopened boxes, for use by the Owner.

1. Spare parts as specified in section entitled "Programmable Logic Controllers"
2. 1 - pilot light of each type supplied
3. 1 - intrinsic safety barrier of each type supplied
4. 25% spare fuses of each type used
5. 25% spare terminal blocks of each type used
6. 2- control relays/bases with retainer clips of each type used

B. All spare parts shall be packaged in separate containers with the part name and number clearly marked.

C. Package spare parts in boxes, labeled with the manufacturer's name, address and telephone number; local representative's name, address and telephone number; name of equipment the parts are for and list of parts contained therein.

D. All spare parts shall be included in the base bid.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General

1. Electrical Contractor shall verify placement of panel prior to fabrication, and any and all shipping splits shall be provided.
2. All panel wiring shall be installed by the panel manufacturer and shall be brought out to identified terminal blocks. Interwiring between panel sections shall be from terminal blocks to terminal blocks. Terminal blocks for panel wiring shall be correlated with those for the electrical equipment by the panel manufacturer.
3. Panels shall be grounded. All equipment and circuits included in the panels, as shown or required to be grounded, shall be connected to the grounding terminal block.
4. The panels shall be installed as shown and directed. All wiring shall enter the panels as shown or specified. Penetrations shall not be permitted in the top surface of Control Panel. If a top surface entrance is required, obtain a written exemption from the Engineer for each conduit. These conduits will, at a minimum, be sealed to prevent moisture from falling into the enclosure.
5. The panel shall be checked, and all necessary adjustments shall be made in the field after installation by representatives of the manufacturers of the equipment included in the panel.
6. AC and DC wiring is to be separated within the control panel.

3.2 POWER LINE SURGE PROTECTORS

A. Install power line surge protectors on the incoming power of all equipment susceptible to damage in an industrial or commercial environment due to line surges, lightning, transients, or other line disturbances.

B. Individual equipment with adequate integral line surge protection is not required to have additional protection, although the Electrical Contractor is cautioned that some integral surge protection is not adequate for an industrial environment.

C. The control panel contains electronic, microprocessor based, and other line-powered equipment and thus is susceptible to damage. Therefore, the control panel shall be provided with adequate line surge and transient protection.

3.3 GROUNDING

A. Equipment shall be solidly grounded with an equipment grounding conductor and as recommended by the Manufacturer. Control panel and instruments shall be grounded at the power supply end using a ground wire pulled with the power wires.

B. All instruments and transmitters shall be grounded at the device's power source using a ground wire pulled with the power wires. Metal cases of loop-powered instruments shall be grounded at the control panel powering the loop using a ground wire pulled with the twisted-shielded pair cable(s). All transmitters and metal cases shall be grounded at the control panel with a ground wire. Grounding through conduit and fittings and via grounds other than that of the control panel are not acceptable.

C. The shield in twisted-shielded pairs shall be grounded at the power supply end. Meaning, 4-wire transmitters = ground at transmitter end, 3-wire transmitters = ground at power source end, 2-wire transmitters = ground at loop power source end.

END OF SECTION

SECTION 430000 – DEICING TANKS AND EQUIPMENT

PART 1 - GENERAL

1.1 DEFINITIONS

A. ADF – Aircraft Deicing Fluid

B. AAF – Aircraft Anti-Ice Fluid

C. Type 1 – ADF or Aircraft Deicing Fluid

D. Type IV – AAF or Aircraft Anti-Ice Fluid

1.2 SCOPE OF WORK

A. Provide three (3) shop fabricated, double-wall, aboveground storage tanks (ASTs) for the storage of Aircraft Anti-icing Fluid and Aircraft Deicing Fluid. The tanks system shall be provided with stairways and catwalks as shown on the Contract Drawings. The storage tanks shall be provided as indicated on the Contract Drawings and specifications herein, including but not limited to:

1. Secondary containment, level gauge, overfill prevention equipment, and leak detection.

2. Service vents and emergency vents.

3. The tank systems shall be shop painted and pressure tested prior to shipment to the project site.

4. Field tank tightness.

B. Install the following Liquid Automation Systems (LAS) pre-engineered and prefabricated deicing equipment procured by Owner:

1. Three (3) Type I ADF Blending Units (“Deicube”)

2. Three (3) Type IV AAF heated pump skids

3. Three (3) heated water cabinet skids

4. Three (3) ADF and AAF transfer stands (“Triple Load Stands”)

5. Four (4) Fluid Management System (FMS) Kiosks

6. One (1) ADF heated offloading skid

7. One (1) AAF heated offloading skid

C. Provide two (2) shop fabricated, single-wall, aboveground storage tanks (ASTs) for the storage of Potassium Acetate (runway deicing). The storage tanks shall be provided as indicated on the Contract Drawings and specifications herein.

D. Offloading remote spill boxes as shown on the plans

E. Aboveground piping and supports to connect the ASTs to the respective equipment, as shown on the Plans.

F. Testing, startup, and training of all tanks and all equipment.

G. Work includes all incidental items necessary to complete the Work as shown on the Plans and included in the Proposal and Contract Documents.

1.3 RELATED DOCUMENTS

A. Division 26 – Electrical

1.4 QUALITY ASSURANCE

A. Acceptable manufacturers or suppliers may be noted for some products, items, or materials.

B. Obtain and pay for required construction approvals and permits.

1.5 QUALIFICATIONS OF CONTRACTOR AND PERSONNEL

A. The Contractor shall have completed at least three similar projects (i.e., construction of deicing and transfer systems) within the past five years.

B. Installation of storage tank equipment shall be performed only by workers who have been trained in the hazards associated with such equipment, confined spaces, electrical hazard areas, fall protection, etc.

1.6 GOVERNING CODES AND STANDARDS

A. Equipment and installation necessary to accomplish the Work specified herein shall be consistent with the latest editions (unless noted otherwise) of applicable federal, state, and local codes and regulations regarding fluid storage, transfer, and dispensing systems, including but not limited to the following:

1. Regulations:
   i. Building Code of New York State.
   ii. Fire Code of New York State.
   iii. Occupational Safety and Health Administration (OSHA) Permit-Required Confined Space Rule (29 CFR Part 1910.146).

2. Referenced Standards
   i. National Fire Protection Association (NFPA).
   ii. NFPA 70, National Electric Code (NEC), 2017 edition.

iii. NFPA 30, Flammable and Combustible Liquids Code

3. American Petroleum Institute (API).
   i. API Standard No. 2000, Venting Atmospheric and Low-Pressure Storage Tanks.

4. Underwriters Laboratories, Inc. (UL).
   i. UL 142, Steel Aboveground Tanks for Flammable and Combustible Liquids.

5. American Society of Mechanical Engineers
   i. ASME Section VIII, Rules for Construction of Pressure Vessels

6. American Society for Testing and Materials (ASTM):
   i. A 582, Standard Specification for Free-Machining Stainless Steel Bars.

7. American National Standards Institute (ANSI):
   i. B31.3, Process Piping.

8. Occupational Safety and Health Administration (OSHA) Regulations (Standards) 26 CFR Part 1910, Occupational Safety and Health Standards.

9. All work specified herein shall conform to or exceed the requirements of the above referenced codes, regulations, and standards; provided that whenever the provisions of said publications conflict with the requirements specified herein, the more stringent requirement shall apply.

B. Notifications and Approvals: Work shall not be started until required federal, state, and local permits and notifications have been secured by and paid for the Contractor.

1.7 SUBMITTALS

A. Prior to construction, submit shop fabrication drawings for the products listed herein. Drawings must be scaled and of sufficient detail for the reviewer to determine compliance with the Contract Documents and to facilitate proper installation.

1. Storage Tanks: Provide plan, sectional and/or elevation, and end views, drawn to scale of the tank systems. Include the following information:
   i. Tanks and fueling equipment – show dimensions, supports (tank, piping, catwalk, electrical conduit, etc.), tank top fittings, accessories, finishes, etc.
   ii. Tank supports – show critical dimensions, finishes, and indicate recommended attachment system.
   iii. Stairway and walkway/platform assembly – show critical dimensions, supports, finishes, and indicate recommended attachment systems.
   iv. Tank and equipment markings and signage.

B. Prior to final acceptance, submit the following items.

1. Field testing of tanks: Before being placed in service, the storage tanks and piping systems shall be tested for tightness and inspected in accordance with the manufacturers instructions. All fittings, welds, and joints must be also coated with a soap solution and inspected for air leaks. Submit written certification stating that the

tanks and piping systems have been successfully tightness tested in the field, and as follows:

i. Tanks shall have the primary (inner) tank tested and the interstitial space tested for tightness.

ii. Repair leaks discovered by testing. Tank repairs shall be done under supervision of tank manufacturer's representative. After repairs are completed, re-test tank (inner and outer chambers). If leaks cannot be repaired, replace the tank.

2. Calibration Chart and Gauge Stick: Provide two laminated copies of the manufacturer's calibration chart and one gauge stick for each tank provided.

3. Manuals, including:

i. Operation and Maintenance, including shop drawings, product data, record drawings, test results, etc.

4. Maintenance materials, including:

i. Provide a minimum of 5-gallons of the specified paint for the tank exterior.

ii. Provide a minimum of 2-gallons of the specified paint for the catwalk stairway/platform assembly.

iii. Provide padlocks where required within. All locks shall be keyed the same. Include a minimum of two extra locks and four extra key sets. Locks shall be Master Lock 911-DKA or approved equal.

1.8 STARTUP AND TRAINING

A. Schedule the start-up and training for the following fuel facility systems:

1. Storage tanks and fuel transfer systems.

B. Notify the Owner at least 1 week prior to the scheduled equipment start-up and training.

C. Provide a qualified manufacturer's representative to supervise the start-up and conduct training in the fuel facility systems.

D. Pay for all costs associated with startup and training, including travel, lodging, meals, labor, and materials as scheduled below in Part 3 - Execution.

1.9 SYSTEM DESCRIPTIONS

A. Functional and Performance Requirements: The storage tank systems shall be configured to provide the functions and performance described below.

1. ADF loading onto deice truck:

i. The deicing fluid flow rate at 30% deice fluid / 70% non-potable water shall not be less than 120 GPM.

ii. The blended deicing fluid flow rate at a 50% mix ratio shall not be less than 120 GPM.

iii. The deicing fluid flow rate at 70% deice fluid / 30% non-potable water shall not be less than 120 GPM.

2. AAF loading onto deice truck: 77 GPM

3. ADF offloading into storage: 200 GPM

4. AAF offloading into storage: 77 GPM

B. Design Requirements:

1. All systems and components shall comply with requirements of referenced standards and regulatory authorities.

2. All systems and components shall be designed and constructed for temperatures that range between -10 to +120 F, in a varying environment of sunny, humid, and wet weather conditions.

3. Orient all equipment to facilitate operation and maintenance.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Handle tanks and equipment to prevent damage, breaking, denting, and scoring of coatings. Do not install damaged equipment; repair to new condition or replace with new.

B. Advise the Owner in writing of the equipment shipping date 2 weeks in advance. In addition, verbal notice shall be given 48 hours prior to arrival.

C. Set packaged system in final location with a minimum of handling.

D. Keep all tank and piping openings capped or plugged as appropriate to keep water, debris, etc. out.

PART 2 - PRODUCTS

2.1 ADF AND AAF FLUID STORAGE TANKS

A. Acceptable Manufacturers:

1. Buckeye Fabricating (Springboro, OH)

2. International Production Specialists (Honey Creek, WI)

B. 20,000-Gallon ADF Storage Tanks

1. Provide two (2) nominal 10’-6” diameter by 31’-0” long 20,000-gallon design capacity, aboveground, horizontal, cylindrical, double-wall, carbon steel storage tanks.

2. Provide raised tank saddles such that the bottom invert of the tank inlets and outlets are no less than 24” from the bottom of the saddle.

3. Manufactured according to Underwriters Laboratory (U.L.) Standard 142 or ASME Section VIII.

4. Provide each tank with the following appurtenances (refer to the Contract Drawings for details).

i. One (1) 24-inch manway with bolted cover.

ii. One (1) 2” NPT fitting for thermal relief return

iii. One (1) 6” flanged fitting for the 6” service vent.

iv. One (1) 2” NPT fitting for the clock gauge.

v. One (1) 4” NPT fitting with 3” male camlock and dust cap for the sample port

vi. One (1) 4” NPT fitting for the tank level probe.

vii. One (1) 10-inch flanged connection for the primary emergency vent (or sized as recommended by the tank manufacturer).

viii. One (1) 10-inch flanged connection for the secondary emergency vent (or sized as recommended by the tank manufacturer).

ix. One (1) 4” NPT spare opening with threaded plug.

5. Exterior Finish: The tanks’ exterior surfaces shall be protected from corrosion via a factory prepared and finished coating system consisting of SP6 blast, one coat shop primer, and one coat aliphatic urethane gloss enamel, minimum of 3 mils dry film thickness, color white, or approved equal.

C. 20,000-Gallon AAF Storage Tank

1. Provide one (1) nominal 10’-6” diameter by 31’-0” long 20,000-gallon design capacity, aboveground, horizontal, cylindrical, double-wall, carbon steel storage tank.

2. Provide raised tank saddles such that the bottom invert of the tank inlets and outlets are no less than 24” from the bottom of the saddle.

3. Manufactured according to Underwriters Laboratory (U.L.) Standard 142 or ASME Section VIII.

4. Provide each tank with the following appurtenances (refer to the Contract Drawings for details).

i. One (1) 24-inch manway with bolted cover.

ii. One (1) 2” NPT fitting for thermal relief return

iii. One (1) 6” flanged fitting for the 6” service vent.

iv. One (1) 2” NPT fitting for the clock gauge.

v. One (1) 4” NPT fitting with 3” male camlock and dust cap for the sample port

vi. One (1) 4” NPT fitting for the tank level probe.

vii. One (1) 10-inch flanged connection for the primary emergency vent (or sized as recommended by the tank manufacturer).

viii. One (1) 10-inch flanged connection for the secondary emergency vent (or sized as recommended by the tank manufacturer).

ix. One (1) 4” NPT spare opening with threaded plug.

D. Exterior Finish: The tanks’ exterior surfaces shall be protected from corrosion via a factory prepared and finished coating system consisting of SP6 blast, one coat shop primer, and one coat aliphatic urethane gloss.

E. Stair and Catwalk Assembly:

1. As shown on the Contract Drawings provide two (2) shop fabricated stairways with handrails.

2. All material shall be painted safety yellow except safety gates and fiberglass grating.

3. The entire assembly shall be OSHA compliant.

4. The catwalks shall be supported by each tank as designed and recommended by the tank manufacturer.

F. Tanks shall meet the following requirements:

1. Tanks shall include manufacturers installation instructions, gauging stick and charts and warranty documentation.

2. The tanks shall be tested during the fabrication process by applying 1.5 to 5 psi to the primary and interstitial spaces to verify integrity.

3. The tanks shall include a permanently installed nameplate indicating the tank serial number.

4. Secondary Containment: A secondary containment system must include the following features:
   i. Means shall be provided for determining the level of liquid in the tanks. This means shall be accessible to the delivery operator and at a minimum shall include a vapor-tight gauge hatch on top of the tanks and a mechanical gauge.
   ii. Means shall be provided to prevent tank overfills by sounding an alarm when the liquid level in the tank reaches 90% of capacity and by automatically stopping delivery of liquid into the tank when the liquid level in the tank reaches 95% of capacity. In no case shall these provisions restrict or interfere with the proper functioning of the normal or emergency vents.
   iii. The primary and interstitial spaces shall be provided with emergency venting (long bolt manways are not allowed).
   iv. Means shall be provided to establish the integrity of secondary containment, in accordance with NFPA 30. The secondary containment shall be designed to withstand the hydraulic head resulting from a leak from the primary tank of the maximum amount of liquid that can be stored in the primary tank.

5. Provide tank openings, fittings, and pipe penetrations as shown on the Contract Drawings, as specified herein, and as necessary to facilitate all tank accessories described herein.

6. Double-butt weld internal construction.

7. Labeling: The tanks shall receive proper labeling, cautionary wording, and color codes per governing regulations cited herein. In addition, each tank nameplate shall indicate the following:
   i. Name of product to be stored in the tank
   ii. Year in which tank was manufactured.
   iii. Unique identification number (coordinate with Owner).

iv. Dimensions, design capacity, working capacity, and tank model number.

v. Name of tank manufacturer.

vi. Date of installation.

8. Warranty:

i. From the date of shipment, the storage tank shall be warranted for 30 years. All other components shall be warranted for 1 year to be free from defects in manufacturing, workmanship, and materials from the date of startup.

2.2 POTASSIUM ACETATE STORAGE TANKS

A. Acceptable Manufacturers:

1. Assmann (Garrett, IN)

2. Or approved equal

B. Provide two (2) nominal 8'-0" diameter by 16'-4" high, 5,600-gallon design capacity, aboveground, vertical, cylindrical, single-wall, polyethylene storage tanks.

C. Provide each tank with the following appurtenances (refer to the contract drawings for details):

1. One (1) 3-inch tank top bulkhead for the product inlet

2. One (1) 3-inch tank top vent assembly

3. Two (2) 2-inch tank top spare bulkheads (plugged)

4. One (1) 3-inch bottom outlet bulkhead

5. One (1) site gauge tube assembly

2.3 REMOTE FILL CONNECTIONS

A. Provide remote fill connections as follows:

1. Acceptable Manufacturers: Morrison 515, OPW 211, or approved equal

2. Provide one (1) dual port offloading remote fill box for offloading 100LL.

3. Provide one (1) single port offloading remote fill box for offloading Jet A. Each skid to be provided with it's own spill box.

4. Provide rear entry with dual 3-inch connections, dry disconnect and cap.

5. Model to include 4-leg stand with stainless steel construction and minimum of 15 gallons of capacity.

2.4 ABOVEGROUND PIPING

A. AAF and ADF Piping

1. Chemical Compatibility:
    i. Valves material seats and seals must be compatible with the product they are conveying:
        a. Mixture of up to 88% by weight of Propylene Glycol (CAS-No. 57-55-6) and Water (Cas-No. 7732-18-5).
2. The 20k ADF and AAF tanks shall have 3-inch fill & 6-inch supply manifold with 3-inch branches to equipment.
3. All piping shall be welded aboveground 304 schedule 10 stainless-steel.
4. All piping is to be welded and flanged. Welders must be ASME Section IX Certified for the welding they are doing. Welding techniques to minimize introduction of carbon and oxygen into the weld shall be used to avoid sensitization and poor corrosion performance. Piping interior shall be cleaned and free of slag and welding deposits. All welds should be treated with pickling paste to avoid corrosion.

B. Potassium Acetate Piping

1. Chemical Compatibility:
    i. Valves material seats and seals must be compatible with the product they are conveying:
    ii. AAF: Mixture of 45-55% by weight of Potassium Acetate (CAS-No. 127-08-2) and Water (Cas-No. 7732-18-5).
2. The 5,600 gal Potassium Acetate tanks shall have 3-inch supply and fill schedule 80 CPVC piping.

C. Any deviation must be authorized by the authority having jurisdiction and the Engineer.

D. Provide pipe supports as appropriate.

2.5 VALVES

A. Potassium Acetate System

1. Plastic Valves UV Resistance:
    i. Valves will be manufactured from UV resistant resin or coated with a UV protective coating per manufacturers requirement.
2. Plastic Valves to be Schedule 80 CPVC valves made with Virgin materials. Valves are to be true union.
3. Valve Pressure-Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
4. Valve Sizes: Same as upstream piping unless otherwise indicated.
5. Valves in Insulated Piping:
    i. Provide 2-inch extended neck stems.

6. Extended operating handles with nonthermal-conductive covering material, and protective sleeves that allow operation of valves without breaking vapor seals or disturbing insulation.

7. Memory stops that are fully adjustable after insulation is applied.

2.6 ADDITIONAL SUPPLIES

A. Maintenance materials:

1. Provide a minimum of 1-gallon of the specified paint for the tank exterior.

2. Provide padlocks where required within. All locks shall be keyed the same. Include a minimum of two extra locks and four extra key sets. Locks shall be Master Lock 911-DKA, or approved equal.

3.

PART 3 - EXECUTION

3.1 GENERAL:

A. All items specified herein shall be installed per the manufacturer's instructions, as well as all applicable codes and regulations, and as shown on the Contract Drawings.

3.2 EXAMINATION:

A. Examine areas and conditions under which the tanks are to be installed. Do not proceed with installation until satisfactory conditions are corrected.

3.3 PERMITTING & NOTIFICATIONS

A. Submit permit application as required and copy Engineer. Provide Engineer with copy of approved permit upon receiving.

B. Notify the Owner between 30 and 45 days prior to tank installation, and between 48 and 72 hours prior to tank installation, either electronically or in writing and copy the Engineer.

3.4 INSTALLATION:

A. Installation of Valves

1. Install valves with unions or flanges at each piece of equipment arranged to allow space for service, maintenance, and equipment removal without system shutdown.

2. Provide support of piping adjacent to valves such that no force is imposed upon valves.

3. Locate valves for easy access.

4. Install valves in horizontal piping with stem at or above center of pipe.

5. Install valves in position to allow full valve actuation movement.

6. Valve Tags: Comply with requirements in Section 230553 "Identification for HVAC Piping and Equipment" for valve tags and schedules.

7. Adhere to manufacturer's written installation instructions. Utilize primer on all solvent weld connections.

8. Adjust valve packing after piping systems have been tested and put into service, but before final adjusting and balancing. Replace valves exhibiting leakage.

B. Installation of steel storage tanks:

1. Off-load and install tanks and equipment in accordance with the manufacturer’s written instructions. Minimize handling.

2. Repair damage to coatings with suitable repair materials to a condition equal or better than original.

3. Integrity/leak test each tank as specified herein.

4. Notify the authorities having jurisdiction in writing and copy the Engineer between 30 and 45 days prior to the tank installation date.

5. Anchor the tank and equipment to the concrete pad as shown on the Contract Drawings

6. Repair damage to coatings with suitable repair materials to a condition equal or better than original.

7. If tanks are shipped with a vacuum monitor in the interstitial space, read and record the vacuum pressure. If the vacuum monitor reading is less than 12-inches Hg, perform step E below.

8. If tanks are not equipped with a vacuum monitor (or if tanks are shipped with a vacuum monitor in the interstitial space, but the vacuum monitor reading is less than 12-inches Hg), before off-loading each tank, pressure test tanks in accordance with manufacturer’s printed test instructions.

9. Tanks should not be pressurized beyond manufacturer’s specified limits.

10. The tank must hold the test pressure for 30 minutes.

11. Check fitting connections, and seams in outermost tank by applying a soapsuds solution.

12. Reject any leaking tanks.

13. All fittings, welds, and joints must be also coated with a soap solution and inspected for air leaks. Submit written certification stating that the tanks and piping systems

have been successfully tightness tested in the field consistent with NFPA 30, and as follows:

i. Tanks shall have the primary (inner) tank tested and the interstitial space tested for tightness in accordance with NFPA 30.

ii. Repair leaks discovered by testing. Tank repairs shall be done under supervision of tank manufacturer's representative. After repairs are completed, re-test tank (inner and outer chambers). If leaks cannot be repaired, replace the tank.

3.5 STARTUP AND TRAINING:

A. Startup: Startup of the deicing systems shall performed for as long a period as is necessary to ensure proper equipment operation.

B. Training: Provide training of the Owner’s workforce for the subject facility systems as scheduled below.

1. Deicing systems: 4-hours onsite.

2. Details pertaining to operation and maintenance of the various components shall be thoroughly explained. Any special tools required for adjusting and maintaining the equipment, or training materials, shall be furnished by the Contractor’s representative.

C. Any leaks, malfunctions, etc. shall be corrected/repaired to the satisfaction of the Owner’s Representative.

3.6 METER AND DISPENSER CALIBRATION

A. Coordinate and pay for a representative from the local or state Bureau of Weights and Measures (or equivalent agency) to visit the site and calibrate and certify all meters and dispensers as required.

END OF SECTION

SECTION 440000 - EQUIPMENT INSTALLATION

PART 1 - GENERAL

1.1 SCOPE. This section covers installation of new equipment units that have been purchased by Contractor as part of this Work.

Startup requirements shall be as indicated in Specification Sections 440001.

1.2 GENERAL. Equipment installed under this Section shall be erected and placed in proper operating condition in full conformity with the Drawings, Specifications, engineering data, instructions, and recommendations of the equipment manufacturer, unless exceptions are noted by Engineer.

When pumping units are being installed, hydraulic considerations and definition of terms shall be as set forth in the Hydraulic Institute Standards.

A. Coordination. When manufacturer's field services are provided by the equipment manufacturer, Contractor shall coordinate the services with the equipment manufacturer. Contractor shall give Engineer written notice at least 30 days prior to the need for manufacturer's field services furnished by others.

1.3 DELIVERY, STORAGE, AND HANDLING.

A. Storage. Upon delivery, all equipment and materials shall immediately be stored and protected by Contractor, until installed in the Work. Equipment shall be protected by Contractor against damage and exposure from the elements. At no time shall the equipment be stored on or come into contact with the ground, grass, or any other type of vegetation. Contractor shall keep the equipment dry at all times.

1.3 METHOD OF MEASUREMENT AND BASIS OF PAYMENT

A. Method of Measurement
All work in this section shall have no separate measurement and be included with the lump sum cost of item D-751 Stormwater Pump Station Structure, Pumps, Controls and all Appurtenances.

B. Basis of Payment
All work in this section shall have no separate basis of payment and be included with the lump sum cost of item D-751 Stormwater Pump Station Structure, Pumps, Controls and all Appurtenances.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General. Equipment shall not be installed or operated except by, or with the guidance of, qualified personnel having the knowledge and experience necessary to obtain proper results as specified in the Specification Sections 440001 – Startup Requirements.

Each equipment unit shall be leveled, aligned, and shimmed into position.

Installation procedures shall be as recommended by the equipment manufacturer and as required herein. Shimming between machined surfaces will not be permitted.

Anti-seize thread lubricant shall be liberally applied to the threaded portion of all stainless steel bolts during assembly.

When specified in the equipment Sections, the equipment manufacturer will provide installation supervision and installation checks. For installation supervision, the manufacturer's field representative will observe, instruct, guide, and direct Contractor's erection or installation procedures as specified in the equipment specifications. For installation checks, the manufacturer's field representative will inspect the equipment installation immediately following erection by Contractor, and observe the tests indicated in Startup Requirements section.

B. Pumping Units. When pumping units are to be installed, the equipment shall be installed in accordance with the Hydraulic Institute Standards. When installing pumping units, the equipment base shall be grouted after initial fitting and alignment, but before final bolting of connecting piping. Special care shall be taken to maintain alignment of pumping unit components. No stresses shall be transmitted to the pump flanges. After final alignment and bolting, connections to pumping equipment shall be tested for applied piping stresses by loosening the flange bolts. If any movement or opening of the joints is observed, piping shall be adjusted to proper fit.

Couplings shall be realigned after grouting. Final coupling misalignment shall be within one-half of the coupling manufacturer's allowable tolerance.

3.2 FIELD QUALITY CONTROL.

A. Installation Supervision. The Contractor shall provide the services of a qualified field installation supervisor of the manufacturer during the equipment installation. Manufacturers' installation supervisor shall observe, instruct, guide, and direct the installing contractor's erection or installation procedures. The equipment manufacturer shall be provided with written notification 10 days prior to the need for such services.

Contractor shall include a minimum number of days and trips to the site for Installation Supervision as indicated in each specific equipment Specification Section. Should, in the Contractor’s opinion, the Contractor require additional time for manufacturer’s Installation Supervision for a particular piece or pieces of equipment in excess of the minimum time specified, the Contractor shall include the cost of that additional time in the price bid for this Contract.

B. Installation Check. The Contractor shall provide the services of an experienced, competent, and authorized representative of the manufacturer shall visit the site of the Work and inspect, check, adjust, and approve the equipment installation. The representative shall be present when the equipment is placed in operation, and shall revisit the job site as often as necessary until all trouble is corrected and the equipment installation and operation are satisfactory in the opinion of the Engineer.

C. Installation Certification. The manufacturer's representative shall furnish a written report certifying to the Contractor and the Engineer that the equipment has been properly installed and lubricated; is in accurate alignment; is free from any undue stress imposed connecting piping or anchor bolts; and has been operated under full load conditions and that it operated satisfactorily.

3.3 STARTUP AND TESTING. Startup requirements, and tests associated with startup shall be as indicated in Specification Sections 440001. Other field tests shall be as indicated in the specific equipment sections. Startup and tests required shall occur in the order listed in the following paragraphs. Tests shall not begin until any installation supervision and installation checks by the equipment manufacturer have been completed, except where noted below.

A. Preliminary Field Tests. Preliminary field tests shall be conducted on all equipment by Contractor as indicated in Specification Sections 440001 – Startup Requirements. When an installation check is specified in the equipment sections, the equipment manufacturer's representative will participate in these tests to the extent described in Specification Sections 440001 and in the equipment sections.

B. Field System Operation Tests. Field system operation tests shall be conducted on all equipment by Contractor as indicated in Specification Sections 440001 – Startup Requirements. When an installation check is specified in the equipment sections, the equipment manufacturer's service personnel will participate in these tests to the extent described in Specification Sections 440001 and in the equipment sections.

C. Field Demonstration Tests. Field demonstration tests will be conducted by the equipment manufacturer on equipment as indicated and as specified in the equipment sections.

D. Field Performance Tests. Field performance tests will be conducted by the equipment manufacturer on equipment as indicated and as specified in the equipment sections.

E. Field Baseline Performance Tests. Field baseline performance tests shall be conducted by Contractor on the equipment indicated in the equipment sections, and the tests shall be performed as indicated. When indicated in the equipment sections, the equipment manufacturer will participate in these tests. This test shall not be considered an acceptance test, but rather a test to determine initial performance curves and efficiency just prior to the equipment entering service. The Contractor shall repeat these tests at the end of the one year warranty period.

END OF SECTION

SECTION 440001 - STARTUP REQUIREMENTS

1.1 SCOPE. This Section covers startup requirements for all items of equipment and systems including mechanical equipment. Additional requirements may be specified in specific equipment specifications. The requirements of this Section shall be satisfactorily completed prior to any field tests specified in the specific equipment Sections.

1.2 METHOD OF MEASUREMENT AND BASIS OF PAYMENT.

A. Method of Measurement
All work in this section shall have no separate measurement and be included with the lump sum cost of item D-751 Stormwater Pump Station Structure, Pumps, Controls and all Appurtenances.

B. Basis of Payment
All work in this section shall have no separate basis of payment and be included with the lump sum cost of item D-751 Stormwater Pump Station Structure, Pumps, Controls and all Appurtenances.

2.1 GENERAL. Equipment shall not be operated except by, or with the guidance of, qualified personnel having the knowledge and experience necessary to obtain proper results. All items of equipment and systems shall be tested for proper operation, efficiency, and capacity. All required adjustments, tests, operation checks, and other startup activity shall be provided by qualified personnel. Contractor shall be responsible for planning, supervising, and executing the installation of Work.

A. Coordination. Contractor shall coordinate all tests related to startup of equipment and systems and shall report the results to Engineer in accordance with the Submittals Section. Contractor shall accept the equipment and the test results related to starting of equipment and systems before the Owner’s Representative will accept the equipment and the test results.

When equipment is ready for a witness test, Contractor shall give written notice to the Owner’s Representative at least 14 days before any offsite witness testing is performed or any field witnessed performance testing, unless otherwise specified.

3.1 EQUIPMENT TESTS.

A. Factory Tests. When specified in the specific equipment Sections, the equipment will be test run at the point of manufacture at the expense of the Supplier and the test results will be delivered to Engineer. Such equipment will not be shipped until the Owner’s Representative has reviewed the test results and advised the Contractor, in writing, that the equipment is acceptable for shipment. Such acceptance, however, will not be considered as final acceptance, which will only be made on the basis of the test results of the equipment after installation.

B. Preliminary Field Tests. All items of mechanical equipment shall be given a preliminary field test by Contractor after installation for proper operation, efficiency, and capacity. The preliminary field test shall consist of the requirements listed herein, unless exceptions or

additions are indicated in the specific equipment Sections.

Contractor's test operation of each piece of mechanical equipment shall continue for not less than 8 hours without interruption. All moving parts of equipment and machinery shall be carefully tested for operation, and adjusted so all parts move freely and function to secure satisfactory operation. All equipment shall be tested continuously under actual or simulated operating conditions. All parts shall operate satisfactorily in all respects, under continuous full load and in accordance with the specified requirements, for the full duration of the 8 hour test period. If any part of a unit shows evidence of unsatisfactory or improper operation during the 8 hour test period, correction or repairs shall be made and the full 8 hour test operation, as specified, shall be completed after all parts operate satisfactorily.

Tests of all process and pumping equipment, drive motors, including auxiliaries shall be made in accordance with the appropriate and approved test codes such as the American Society of Mechanical Engineers, Hydraulic Institute Standards, and IEEE.

Tests shall be conducted after the Work is substantially complete so each item of equipment is ready for integrated operation with other equipment at the plant. Testing, measuring, and calibrating procedures shall be submitted to Engineer for review and acceptance prior to startup and testing of equipment.

The equipment shall be properly filled, by Contractor, with oil and grease, and Contractor shall furnish all power, personnel, water, chemicals, fuels, oil, grease, and auxiliaries necessary for conducting the testing of the equipment for proper operation, efficiency, and capacity.

The period of inspection, initial startup operation, and field adjustment shall be as needed to achieve satisfactory installation and operation of the items furnished. Any period required for instruction of Owner's personnel shall be as specified in the Contract Documents.

When the specific equipment Sections indicate that an installation check is required by the equipment manufacturer, the manufacturer's representative will make all necessary field adjustments and correct defects in materials or workmanship during this test period.

All equipment installed under this Contract, including that furnished by others, shall be placed into successful operation according to the written instructions of the equipment manufacturer and the instructions of the manufacturer's field representative.

C. Field System Operation Test. After all equipment is installed and the entire plant or system is ready to operate, Contractor shall conduct a field system operation test. The test shall consist of the requirements listed herein, unless exceptions or additions are indicated in the specific equipment Sections.

The test period shall be at least 7 days, and each system shall operate under actual or simulated operating conditions before a certificate of Substantial Completion of the Work is issued. All defects of material, workmanship, or equipment which appear during this test period shall be corrected by Contractor. After such corrections are made, the 7 day test shall be repeated before a certificate of Substantial Completion of Work is issued, unless waived by Owner’s Representative.

Contractor shall supply all power, water, oil, grease, auxiliaries, and operating personnel

required for this operation test.

When necessary for certain items of equipment, the final adjustments and inspections will be made by factory trained service personnel (other than sales representatives), representing the Supplier, rather than by Contractor. The service personnel will also supervise the test operation. This requirement will be stated under the detailed specification for the particular piece or pieces of equipment. The manufacturer's service personnel will make adjustments and supervise testing by Contractor until such tests have been accepted by the Owner's Representative.

4.1 ACCEPTANCE. When no other field tests for acceptance are specified in the equipment Sections, at the end of the field system operation testing, each system will be accepted if, in the opinion of the Owner's Representative, it has operated satisfactorily without excessive power use, wear, or need for lubrication, or requiring undue attention; and if all its rotating parts operate without excessive vibration or noise at any operating condition.

When other field tests for acceptance are specified in the equipment Sections, acceptance shall be after all tests are satisfactorily conducted as specified in the appropriate equipment procurement specification.

When a field performance test for baseline is specified in the equipment Sections, acceptance shall be after a completion of the baseline performance test that is conducted as specified in the pumping unit field testing - baseline performance Section.

Acceptance by Owner or approval of the manufacturer's field representative will not relieve Contractor of responsibility for defective Work.

END OF SECTION

SECTION 440002 - INSTRUCTION OF OPERATIONS AND MAINTENANCE PERSONNEL

PART 1 - GENERAL

1.1 DESCRIPTION

A. CONTRACTOR shall provide services of Supplier's operation and maintenance training specialists to instruct Owner's personnel in recommended operation and maintenance procedures for products and equipment per the Specifications.

B. Supplier shall provide a combination of classroom and field training. All training shall be conducted at the Site, unless otherwise stated in the Specifications.

C. OWNER reserves the right to videotape training sessions.

D. Scheduling of Training Sessions:

1. General:

CONTRACTOR shall coordinate training services with start-up and initial operation of products and equipment on days and times, and in manner, acceptable to OWNER and per the Specifications.

Training may be required outside of normal business hours to accommodate schedules of operations and maintenance personnel. Provide services as necessary at no additional cost to OWNER.

2. Prerequisites to Training:

Training of OWNER'S personnel shall commence only after acceptable preliminary operation and maintenance data have been provided and Work described in Section 440001 – Startup Requirements has been completed.

At option of OWNER or OWNER'S REPRESENTATIVE, training may be allowed to take place before, during, or after equipment start-up.

3. Training Schedule Submittal:

Training Schedule Required: CONTRACTOR shall prepare and submit proposed training schedule for review and acceptance by OWNER'S REPRESENTATIVE and OWNER. Proposed training schedule shall show all training required under the Contract, and shall demonstrate compliance with specified training requirements relative to number of hours of training, number of training sessions, and scheduling.

Timing of Submittal: Submit initial training schedule at least sixty days prior to scheduled start of first training session. Submit final training schedule, incorporating

revisions per comments of OWNER and OWNER'S REPRESENTATIVE, no later than thirty days prior to start of first training session. OWNER'S REPRESENTATIVE may reduce the number of days and otherwise modify requirements for submittal of training schedule.

OWNER reserves the right to modify training schedule to meet process or emergency needs at the Site.

1.2 QUALITY ASSURANCE

A. Qualifications:

1. Supplier's instructors shall be factory-trained by manufacturer of equipment or product.

2. Supplier's instructors shall be proficient and experienced in conducting training of type required.

3. Qualifications of instructors are subject to acceptance by OWNER'S REPRESENTATIVE. If OWNER'S REPRESENTATIVE does not accept qualifications of proposed instructor, provide replacement instructor with acceptable qualifications.

B. Training Scheduling Conference:

1. Prior to preparing initial training schedule submittal, schedule and hold training scheduling conference at the Site, to review:

Training requirements per the Contract Documents.

Work to be completed prior to starting training.

Work progress and Progress Schedule relative to start-up and training.

Scheduling constraints for Owner's personnel (i.e., days and times of training sessions).

Preferred days for training.

Training location and facilities available.

Required submittals.

Other issues relative to training of operations and maintenance personnel.

2. Attendance is mandatory for the following:

Contractor's project manager.

Contractor's Site superintendent.

Project manager of Subcontractors responsible for providing equipment and products for which training of Owner's personnel is required.

Suppliers invited by CONTRACTOR.

OWNER'S REPRESENTATIVE.

Owner's staff responsible for training coordination, and staff responsible for scheduling operations and maintenance personnel.

3. If additional information must be developed to adequately cover agenda items, reconvene conference as soon as possible.

4. CONTRACTOR shall record discussions of conference and decisions and agreements (or disagreements) and provide copy of record to each conference attendee.

1.3 SUBMITTALS

A. Action Submittals: Submit the following:

1. Training Schedule: Detailed schedule of training sessions, demonstrating compliance with number of training sessions, hours required in the Contract Documents, and specified schedule requirements. Provide training schedule submittals per time frames specified in this Specification Section.

B. Informational Submittals: Submit the following:

1. Lesson Plan: Acceptable proposed lesson plan for training on each product or equipment item, per Table 440002-A and Specifications. Lesson plan shall conform to requirements of this Specification Section. Include with lesson plan copy of handouts that will be used during training sessions. Provide lesson plan submittals per time frames specified in this Specification Section.

2. Qualifications: Credentials of Supplier's proposed operations and maintenance instructor(s). Credentials shall demonstrate compliance with requirements of this Specification Section and shall include brief resume and specific details of instructor's operation, maintenance, and training experience relative to the specific products for which instructor will provide training.

3. Minutes of training scheduling conference.

C. Closeout Submittals: Submit the following:

1. Trainee sign-in sheet for each training session. Provide to Owner's training coordinator.

1.4 LESSON PLAN

A. Supplier's lesson plan shall describe specific instruction topics, system components for which training will be provided, and training procedures. Handouts to be used in training shall be attached to lesson plan when applicable. Describe in lesson plan "hands-on" demonstrations planned for training sessions.

B. Provide acceptable lesson plan fourteen days prior to starting associated training.

C. Lesson plan shall include estimated duration of each training segment.

D. Lesson plan shall include the following:

1. Equipment Overview (required for all types of operations and maintenance training):

   Describe equipment's operating (process) function and performance objectives.

   Describe equipment's fundamental operating principles and dynamics.

   Identify equipment's mechanical, electrical, and electronic components and features. Group related components into subsystems and describe function of subsystem and subsystem's interaction with other subsystems.

   Identify all support equipment associated with operation of subject equipment (i.e., air intake filters, valve actuators, motors).

   Identify and describe all safety precautions and potential hazards related to operation.

   Identify and describe in detail safety and control interlocks.

2. Operations Personnel Training:

   Equipment Overview: As described above.

   Operation:

   Describe operating principles and practices.

   Describe routine operating, start-up, and shutdown procedures.

   Describe abnormal or emergency start-up, operating, and shutdown procedures that may apply.

   Describe alarm conditions and responses to alarms.

   Describe routine monitoring and recordkeeping procedures.

   Describe recommended housekeeping procedures.

Troubleshooting: Describe how to determine if corrective maintenance or an operating parameter adjustment is required.

3. Mechanical Maintenance Training:

Equipment Overview: As described above.

Equipment Preventive Maintenance:

Describe preventative maintenance inspection procedures required to:

Inspect equipment in operation.

Spot potential trouble symptoms and anticipate breakdowns.

Forecast maintenance requirements (predictive maintenance).

Define recommended preventative maintenance intervals for each component.

Provide lubricant and replacement part recommendations and limitations.

Describe appropriate cleaning practices and recommend intervals.

Identify and describe use of special tools required for maintenance of equipment.

Describe component removal/installation and disassembly/assembly procedures.

Perform “hands-on” demonstrations of preventive maintenance procedures.

Describe recommended measuring instruments and procedures, and provide instruction on interpreting alignment measurements, as appropriate.

Define recommended torquing, mounting, calibrating, and aligning procedures and settings, as appropriate.

Describe recommended procedures to check and test equipment following corrective maintenance.

Equipment Troubleshooting:

Define recommended systematic troubleshooting procedures.

Provide component-specific troubleshooting checklists.

Describe applicable equipment testing and diagnostic procedures to facilitate troubleshooting.

Describe common corrective maintenance procedures with “hands on” demonstrations.

4. Instrumentation/Controls Maintenance Training:

Equipment Overview: As described above.

OWNER'S REPRESENTATIVE may grant waiver(s) to allow all training for a given system to be at the Site.

1.5 TRAINING AIDS

A. Supplier's instructor shall incorporate training aids as appropriate to assist in the instruction. Provide text and figure handouts. Other appropriate training aids include:

1. Audio-Visual aids, such as videos, PowerPoint presentations, overhead transparencies, posters, blueprints, diagrams, catalog sheets.

2. Equipment cutaways and samples, such as spare parts and damaged equipment.

3. Tools, such as repair tools, customized tools, measuring and calibrating instruments.

B. Handouts:

1. Supplier's instructor shall utilize descriptive class handouts during training. Customized handouts developed especially for training at the Site are encouraged.

2. Photocopied handouts shall be good quality and completely legible.

3. Handouts should accompany the instruction with frequent reference made to handouts.

4. Provide at least fifteen copies of handouts per training session.

C. Audio-visual Equipment: Supplier shall provide audio-visual equipment required for training sessions. If it is available at the Site, OWNER may make available Owner's audio-visual equipment; however, do not count on OWNER providing audio-visual equipment. Audio-visual equipment that Supplier shall provide, as required, includes:

1. Laptop computer, presentation software, and PowerPoint projector.

2. As required, extension cords and spare bulb for projector.

1.6 METHOD OF MEASUREMENT AND BASIS OF PAYMENT.

A. Method of Measurement

All work in this section shall have no separate measurement and be included with the lump sum cost of item D-751 Stormwater Pump Station Structure, Pumps, Controls and all Appurtenances.

B. Basis of Payment

All work in this section shall have no separate basis of payment and be included with the lump sum cost of item D-751 Stormwater Pump Station Structure, Pumps, Controls and all Appurtenances.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.1 TRAINING DELIVERY

A. General:

1. Instructors shall be fully prepared for the training sessions. Training delivery shall be communicative, clear, and proceed according to lesson plan accepted by OWNER'S REPRESENTATIVE, with lesson content appropriate for trainees. If OWNER or OWNER'S REPRESENTATIVE deems that training delivery does not to conform to requirements of Specifications, training shall be postponed, rescheduled, and re-performed in acceptable manner at no additional cost to OWNER.

2. Trainee Sign-in Sheets: In format acceptable to OWNER, provide sign-in sheet for trainees for each session. Sign-in sheets shall include the Project name, product or system for which training was provided, and type of training (e.g., operations, mechanical maintenance, instrumentation/controls maintenance, or other), and name of each trainee. Upon completion of training, provide copy of each sign-in sheet to Owner's training coordinator.

B. "Hands-On" Demonstrations:

1. Supplier's instructor shall present "hands-on" demonstrations of operations and maintenance of equipment for each training session, per lesson plan accepted by OWNER'S REPRESENTATIVE.

2. CONTRACTOR and Supplier shall all provide tools necessary for demonstrations.

3.2 TRAINING SCHEDULE

A. Supplier shall provide, at minimum, hours of training and number of sessions shown in Table 440002-A. Travel time and expenses are responsibility of Supplier and are excluded from required training time specified in Table 440002-A and in the Specifications.

B. Shifts and Training Sessions Required:

1. Owner's operations at the Site take place 24 hours per day, divided into three shifts as follows: day, evening, and night shift.

2. Training Sessions per Shift:

Operators: Maximum training per day is four hours; sessions longer than four hours shall be spread over multiple, preferably consecutive, days. Provide identical training sessions as follows:

Two identical sessions during day shift, each session in a different week.

One session during evening shift.

One session during night shift.

Mechanical Maintenance: Provide two identical training sessions during day shift, each session in a separate week, for designated equipment. Maximum training per day is four hours; sessions longer than four hours will be spread over multiple, preferably consecutive, days.

Instrument/Controls Maintenance: Provide two identical training sessions during day shift, each session in a separate week, for designated equipment. Maximum training per day is four hours; sessions longer than four hours will be spread over multiple, preferably consecutive, days.

TRAINING SUMMARY TABLE
TABLE 440002-A

Specification Section	Type of Equipment	Operations # Training Sessions Required	Operations Hours per Training Session	Maintenance # Training Sessions Required	Maintenance Hours per Training Session	Electrical and Instrument Maintenance # Training Sessions Required	Electrical and Instrument Maintenance Hours per Training Session	Total Hours
333211	Submersible Sewage Pumps	1	4	1	2	1	2	8
405300	Programmable Logic Controllers	1	4	1	2	1	2	8

END OF SECTION

SECTION 440003 - OPERATIONS AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 DESCRIPTION

A. Provide operation and maintenance data, as described in this Section, for use as instructional and reference manuals by operations and maintenance personnel at the Site. Listing of operation and maintenance data required is in Table 440003-A at the end of this Section.

B. Required Operation and Maintenance Data: For each operation and maintenance manual required, provide the following:

1. Preliminary Submittal: Printed and bound copy of entire operation and maintenance manual, except for test data, service reports by Supplier's representative, and electronic copies.

2. Final Submittal: Printed and bound copy of complete operations and maintenance manual, including test data and service reports by Supplier's representative, with electronic copies.

C. Prepare each operations and maintenance manual specifically for Project. Include in each manual all pertinent instructions, as-built drawings as applicable, bills of materials, technical bulletins, installation and handling requirements, maintenance and repair instructions, and other printed materials required to provide accurate and comprehensive information for safe and proper operation, maintenance, and repair of products furnished for Project. Include in manual all specific information required by applicable Specification Section, and all data required by Laws and Regulations and by authorities having jurisdiction.

1.2 NUMBER OF COPIES AND TIMING OF SUBMITTALS

A. Number of Copies Required and Timing of Submittals:

1. Preliminary Submittal:

Three hard copies and one electronic copy, exclusive of copies required by CONTRACTOR.

Provide submittal to OWNER'S REPRESENTATIVE by the earlier of: ninety days following approval of Shop Drawings and related submittals, or ten days prior to starting operations and maintenance personnel training and operational testing at the Site.

Preliminary submittal shall be provided in acceptable form and content and be reviewed by OWNER'S REPRESENTATIVE before payment will be made for the associated products.

2. Final Submittal: Provide final submittal prior to Substantial Completion, unless submittal is specified as required prior to an interim Milestone.

Printed Copies: 3 copies.

Electronic Copies: 1 copy.

1.3 FORMAT OF HARDCOPIES

A. Binding and Cover:

1. Bind each operation and maintenance manual in durable, permanent, stiff-cover binder(s), comprising one or more volumes per copy as required. Binders shall be minimum one-inch wide and maximum of three-inch wide. Binders for each copy of each volume shall be identical.

2. Binders shall be locking three-ring/”D”-ring type, or three-post type. Three- ring binders shall be riveted to back cover and include plastic sheet lifter (page guard) at front of each volume.

3. Do not overfill binders.

4. Covers shall be oil, moisture, and wear resistant, including identifying information on cover and spine of manual.

5. Provide the following information on cover of each volume:

Title, ”OPERATING AND MAINTENANCE INSTRUCTIONS”.

Name or type of equipment covered in the manual.

Volume number, if more than one volume is required.

Name of Project and, if applicable, contract name and number.

Name of building or structure, as applicable.

6. Provide the following information on spine of each volume:

Title, ”OPERATING AND MAINTENANCE INSTRUCTIONS”.

Name or type of equipment covered in the manual.

Volume number, if more than one volume is required.

Project name and building or structure name.

B. Pages:

1. Print pages in manual on 8.5 inches by 11 inches paper.

2. Provide each page with binding margin of at least one inch wide. Punch each page with holes suitable for the associated binding.

C. Drawings:

1. Bind into the manual drawings, diagrams, and illustrations up to and including 11 by 17 inches in size, with reinforcing specified for pages.

2. Documents larger than 11 inches by 17 inches shall be folded and inserted into clear plastic pockets bound into the manual. Mark pockets with printed text indicating content and drawing numbers. Provide no more than three drawings per pocket.

D. Copy Quality and Document Clarity:

1. All contents shall be original-quality copies, viz., material shall either be original manufacturer-printed materials or first-generation photocopies indistinguishable from originals. Manuals that contain copies that are not clear, not completely legible, off-center, skewed, or where text or drawings are cut by binding holes, will be rejected. Pages that contain approval or date stamps, comments, or other markings that cover text or drawing are unacceptable. Faxed copies are unacceptable.

2. Clearly mark in ink all components of equipment on catalog pages for ease of identification. In standard or pre-printed documents, indicate options provided or cross out inapplicable material. Use of highlighters is unacceptable.

E. Organization:

1. Coordinate with OWNER'S REPRESENTATIVE and OWNER to develop comprehensive, practical, and consistent indexing system for operations and maintenance data. OWNER'S REPRESENTATIVE and OWNER will review indexing system before operations and maintenance data is submitted.

2. Table of Contents:

   Provide table of contents in each volume of each operations and maintenance manual.

   In table of contents and at least once in each chapter or section, identify products by their functional names. Thereafter, abbreviations and acronyms may be used if their meaning is explained in table bound at or near end of each volume. Using product model or catalog designations for identification is not acceptable.

3. Use dividers and indexed tabs between major categories of information, such as operating instructions, preventive maintenance instructions, and other major subdivisions of data in each manual.

1.4 FORMAT OF ELECTRONIC COPIES

A. Electronic Copies of Manuals:

1. Electronic copy shall include all information provided in hardcopy.

2. Provide each electronic copy on a separate compact disc (CD).

3. File Format:

Files shall be in Adobe Acrobat portable document format (PDF). Files shall be electronically searchable.

Provide separate file for each separate document in the hardcopy.

Within each file, provide bookmarks for the following: Each chapter and subsection listed in the hardcopy document's table of contents; Each figure; Each table; and Each appendix.

4. Also provide drawings and figures in one of the following formats: ".bmp", ".tif", ".jpg", or ".gif". Provide files in separate directory on CD.

B. Copies of Programming and Configuration Files:

1. Provide on CD copy of all software programming, such as programmable logic controller programs, prepared specifically for the Project. Third-party, commercially available software is excluded from requirements of this article; provide copies of commercially-available, third-party software as specified in the Contract Documents.

2. Provide on CD copies of system configuration prepared specifically for the Project, such as SCADA display configurations.

3. Provide number of programming and configuration files as specified for electronic copies of operation and maintenance data.

1.5 CONTENT

A. Provide complete, detailed written operating instructions for each product including: function; operating characteristics; limiting conditions; operating instructions for start-up, normal and emergency conditions; regulation and control; operational troubleshooting; and shutdown. Also include, as applicable, written descriptions of alarms generated by product and proper responses to such alarm conditions.

B. Provide written explanations of all safety considerations relating to operation and maintenance procedures.

C. Provide complete, detailed, written preventive maintenance instructions including all information and instructions to keep product or system properly lubricated, adjusted, and maintained so that products function economically throughout design life. Instructions shall include:

1. Written explanations with illustrations for each preventive maintenance task such as inspection, adjustment, lubrication, calibration, and cleaning. Provide pre-startup check-lists for each equipment item and maintenance requirements for long-term shutdowns.

2. Recommended schedule for each preventive maintenance task.

3. Lubrication charts indicating recommended types of lubricants, frequency of application or change, and where each lubricant is to be used or applied.

4. Table of alternative lubricants.

5. Troubleshooting instructions.

6. List of required maintenance tools and equipment.

D. Complete bills of material or parts lists for products provided. Lists or bills of material may be provided on a per-drawing or per-equipment assembly basis. Bills of material shall indicate:

1. Manufacturer's name, address, telephone number, fax number, and Internet website address.

2. Manufacturer's local service representative's or local parts supplier's name, address, phone number, fax number, and Internet and e-mail addresses, if applicable.

3. Manufacturer's shop order and/or serial number(s) for product or assembly furnished.

4. For each part or piece provide:

Parts cross-reference number. Cross-reference number shall be used to identify the part on assembly drawing, Shop Drawing, or other type of illustration where the part is clearly shown.

Part name or description.

Manufacturer's part number.

Quantity of each part used in each assembly.

Current unit price of the part at the time the operations and maintenance manual is submitted. Price list shall be dated.

E. Complete instructions for ordering of all replaceable parts, including reference numbers (e.g., shop order or serial number) that will expedite ordering process.

F. Manufacturer's recommended inventory levels for spare parts and consumable supplies for the first two years of operation. Consumable supplies are those items consumed or worn by operation of equipment, and items used in maintaining the operation of product, including items such as lubricants, seals, reagents, and testing chemicals used for calibrating or operating the equipment. Provide estimated delivery times, shelf life limitations, and special storage requirements.

G. Provide manufacturer's installation and operation bulletins, diagrams, schematics, and equipment cutaways. Avoid providing catalog excerpts unless they are the only material available showing identification or description of particular component of the equipment. Where materials pertain to multiple models or types, mark the literature to indicate specific product supplied. Marking may be in the form of checking, arrows, or underlining to show pertinent information, or by crossing out or other means of obliterating information that does not apply to the products furnished.

H. Provide original-quality copies of each approved and accepted Shop Drawing and submittal, updated to as-installed condition. Reduced drawings are permissible only if reduction is to not

less than one-half original size and all lines, dimensions, lettering, and text are completely legible on the reduction.

I. Provide complete electrical schematic and wiring diagrams, including complete point-to-point wiring and wiring numbers or colors between all terminal points.

J. Programmable Logic Controllers:

1. Provide complete ladder diagram logic.

2. For ladder diagram logic, include complete cross-referencing of all logic elements. Annotate all elements with clearly understandable tags or descriptive labels.

3. For function block diagram, label each function block with understandable tags or descriptive labels. Describe purpose and action of each function block.

4. For sequential function chart, include extensive comments for each step to describe program step function.

5. For instruction list and structured text, include extensive comments for each program line to describe program line function.

6. Provide complete programmable logic controller listing of all input/output address assignments, tag assignments, and pre-set constant values, with functional point descriptions.

7. Provide complete manufacturer's programming manuals.

K. Copy of warranty bond and service contract as applicable.

L. When copyrighted material is used in operations and maintenance manual, obtain copyright holder's written permission to use such material in the operation and maintenance manual.

1.6 SUBMITTALS REQUIRED

A. Provide operation and maintenance data for the following:

TABLE 440003-A
REQUIRED OPERATIONS AND MAINTENANCE DATA

Specification Section	Type of Equipment
333211	Submersible Sewage Pumps

1.7 METHOD OF MEASUREMENT AND BASIS OF PAYMENT

A. Method of Measurement
All work in this section shall have no separate measurement and be included with the lump sum cost of item D-751 Stormwater Pump Station Structure, Pumps, Controls and all Appurtenances.

B. Basis of Payment
All work in this section shall have no separate basis of payment and be included with the lump sum cost of item D-751 Stormwater Pump Station Structure, Pumps, Controls and all Appurtenances.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

CENTRALIZED DEICING PAD DESIGN

SYR – SYRACUSE HANCOCK
INTERNATIONAL AIRPORT
ONONDAGA COUNTY, NEW YORK

C&S PROJECT#: 068.069.001

RGE PROJECT #: 24.0038

GEOTECHNICAL ENGINEERING SERVICES REPORT

RENAISSANCE
GEOTECHNICAL
ENGINEERING™



PREPARED FOR:

C&S ENGINEERS, INC.
499 COL. EILEEN COLLINS BLVD.
SYRACUSE, NEW YORK 13212

PREPARED BY:

RENAISSANCE GEOTECHNICAL ENGINEERING, PLLC
P.O. BOX 2503
GLENVILLE, NY 12302
al@renaissancegeo.com

THIS DOCUMENT CANNOT BE ALTERED WITHOUT EXPRESS WRITEN CONSCENT OF RENAISSANCE GEOTEOCHNICAL ENGINEERING, PLLC. IT IS A VIOLATION OF THE UNIVERSITY OF THE STATE OF NEW YORK, EDUCATION DEPARTMENT LAW FOR ANY PERSON TO ALTER ANY DOCUMENT THAT BEARS THE SEAL OF A PROFESSIONAL ENGINEER, UNLESS THE PERSON IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER.

RENAISSANCE GEOTECHNICAL ENGINEERING™

January 10, 2025

C&S ENGINEERS, INC.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212

Attn.: Mr. Chris Brubach, P.E., Principal Engineer Via Email to: cbrubach@cscos.com

RE: Subsurface Investigation & Geotechnical Evaluation
Centralized Deicing Pad Design
SYR - Syracuse Hancock International Airport
C&S Project Number: 068.069.001
RGE Project Number: 24.0038

Dear Mr. Brubach:

In accordance with our contract dated October 10, 2024, Renaissance Geotechnical Engineering, PLLC (RGE) has completed the subsurface investigation and Geotechnical Evaluation for the Centralized Deicing Pad Design Project at the Syracuse Hancock International Airport in Syracuse, Onondaga County, New York.

The purpose of this investigation is to estimate the existing pavement thicknesses and establish geotechnical engineering properties of the near surface soils for foundation and pavement design. Results of the field investigations and engineer's review provide the information needed to evaluate the strength of the subgrade soils and generate input parameters for design.

Mr. Brubach, we appreciate the opportunity to work with you on this project, and at your request, we are prepared to assist you with the proper construction monitoring and testing services. If you have any questions regarding the information contained in this report or if we can be of further assistance, please call us at (518) 902-9222 or email at al@renaissancegeo.com

Respectfully,
RENAISSANCE GEOTECHNICAL ENGINEERING, PLLC



Alseny Diop, P.E.
Principal Geotechnical Engineer

REPORT SECTIONS

1.0 INTRODUCTION **2**
2.0 PROJECT DESCRIPTION **2**
3.0 SUBSURFACE EXPLORATION **2**
4.0 EXISTING CONDITIONS **3**
5.0 GROUNDWATER CONDITIONS **7**
6.0 FIELD AND LABORATORY EVALUATIONS **8**
7.0 GEOTECHNICAL CONSIDERATIONS AND RECOMMENDATIONS **8**
7.1 Pavement and Subgrade Recommendations 8
7.2 California Bearing Ratio (CBR) 10
7.3 Light Pole Bases 10
8.0 CONSTRUCTION DEWATERING **10**
9.0 CONSTRUCTION MONITORING **10**
10.0 GENERAL **11**

Appendix A – Vicinity Map & Boring Location Diagram
Appendix B – General Notes, Boring Acronym, Boring Logs
Appendix C – Gradation Graphs & other Index Test Results
Appendix D – Moisture-Density Relationship Results
Appendix E – California Bearing Ratio (CBR) Results
Appendix F – DCP Test Results
Appendix G – Infiltration Test Results
Appendix H – P-209 Gradation Limit Curves
Appendix I – P-154 Aggregate Subbase Limit Curves
Appendix J – P-154 Recycled Asphalt or Concrete Pavement (RAP or RCO) Limits

List of Tables:

Table I – Description of Completed Pavement Cores
Table II – Groundwater Levels
Table II – P-209 FAA Gravel Base
Table III – P-154 FAA Gravel Subbase, Recycled Asphalt Pavement (RAP) & Recycled Concrete Pavement (RCO)
Table IV – Structural Fill

List of Figures:

Fig. 1: BC-1 Pavement Core
Fig. 2: BC-2 Pavement Core
Fig. 3: BC-3 Pavement Core
Fig. 4: BC-4 Pavement Core
Fig. 5: BC-5 Pavement Core
Fig. 6: BC-6 Pavement Core

1.0 INTRODUCTION

RGE has completed the subsurface investigation and geotechnical testing services for the design of a Centralized Deicing Pad Project at the Syracuse Hancock International Airport in Syracuse, Onondaga County, New York. This report describes the pavement and subsurface conditions encountered and furnishes laboratory data acquired. Recommended infiltration rates for the design of stormwater management ponds are also included.

Exploration of the subsurface materials consisted of six (6) pavement cores (CB-1/DCP-1 to CB-6), sixteen (16) exploratory borings (B-1 to B-6, B-8, B-9, B-10, B-12, CB-1/DCP-1, CB-2 to CB-6) to depths ranging from 8 to 15 feet.

Two (2) additional exploratory borings (IT-1 and IT-2) advanced to a depth of approximately 5 feet were converted to infiltration test wells.

Bulk composite samples of dominant materials were collected from 4 test pits (TP-1 to TP-4) for subgrade strength testing using the California Bearing Ratio (CBR) test.

To supplement the laboratory CBR tests, we completed three dynamic cone penetration (DCP) tests in accordance with ASTM Designation D6951.

A boring location diagram and a Vicinity Map of the site are shown in Appendix A.

2.0 PROJECT DESCRIPTION

The proposed project is for the design of a centralized deicing pad, and pavement rehabilitation including paving, grading, widening, and lighting.

It is further understood that RGE's scope of geotechnical services is limited to completing the subsurface investigations, recording the approximate thicknesses of the recovered pavement cores, conducting soil infiltration testing for the design of stormwater management ponds, conducting soil classifications, providing a recommended design CBR, foundation recommendations for the design of light pole bases.

3.0 SUBSURFACE EXPLORATION

Subsurface investigations were performed through the completion of 10 conventional test borings (B-1 to B-6, B-8, B-9, B-10, B-12) to depths of approximately 8 to 15 feet.

After coring through the existing pavement, recording the pavement and base course thicknesses, and taking photographs of the pavement cores with an overlaid tape measurer, 6 shallow borings (CB-1 through CB-6) were advanced to approximate depths 8 to 10 feet.

Two (2) infiltration test holes (TI-1 and IT-2) were completed in general accordance with Appendix D of the New York State Department of Environmental Conservation (NYSDEC) Stormwater Design Manual. Infiltration tests were conducted at a depth of approximately 5 feet below existing grade.

Continuous standard penetration test (SPT) samples were generally obtained in accordance with ASTM Designation D-1586.

The SPT sampling process requires a split-barrel sampling tube be used to obtain soil samples. A 2-inch outside diameter sampling tube is hammered, using an automatic drive hammer, into the bottom of the borehole with a 140-pound weight falling 30 inches. The number of blows required to advance the tube the middle 2, 6-inch increments of a 24-inch sampling interval or portion thereof, is recorded as the standard penetration resistance value, N. The in-situ relative density of granular soils, the consistency of cohesive soils, and the hardness of weathered bedrock can be estimated from the N value. The uncorrected, N values recorded for each test are shown on the attached boring logs at their relative sampling depths.

Three (3) DCP soundings, DCP-1, DCP-4 and DCP-6 were completed. DCP-1 was attempted near CB-1, above the gravel base layer. However, it yielded no results as the penetration after 100 blows was nearly zero.

Lastly, four (4) test pits (TP-1 to TP-4) were advanced to depths of 4 to 5 feet using a mini-excavator, model SANY35U, 24-inch bucket.

The final generated borings, core and infiltration logs can be found in Appendix B of this report. The results of the completed DCP soundings, and the infiltration results are included in Appendices F and G.

4.0 EXISTING CONDITIONS

Pavement sections varied from 5 inches to 16–¼ inches. The thinnest pavement core was CB-6 with approximately 5 inches of Asphalt over 24 inches of Poorly Graded SAND with Silt and Gravel (SP-SM). The following Table provides our estimated pavement thicknesses:

Table I – Description of Completed Pavement Cores

Boring Location	Estimated Pavement Thickness (inch)	Description
CB-1/DCP-1	16	4 inches of surface course in 2, 2-inch lifts over 1, 3-inch lift of leveling course over 3, 3-inch lifts of a base course (9 inches) tack coat generally present in good condition (see Fig. 1)
Pavement supported on approximately 36 inches of SAND (See boring logs for more information)		
CB-2	14	4 inches of surface course in 2, 2-inch lifts over 2, 3-inch lifts of leveling course (6 inches)over 1, 4-inch lift of a base course (4 inches) tack coat generally present in fair condition with porous asphalt layers (see Fig. 2)
Pavement supported on approximately 12 inches of GRAVEL (See boring logs for more information)		
CB-3	16¼	2 inches of surface course in 1, 2-inch lift over 1, 4.5-inch lift of leveling course (4.5 inches)over 9–¾ inches of a base course (in 2 lifts) Pavement contains about a ¼-inch of TAR in poor condition (see Fig. 3)
Pavement supported on approximately 30 inches of SAND over a Separator Fabric (See boring logs for more information)		
CB-4	15	3.5 inches of surface course in 1, 3.5-inch lift over 1, 4¾-inch lift of leveling course over 1, 3¼ -inch of a leveling course over 1, 3.5-inch lift of base Pavement generally in good condition with minor pores, and tack coat in place (see Fig. 4)
Pavement supported on approximately 24 inches of SAND over a Separator Fabric (See boring logs for more information)		
CB-5	15¾	3.5 inches of surface course in 2, 1¾-inch, lifts over 1, 2-inch lift of leveling course over 10¼ inches of a base in 2 lifts

		Pavement generally in fair condition with moderate number of pores, and tack coat in place (see Fig. 5) The 1¾-inch surface layer may have been an overlay
Pavement supported on approximately 30 inches of GRAVEL over a Separator Fabric (See boring logs for more information)		
CB-6	5	¼ - inch surface course over 2¾ inches of leveling course over 2 inches of a base (dense graded) No GRAVEL or SAND base (Fig. 6)

In borings CB-1 to CB-6, beneath the pavement and base materials, are medium dense to very dense SANDs and SILTs, occasionally grading to very loose to loose.

In the remaining exploratory borings, the SILTS and SANDS were generally very loose to loose but occasionally grading to medium dense to dense.

We understand borings B-8 and B-12 are planned for the design of light pole bases. An average, uncorrected N-value of 9 has been estimated for B-8, and 5 for B-12.

The following figures show photographs of the recovered pavement cores.



Fig. 1: BC-1 Pavement Core



Fig. 2: BC-2 Pavement Core



Fig. 3: BC-3 Pavement Core



Fig. 4: BC-4 Pavement Core



Fig. 5: BC-5 Pavement Core



Fig. 6: BC-6 Pavement Core

5.0 GROUNDWATER CONDITIONS

The presence of water was generally observed between 4.5 feet and 8 feet. The following table provides our recorded groundwater depths:

Table II – Groundwater Levels

Boring No.	Estimated Groundwater Depth (feet)	Depth Before/After Hollow Stem Removal
B-1	8	-
B-2	7	-
B-5	6	-
B-6	6	-
B-8	6	12 Before
B-10	-	5 before/2.5 cave-in
B-12	8	-
CB-4	4.5	-
CB-5	6	-
CB-6	6	-

For design, we recommend a groundwater depth of 4.5 feet. Groundwater level fluctuations and/or perched water conditions may occur due to seasonal variations in the amount of rainfall and other factors such as drainage characteristics. To obtain more accurate groundwater level information, long-term observations in a monitoring well or piezometer that is sealed from the influence of surface water would be needed.

6.0 FIELD AND LABORATORY EVALUATIONS

As part of the geotechnical evaluation, the field geotechnical engineer examined each of the soil samples and selected representative samples for further laboratory testing. These additional tests were chosen based on the requirements specified by C&S ENGINEERS, INC., and to help the engineer classify the soils and to provide engineering properties of the samples.

The tests included ASTM Designations D2216 - "*Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass*", C136 "*Standard Test Methods for* Sieve Analysis of Fine and Coarse Aggregates", C117 "*Standard Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing*", D4318-17e1, the "Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils", D1557, "*Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2,700 kN-m/m^3))*", and D1883-21, "*Standard Test Method for California Bearing Ratio (CBR) of Laboratory-Compacted Soils*".

Infiltration tests were conducted based on Appendix D of the DEC Stormwater Design Manual for Infiltration Testing.

The results of the completed tests can be found in the appropriate columns of the boring logs included in Appendix B, with additional index property and strength test results provided in Appendices C, D, E, and F.

The results of the infiltration tests are shown in Appendices G.

7.0 GEOTECHNICAL CONSIDERATIONS AND RECOMMENDATIONS

7.1 Pavement and Subgrade Recommendations

Based on our observation, the existing pavement appears to be in fair condition with some areas of hairline cracking. However, it is understood that some areas will be widened, and an FAA P-209 Base and/or P-154 Subbase can be used for pavement support. The proposed P-209 Base, and P-154 Subbase should meet the gradation requirements of Tables II and III. Additional requirements of FAA Advisory Circular 150-5370 shall be followed. The following link provides the latest FAA Advisory for the use of P-209 and/or P-154. https://www.faa.gov/documentLibrary/media/Advisory_Circular/150-5370-10H.pdf.

Table III – P-209 FAA Aggregate Base Material

Sieve Size Designation	Percent Passing by Weight	Tolerance – Job Control Grading Band (%)[1]
2-inch (50 mm)	100	0
1 – ½" (37.5 mm)	95 – 100	± 5
1" (25 mm)	70 – 95	± 8
¾" (19 mm)	55 – 85	± 8
No. 4 (4.75 mm)	30 – 60	± 8
No. 40[2] (425 µm)	10 – 30	± 5
No. 200[2] (75 µm)	0 – 10	± 3

[1] The "Job Control Grading Band Tolerances for Contractor's Final Gradation" in the table shall be applied to "Contractor's Final Gradation" to establish a job control grading band. The full tolerance still applies if application of the tolerances results in a job control grading band outside the design range.
[2] The fraction of material passing the No 200 (75 µm) sieve shall not exceed two-thirds the fraction passing the No 40 (425 µm) sieve.

Table IV – P-154 FAA Subbase Aggregate, RAP or RCO

Sieve Size Designation	Percent Passing by Weight (Aggregate)	(Recycled Asphalt or Concrete – RAP or RCO)	Tolerance – Job Control Grading Band (%)[1]
3-inch (75 mm)	100	-	0
1 – ½" (37.5 mm)	-	100	0
¾" (19 mm)	70 – 100	70 – 100	± 10
No. 10 (2 mm)	20 – 100	20 – 100	± 10
No. 40[2] (425 µm)	5 – 60	5 – 60	± 5
No. 200 (75 µm)	0 – 15	0 – 15	± 5

[1] The "Job Control Grading Band Tolerances" shall be applied to "Contractor's Final Gradation" to establish the job control grading band

[2] The portion of the material passing the No. 40 (425 µm) sieve shall have a liquid limit of not more than 25 and a plasticity index of not more than six (6) when tested in accordance with ASTM D4318.

Appendices H, I and J depict the gradation curves of the onsite gravel layers encountered as they relate to the gradation requirements of Tables III and IV above for both the Aggregate and the recycled asphalt or recycled concrete (RAP & RCO) limits.

Any fill required to develop final grade lines should consist of moisture controlled onsite soils or materials meeting the gradation limits of Tables III and/or Table IV above, or materials meeting the gradation requirements of Table V below.

Table V – Structural Fill

Sieve Size	Percent Finer by Weight
4-inch	100
No. 40	0-70
No. 200	0-15

The above specified P-209, P-154, Structural Fill or onsite soils should be placed in maximum loose lift thicknesses of 12 inches and each lift compacted to a dry density equal to at least 95 percent of the material's maximum dry density as it is defined by ASTM Designation D-1557, with a moisture content within about 3 percent of the optimum moisture content.

During compacting operations, the exposed subgrade and each lift of fill shall be tested for moisture and density at a rate of 3 tests every 1,500 square feet with a minimum of 3 tests per compacted area.

All excavated materials should be disposed of in accordance with applicable regulations. We recommend that RGE or a qualified Geotechnical Inspector be retained to witness the removal process and establish the extent of removal necessary. Prior to any fill placement, the subgrade should be thoroughly proofrolled and compacted using 6 or more passes of a smooth drum vibratory roller having a static weight of at least 10 tons. Any subgrade area that pumps or weaves under the passing roller should be undercut and stabilized through backfilling the undercut area with Structural Fill.

We understand some sections of the pavements may be overlayed. Prior to placing the overlay layer, any pavement areas determined by the Project Engineer to have experienced fatigue cracking and high severity transverse, thermal, longitudinal, and alligator cracking should be removed down to the base material. The exposed subgrade should be scarified, moisture conditioned, replaced as necessary, and recompacted as previously noted. Areas of lesser severity should be crack-sealed, and a tack coat should be applied to the surface of the existing pavement structure.

To minimize the impact of reflective cracking, a geosynthetic paving mat, or other methods approved by the design engineer should be used.

7.2 California Bearing Ratio (CBR)

The California Bearing Ratio (CBR) was estimated in the laboratory in general accordance with ASTM Specification D-1883. The results of this test have been provided in Appendix E. To supplement the CBR tests, we completed four dynamic cone soundings at locations selected by the client.

Based on the results of the completed tests, we recommend a CBR of 9 be used for design.

7.3 Light Pole Bases

Straight shaft, drilled, cast-in-place, concrete piers can be used to support the proposed light poles. Due to the expected variations in the depth and quality of the bearing materials with increased distance away from the borings, RGE or qualified geotechnical consultant should be retained to perform proper pier inspection and testing during pier drilling to verify that suitable bearing material has been sufficiently penetrated. The minimum bearing depth of the piers should be 4 feet. Deeper piers may be required in areas near B-12.

For the design of piers bearing at least 4 feet, an allowable bearing pressure of 1,500 pounds per square foot can be used. Additional capacity can be developed using an allowable skin friction value of 160 pounds per square foot per foot of penetration beyond the minimum required embedment depth of 4 feet.

Uplift forces can be resisted by the weight of the drilled pier and the computed allowable frictional load using the above recommended skin friction value of 160 pounds per square foot per foot of penetration. The weight of the drilled piers can be calculated using a concrete unit weight of 140 pounds per cubic foot.

Temporary casing will be required to prevent caving of the soils and to minimize the influx of water from the overburden materials encountered at the site. Seepage of groundwater into the pier excavations may also occur; therefore, dewatering equipment should be onsite and ready for use prior to pier excavations. Any water and loose or sloughed material should be removed from drilled piers prior to placing concrete. To facilitate pier construction, concrete should be on-site and ready for placement as pier excavations are completed. In no case should concrete be allowed to strike reinforcing steel or the excavation sides while it is being placed. Pier excavations should not be allowed to remain open long periods of time without the approval of the Geotechnical Engineer. Drilled piers should be constructed in accordance with the latest addition of ACI 336.1, Specification for the Construction of Drilled Piers.

8.0 CONSTRUCTION DEWATERING

Construction excavations are generally not anticipated to extend below the recorded groundwater levels, except for undercuts below 6 feet. During periods of rain, perched water conditions may develop. It shall be the responsibility of the contractor to keep and restore foundation excavation subgrades to a dry condition and preparing subgrades that are free of mud, water, and disturbed soils.

9.0 CONSTRUCTION MONITORING

This report provides data obtained from our explorations as specified by C&S ENGINEERS, INC. based on the subsurface conditions encountered in the borings, and pavement cores and based on probing data gathered through the completion of the DCP soundings. It is not practical or economical to perform enough subsurface investigation borings to identify all conditions at the site. Subsurface conditions may vary with distance away from the borings completed for this report. Conditions that may affect the data contained within this geotechnical report may exist and may not become known until construction. In general accordance with the New York State Building Code and FAA Guidelines, monitoring of subsurface conditions during construction should be performed by a geotechnical engineer registered in the State of New York or his/her representative to verify that conditions are consistent with the geotechnical report.

10.0 GENERAL

The findings and recommendations contained in this geotechnical report have been made with generally accepted professional geotechnical practices in the local area. No other warranties are implied or expressed. The scope of services and test results contained in this report do not include any environmental assessment or identification of contaminated or hazardous materials. Any statements in this report or in the test pit and/or DCP logs concerning suspicious odors, colors, irregular textures or abnormal conditions are for informational purpose only and have not been verified by the geotechnical engineer, drilling or testing companies.

Appendix A

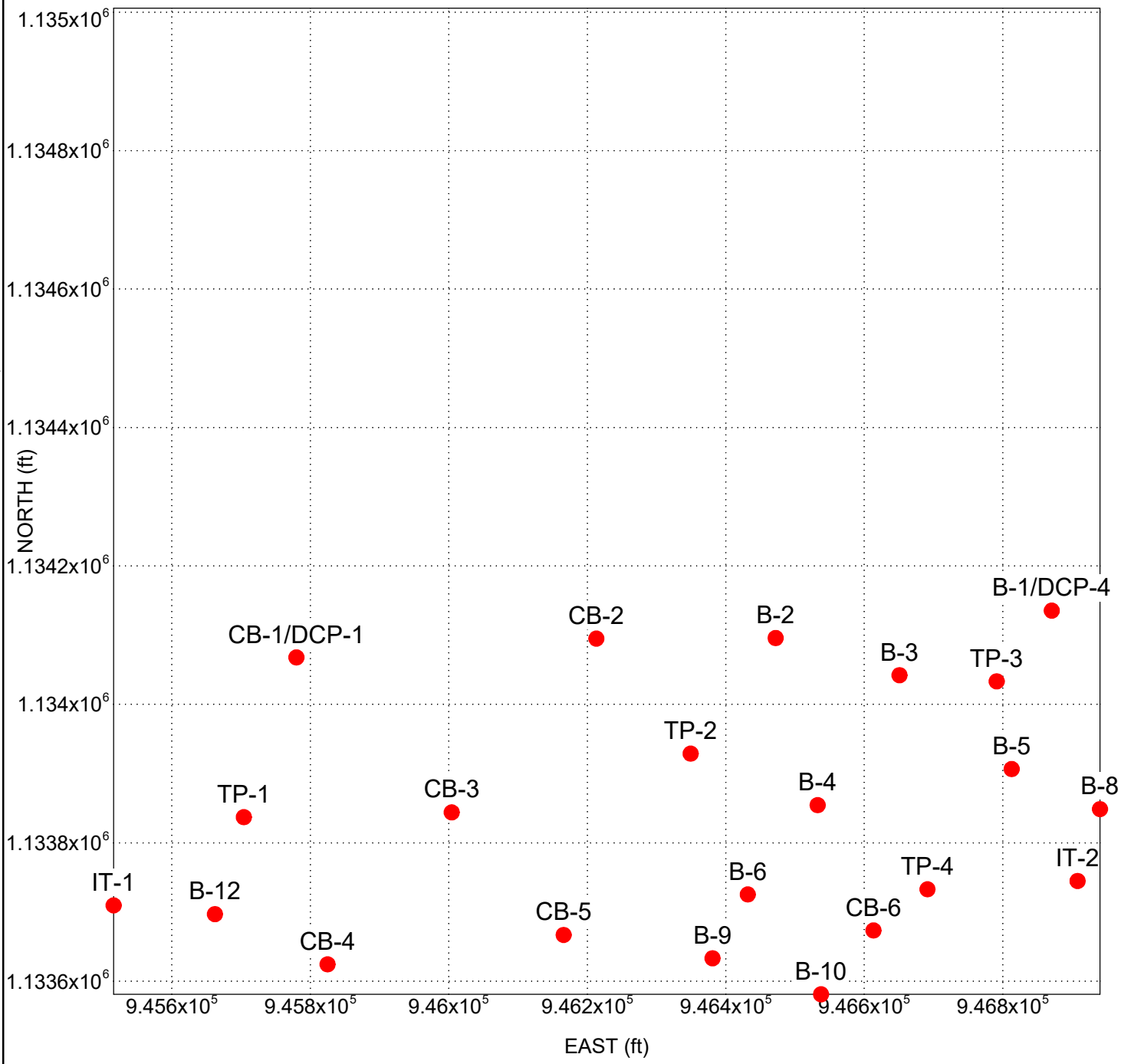
Vicinity Map &
Boring Location Diagram


PROJECT LOCATION
North Syracuse
New York State DMV - North Syracuse
The Spinning Wheel
Swift Transportation - Syracuse Terminal
North Syracuse Jr High School
Applebee's Grill + Bar
Circle K
United States Postal Service
Helping Hounds Dog Rescue
Delta Sonic Car Wash
Flaming Grill Buffet
Hancock Field ANGB
US Marine Corps Reserve Center
Battery World
Koffee King Vending & Food Services
Boondocker Equipment Inc
Sunshine's Coffee Shop
E Molloy Rd
Beley Ave
Matly Ave
Townline Rd
Teall St
Northwood Dr
Florida Rd
Wright Ave
Olival Dr
Pickard Dr
Falso Dr
Moore Rd
Thompson Rd
North Branch Ley Creek
Boss Rd
Eastern Ave
Plymouth Ave
Marian Dr
Florida Rd S
2619 ft
N
Google Earth
Imagery Date: 9/17/2019 lat 43.109277° lon -76.110092° elev 0 ft eye alt 10778 ft

Renaissance Geotechnical Engineering, PLLC
3049 Hamburg Street
Schenectady, NY 12303
Telephone: 518-902-9222

SITE MAP AND BOREHOLE LOCATIONS

CLIENT C&S ENGINEERS, INC.
PROJECT NAME SYR CENTRALIZED DEICING PAD DESIGN
PROJECT NUMBER 24.0038
PROJECT LOCATION SYRACUSE HANCOCK INTERNATIONAL AIRPORT



SITE MAP - GINT STD US LAB COLOR.GDT - 7/9/25 13:11 - C:\USERS\RENAISSANCE\ONEDRIVE - RENAISSANCE GEOTECHNICAL ENGINEERING, PLLC\- PROJECTS\- 2024\24.0038 - SYR CENTRALIZED DEICING PAD\GINT\GINT - SYR DEICING PAD.GPJ

NOTE:
AVOID PAVEMENT MARKINGS

TP4 (5') TEST PIT LOCATION (DEPTH)

C/B2 (8') PAVEMENT CORE WITH SOIL BORING LOCATION, CONTINUOUS SAMPLING (DEPTH)

B6 (8') SOIL BORING LOCATION, CONTINUOUS SAMPLING (DEPTH)

IT1 (5') INFILTRATION TRENCH LOCATION (DEPTH)

DCP4 COLOCATED DCP LOCATION

C/B1 (8') DCP1 N=1,134,067.99 E=945,779.90

N=1,133,981.74 E=945,643.09 B13 (30')

N=1,133,902.91 E=945,593.52 B14 (50')

ADJUST LOCATION BASED ON PROPOSED BUILDING FOOTPRINT. LIKELY SECOND MOBILIZATION REQUIRED.

TP1 (8') N=1,133,837.23 E=945,703.96

N=1,133,723.09 E=945,516.79 IT1 (5')

B12 (15') N=1,133,697.08 E=945,662.22

N=1,133,624.65 E=945,824.82 C/B4 (8')

C/B3 (8') N=1,133,844.14 E=946,004.11

N=1,133,652.08 E=946,167.25 C/B5 (8')

N=1,134,095.14 E=946,213.10 C/B2 (8')

N=1,134,095.96 E=946,472.13 B2 (8')

N=1,134,135.53 E=946,870.80 B1 (8') DCP4

N=1,134,042.24 E=946,650.73 B3 (8')

N=1,134,033.41 E=946,791.23 TP3 (5')

N=1,133,928.99 E=946,349.25 TP5 (5')

B5 (8')

N=1,133,848.87 E=946,940.44 B8 (15')

B4 (8') N=1,133,854.58 E=946,532.69

N=1,133,725.65 E=946,431.73 B6 (8')

N=1,133,733.02 E=946,691.27 TP6 (5')

N=1,133,743.74 E=946,904.12 IT2 (5')

N=1,133,633.34 E=946,380.77 B9 (8')

N=1,133,673.60 E=946,613.28 C/B6 (8')

N=1,133,581.50 E=946,528.52 B10 (8') DCP6

A1 CENTRALIZED DEICING PAD GEOTECHNICAL PLAN
SCALE: 1" = 60'

60 0 60 120FT.
60'

Oct. 10, 2024 – 3:21pm
F:\Project\O68 – Syracuse Regional Airport Authority\068069001 – Comp Deicing Pad\Design\CADD\SBO\Geotech Plan.dwg

C&S COMPANIES

C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

PRELIMINARY
NOT FOR CONSTRUCTION

SYR SYRACUSE HANCOCK INTERNATIONAL AIRPORT

CENTRALIZED DEICING PAD
TELEVISING PLAN
SYRACUSE HANCOCK
INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO: O68.069.001
DATE: SEPTEMBER 2024
DRAWN BY:
DESIGNED BY:
CHECKED BY:

NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW

CENTRALIZED DEICING PAD GEOTECHNICAL PLAN

FIGURE 1

Copyright ©

Appendix B
General Notes, Key to Symbols, Boring Logs

RENAISSANCE GEOTECHNICAL ENGINEERING TM
Phone: 518-902-9222
405-215-9367
info@renaissancegeo.com

BORING LOG ACRONYM LIBRARY

- SPT-N: Blow or strike count for the Standard Penetration Test or the Texas Cone Penetrometer Test. In general, the Standard Penetration Test "N" is the numbers of strikes required to advance a standard 2-inch outside diameter split-spoon a distance of 1-foot, or portion thereof, with a 140-pound hammer falling 30 inches.

  In general, the Texas Cone Penetrometer Test (TCP) "N" is the numbers of strikes with penetration depths required to advance a solid steel three-inch diameter cone of standard dimensions with a170-pound weight falling 24-inches. Two 50 strike intervals or two 6-inch penetration intervals is recorded.

- WOH: Weight of Hammer
- WOR: Weight of Drilling Rod
- USCS Symbol: The Unified Soil Classification System Identification Symbol
- ATV: All-Terrain Vehicle Mounted Drill Rig
- EL: Elevation
- Lt: Left
- Rt: Right
- LL, PL, PI: Atterberg Limits (Liquid Limit, Plastic Limit, Plasticity Index)
- -#200: Percent Passing Standard No. 200 Sieve
- NP – Non-Plastic
- MC: Moisture Content
- AS: Auger Sample
- BS: Bucket Sample
- DB: Diamond Drilling Bit (Truck Rotary Drilling using air or water to remove cuttings)
- DCD: Diamond Core Barrel Drilling
- HA: Hand Auger
- HS: Hollow Stem Auger (Truck Rotary Drilling)
- PA: Power Auger (Truck Rotary Drilling)
- NR: No Recovery
- PMT: Pressure Meter
- DMT: Dilatometer
- CPT: Cone Penetration Test
- BHS: Borehole Shear
- FV: Field Vane Shear
- TV: Torvane
- PP: Pocket Penetrometer
- RB: Rock/Roller Bit (Truck Rotary Drilling using air or water to remove cuttings)
- RC: Rock Core using
- RQD: Rock Quality Designation
- SS/SPT: Standard Penetration Test (Split-Spoon)
- ST: Thin-Wall Tube Sample (Shelby Tube): a 3" O.D. tube, unless noted otherwise
- TCP: Texas Cone Penetrometer Test
- DCP: Dynamic Cone Penetrometer
- WS: Wash Sample
- WB: Wash Bore
- AB: After Boring Complete
- DCI: Dry Cave In
- WCI: Wet Cave In
- WD: While Drilling
- WS: While Sampling
- WL: Water Level Depth from Boring Surface Elevation
- CME: Central Mine Equipment
- GP: Geoprobe
- AHS: After Hollow Stem
- BHS: Before Hollow Stem

RENAISSANCE GEOTECHNICAL ENGINEERING TM

Phone: 518-902-9222
405-215-9367
info@renaissancegeo.com

GENERAL INFORMATION & KEY TO THE SUBSURFACE EXPLORATION LOGS

The Subsurface Logs attached to this report present the general observations and mechanical data collected by the drillers at the site, supplemented by classification of the material removed from the borings as determined through visual identification by engineers in the field, and by technicians in the laboratory. The materials removed from the borings represent only a small fraction of the soils at the site and may not be representative of subsurface conditions between and/or away from the boring locations or the sampled intervals. The data presented on the Subsurface Logs along with the recovered samples provide a basis for estimating the engineering characteristics of the soils at the site. The evaluation must consider all the recorded details and their relative significance to the project. It is common that evaluation of standard subsurface data indicates the need for additional testing and/or sampling to evaluate the subsurface conditions more accurately. Any evaluation of the data presented on the Subsurface Logs must be performed by qualified professionals. The following information defines some of the procedures and terms used on the Subsurface Logs to describe the conditions encountered. Water levels measured in low permeability soils (clays & unfractured rock) may require long term observations and therefore, the depths shown may not be accurate.

Soil Classification and Descriptions

- Soil Classification: The soil description and classification is based on the Unified Soil Classification System (USCS) unless noted otherwise

- *Consistency/Relative Density*

Cohesionless Materials		Cohesive Materials		
N-blows/ft	Relative Density	N-blows/ft	Consistency	Est. UCS-q_u (psf)
0 – 4	very loose	0 – 2	Very Soft	< 500
5 – 10	loose	2 – 5	Soft	500 – 1,000
11 – 24	medium dense	5 – 10	Medium	1,001 – 2,000
25 – 50	dense	10 – 20	Stiff	2,001 – 4,000
51 – 80	very dense	20 – 30	Very Stiff	4,001 – 8,000
81+	extremely dense	30 – 60	Hard	8,001 – 16,000
		>60	Very Hard	> 16,000

Particle Size

Particle Size	Material Type
Boulders	>12 inches
Cobbles	3 inches to 12 inches
Gravel	coarse: ¾" to 3"
	fine: #4 to ¾"
Sand	coarse: #10 to #4
	medium: #40 to #10
	fine: #200 to #40
Silt/Clay	<#200

- Description Modifier: The following terms may be used as qualifiers for mixed soils

Term Used	Estimated Percent Total	Component	Particle Shape – Applicable to Coarse
Primary	More than 50	Noun – GRAVEL, SAND, SILT or CLAY	*Angular:* sharp edges and relatively plain sides with unpolished surfaces
and or &	35 – 50	Gravelly, sandy, silty, clayey, with	*Subangular:* similar to angular but with rounded edges
Some	20 – 35	**MOISTURE CONTENT DESCRIPTION**	*Subrounded:* nearly plane sides but with well rounded corners and edges
		Dry: absent of moisture, dusty, dry to touch	
little	10 – 20	Moist: damp but no visible water	Rounded: smoothly curved sides and no edges
trace	less than 10	Wet: visible free water	

Varved: Horizontal uniform layers or seams of soil(s)
Seam: Soil deposit less than 6" thick
Laminated - Irregular, horizontal and angled seams and partings of soil

Layer: Soil deposit more than 6"thick.
Parting: Soil deposit Jess than 1/8" thick

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

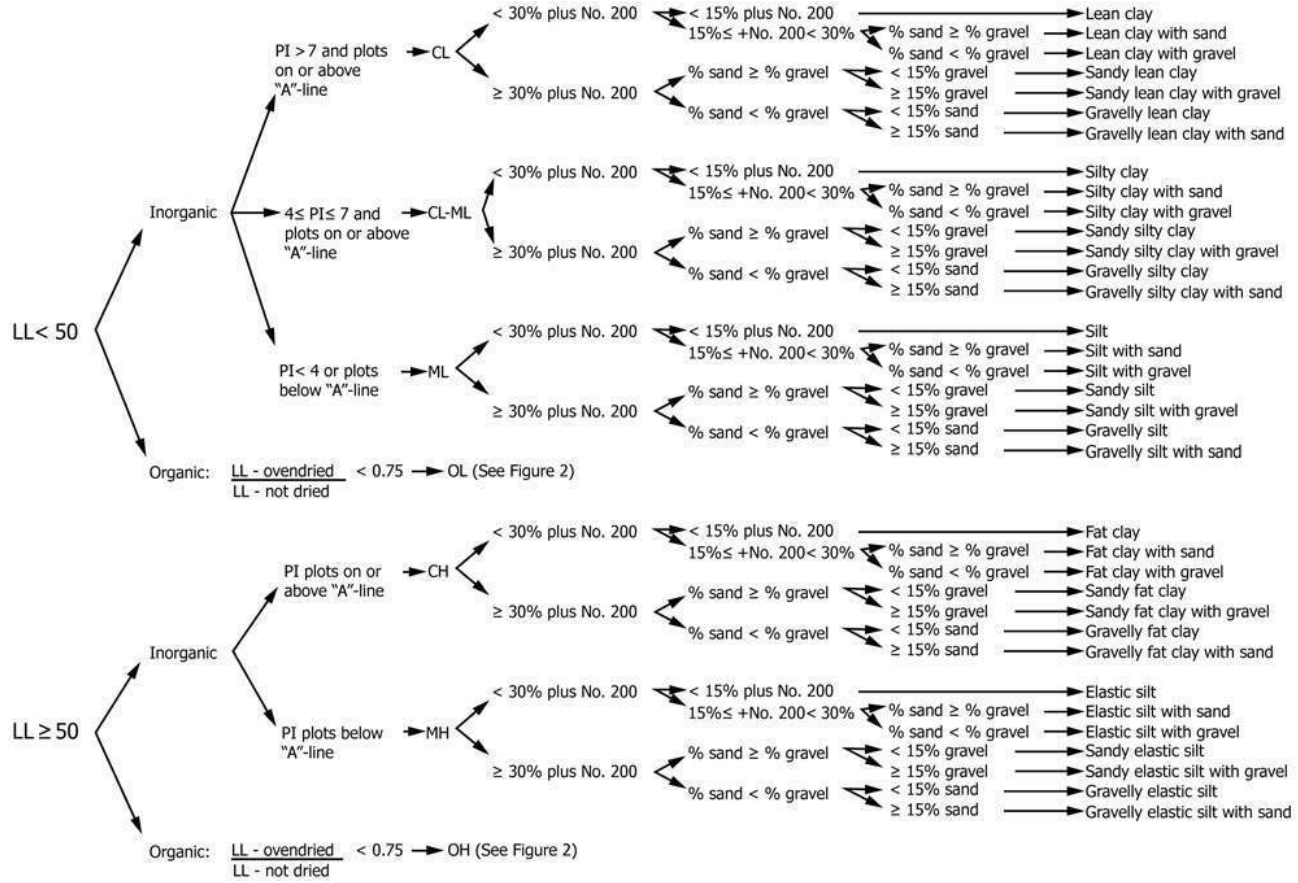


FIG. 1 Flow Chart for Classifying Fine-Grained Soil (50 % or More Passes No. 200 Sieve)

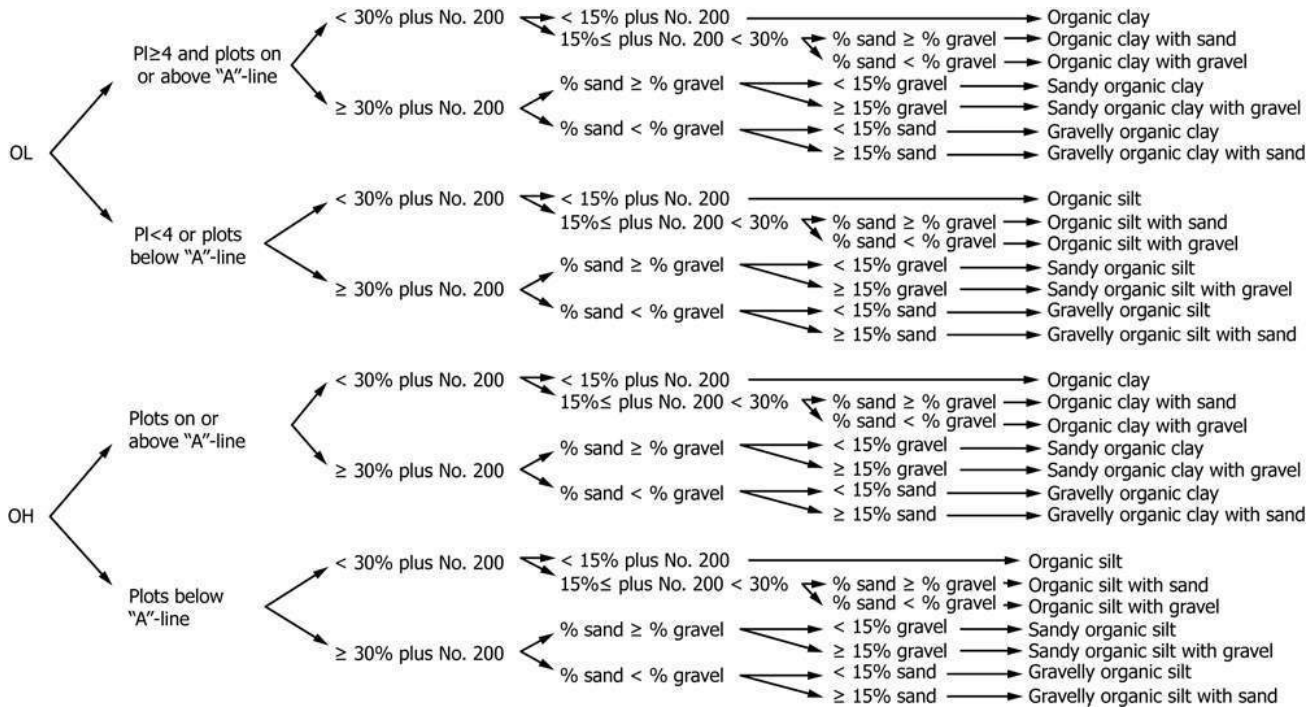


FIG. 2 Flow Chart for Classifying Organic Fine-Grained Soil (50 % or More Passes No. 200 Sieve)

Source ASTM D2487

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

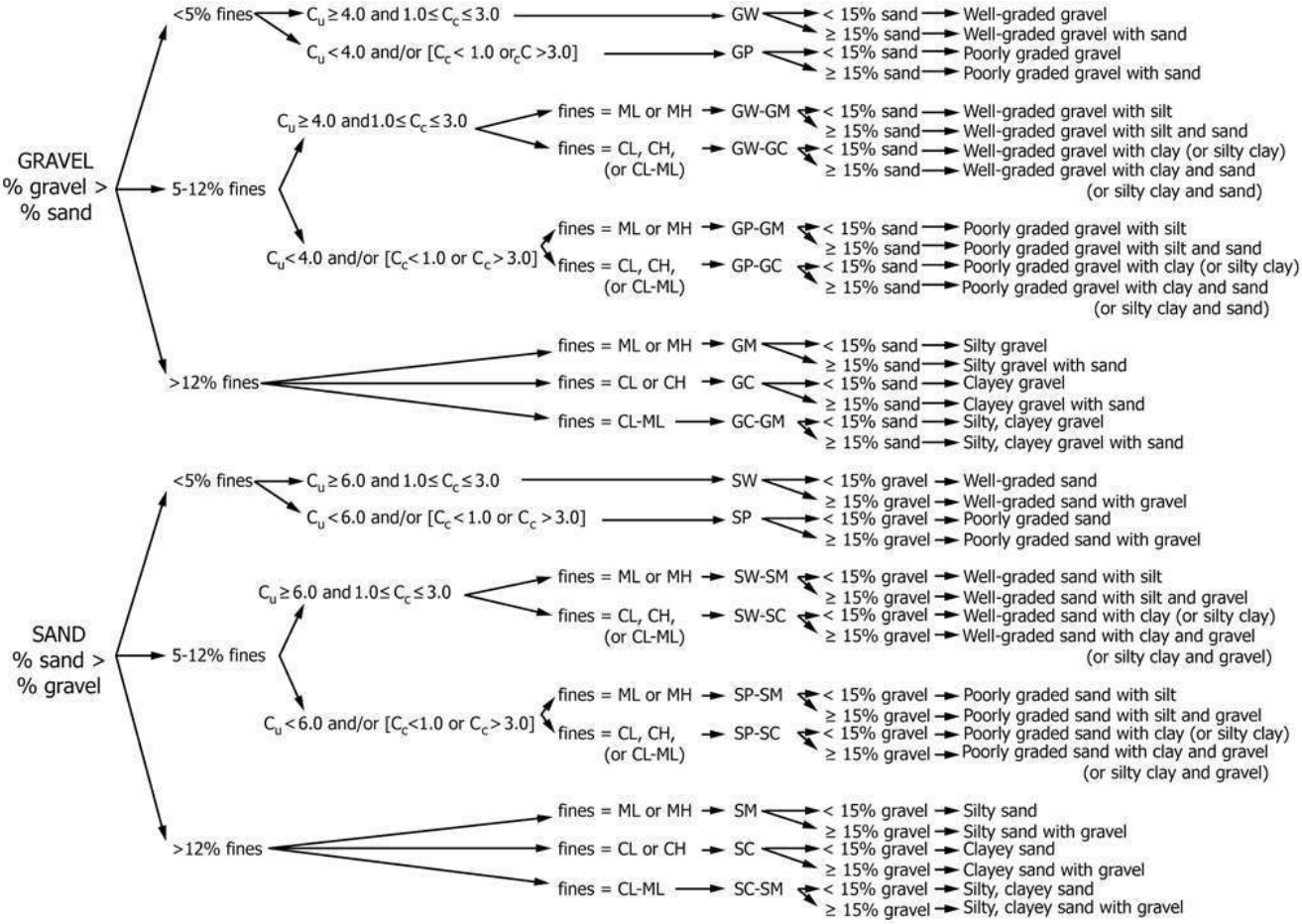


FIG. 3 Flow Chart for Classifying Coarse-Grained Soils (More Than 50 % Retained on No. 200 Sieve)

Source ASTM D2487

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

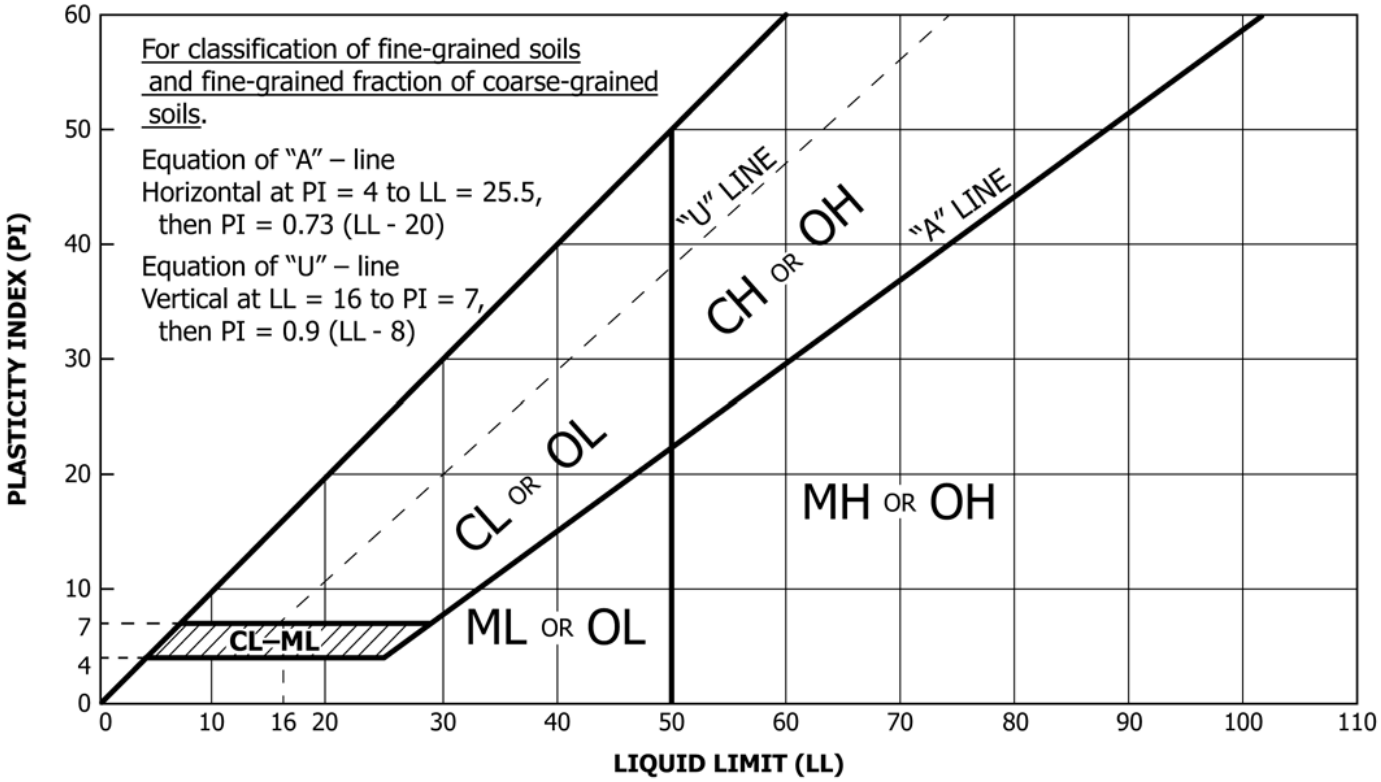


FIG. 4 Plasticity Chart

Source ASTM D2487

Renaissance Geotechnical Engineering, PLLC
2320 Nott Street, Box 9401
Schenectady, NY 12309
Telephone: 518-902-9222

KEY TO SYMBOLS

CLIENT C&S ENGINEERS, INC.
PROJECT NAME SYR CENTRALIZED DEICING PAD DESIGN
PROJECT NUMBER 24.0038
PROJECT LOCATION SYRACUSE HANCOCK INTERNATIONAL AIRPORT

LITHOLOGIC SYMBOLS
(Unified Soil Classification System)

- ASPHALT: Asphalt
- FILL: Fill (made ground)
- GP-GM: USCS Poorly-graded Gravel with Silt
- ML: USCS Silt
- MLS: USCS Sandy Silt
- SANDSTONE: Sandstone
- SM: Silty SAND
- SMG: Silty SAND with Gravel
- SP-SM: USCS Poorly-graded Sand with Silt
- SW-SM: USCS Well-graded Sand with Silt
- TOPSOIL: Topsoil

SAMPLER SYMBOLS

- Auger Cuttings
- CORE DRILL
- HS: Hollow Stem Auger
- Split Spoon
- Test Pit

WELL CONSTRUCTION SYMBOLS

ABBREVIATIONS

LL - LIQUID LIMIT (%)
PI - PLASTIC INDEX (%)
W - MOISTURE CONTENT (%)
DD - DRY DENSITY (PCF)
NP - NON PLASTIC
-200 - PERCENT PASSING NO. 200 SIEVE
PP - POCKET PENETROMETER (TSF)
TV - TORVANE
PID - PHOTOIONIZATION DETECTOR
UC - UNCONFINED COMPRESSION
ppm - PARTS PER MILLION
Water Level at Time Drilling, or as Shown
Water Level at End of Drilling, or as Shown
Water Level After 24 Hours, or as Shown

KEY TO SYMBOLS - GINT STD US LAB COLOR.GDT - 1/13/25 16:12 - C:\USERS\RENAISSANCE\ONEDRIVE - RENAISSANCE GEOTECHNICAL ENGINEERING, PLLC\- PROJECTS\- 2024\24.0038 - SYR CENTRALIZED DEICING PAD\GINT\GINT - SYR DEICING PAD.GPJ

Renaissance Geotechnical Engineering, PLLC
3049 Hamburg Street
Schenectady, NY 12303
Telephone: 518-902-9222

BORING NUMBER B-1

CLIENT C&S ENGINEERS, INC.
PROJECT NAME SYR CENTRALIZED DEICING PAD DESIGN
PROJECT NUMBER 24.0038
PROJECT LOCATION SYRACUSE HANCOCK INTERNATIONAL AIRPORT
DATE STARTED 11/7/24 **COMPLETED** 11/7/24
GROUND ELEVATION 414.1 ft **HOLE SIZE** 4.25 inches
DRILLING CONTRACTOR
GROUND WATER LEVELS:
DRILLING METHOD
▽ **AT TIME OF DRILLING** 8.00 ft / Elev 406.10 ft While Sampling
LOGGED BY A.Diop **CHECKED BY** A.Diop
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	Test Results and Remarks	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0							0.3 **Approximately 4 inches of TOPSOIL**	413.8
	SS 1	69	1-2-4-3 (6)	MC = 9%	SM		(SM) **(Possible FILL) Silty SAND, little gravel** loose, light brown, damp	
							2.0	412.1
	SS 2	65	4-4-5-6 (9)				(SM) **Silty, fine SAND** loose, reddish-brown with calcareous seams, damp	
5	SS 3	88	3-3-2-3 (5)		SM			
	SS 4	88	2-1-2-1 (3)				- grades to very loose, m-f SAND from 6 feet	
							8.0 ▽	406.1

Bottom of borehole at 8.0 feet.

GENERAL BH / TP / WELL - GINT STD US LAB COLOR.GDT - 7/9/25 11:09 - C:\USERS\RENAISSANCE\ONEDRIVE - RENAISSANCE GEOTECHNICAL ENGINEERING, PLLC\- PROJECTS\- 2024\24.0038 - SYR CENTRALIZED DEICING PAD\GINT\GINT - SYR DEICING PAD.GP.

Renaissance Geotechnical Engineering, PLLC
3049 Hamburg Street
Schenectady, NY 12303
Telephone: 518-902-9222

BORING NUMBER B-2

CLIENT C&S ENGINEERS, INC.
PROJECT NAME SYR CENTRALIZED DEICING PAD DESIGN
PROJECT NUMBER 24.0038
PROJECT LOCATION SYRACUSE HANCOCK INTERNATIONAL AIRPORT
DATE STARTED 11/6/24 **COMPLETED** 11/6/24
GROUND ELEVATION 413.6 ft **HOLE SIZE** 4.25 inches
DRILLING CONTRACTOR
GROUND WATER LEVELS:
DRILLING METHOD
AT TIME OF DRILLING --- While Sampling
LOGGED BY A.Diop **CHECKED BY** A.Diop
AT END OF DRILLING --- None
NOTES
AFTER DRILLING --- None

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	Test Results and Remarks	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0							0.5 **Approximately 6 inches of TOPSOIL**	413.1
	SS 1	75	1-1-2-5 (3)		SM		(SM) **Silty, very fine SAND** very loose, light brown with calcareous seams, damp	
	SS 2	81	3-2-3-2 (5)				- grades to loose from 2 feet	
							4.0	409.6
5	SS 3	88	8-8-10-8 (18)	MC = 20% LL = NP PL = NP Fines = 77% Sand = 23%	ML		(ML) **SILT with Sand** medium dense, brown with gray seams, very wet	
							6.0	407.6
	SS 4	100	3-4-5-5 (9)	MC = 21%	SM		(SM) **Silty, medium-fine, SAND** loose, dark brown, wet	
							8.0	405.6

Bottom of borehole at 8.0 feet.

GENERAL BH / TP / WELL - GINT STD US LAB COLOR.GDT - 7/9/25 11:09 - C:\USERS\RENAISSANCE\ONEDRIVE - RENAISSANCE GEOTECHNICAL ENGINEERING, PLLC\- PROJECTS\- 2024\24.0038 - SYR CENTRALIZED DEICING PAD\GINT\GINT - SYR DEICING PAD.GP.

Renaissance Geotechnical Engineering, PLLC
3049 Hamburg Street
Schenectady, NY 12303
Telephone: 518-902-9222

BORING NUMBER B-3

CLIENT C&S ENGINEERS, INC.
PROJECT NAME SYR CENTRALIZED DEICING PAD DESIGN
PROJECT NUMBER 24.0038
PROJECT LOCATION SYRACUSE HANCOCK INTERNATIONAL AIRPORT
DATE STARTED 11/7/24 **COMPLETED** 11/7/24
GROUND ELEVATION 416.2 ft **HOLE SIZE** 4.25 inches
DRILLING CONTRACTOR
GROUND WATER LEVELS:
DRILLING METHOD
AT TIME OF DRILLING --- None
LOGGED BY A.Diop **CHECKED BY** A.Diop
AT END OF DRILLING --- None
NOTES
AFTER DRILLING --- None

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0						0.3 **Approximately 6 inches of TOPSOIL** 415.9
	SS 1	75	1-3-3-5 (6)			(SM) **Silty, m-f, SAND** loose, brown, damp
	SS 2	83	3-4-3-3 (7)			
5	SS 3	75	2-3-3-3 (6)	SM		
	SS 4	29	1-0-1-2 (1)			- grades to moist and very loose from 6 feet
	SS 5	79	2-2-2-3 (4)			- dry from 8 feet
10						10.0 406.2

Bottom of borehole at 10.0 feet.

GENERAL BH / TP / WELL - GINT STD US LAB COLOR.GDT - 7/9/25 11:09 - C:\USERS\RENAISSANCE\ONEDRIVE - RENAISSANCE GEOTECHNICAL ENGINEERING, PLLC\- PROJECTS\- 2024\24.0038 - SYR CENTRALIZED DEICING PAD\GINT\GINT - SYR DEICING PAD.GP.

Renaissance Geotechnical Engineering, PLLC
3049 Hamburg Street
Schenectady, NY 12303
Telephone: 518-902-9222

BORING NUMBER B-4

CLIENT C&S ENGINEERS, INC.
PROJECT NAME SYR CENTRALIZED DEICING PAD DESIGN
PROJECT NUMBER 24.0038
PROJECT LOCATION SYRACUSE HANCOCK INTERNATIONAL AIRPORT
DATE STARTED 11/5/24 **COMPLETED** 11/5/24
GROUND ELEVATION 417 ft **HOLE SIZE** 4.25 inches
DRILLING CONTRACTOR
GROUND WATER LEVELS:
DRILLING METHOD
AT TIME OF DRILLING --- None
LOGGED BY A.Diop **CHECKED BY** A.Diop
AT END OF DRILLING --- None
NOTES
AFTER DRILLING --- None

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0						0.3 **Approximately 4 inches of TOPSOIL**	416.7
	SS 1	58	1-2-3-3 (5)	SM		(SM) **(FILL) Silty, m-f, SAND, trace gravel** loosely compact, dark brown	
						2.0	415.0
	SS 2	67	3-4-5-7 (9)			(SM) **Silty, f SAND** loose to very loose, brown, iron stains, redox, damp	
5	SS 3	88	5-4-4-4 (8)	SM			
	SS 4	90	3-2-2-3 (4)			8.0 - moist from 7.5 feet	409.0

Bottom of borehole at 8.0 feet.

GENERAL BH / TP / WELL - GINT STD US LAB COLOR.GDT - 7/9/25 11:09 - C:\USERS\RENAISSANCE\ONEDRIVE - RENAISSANCE GEOTECHNICAL ENGINEERING, PLLC\- PROJECTS\- 2024\24.0038 - SYR CENTRALIZED DEICING PAD\GINT\GINT - SYR DEICING PAD.GP.

Renaissance Geotechnical Engineering, PLLC
3049 Hamburg Street
Schenectady, NY 12303
Telephone: 518-902-9222

BORING NUMBER B-5

CLIENT C&S ENGINEERS, INC.
PROJECT NAME SYR CENTRALIZED DEICING PAD DESIGN
PROJECT NUMBER 24.0038
PROJECT LOCATION SYRACUSE HANCOCK INTERNATIONAL AIRPORT
DATE STARTED 11/6/24 **COMPLETED** 11/6/24
GROUND ELEVATION 415.3 ft **HOLE SIZE** 4.25 inches
DRILLING CONTRACTOR
GROUND WATER LEVELS:
DRILLING METHOD
▽ **AT TIME OF DRILLING** 6.00 ft / Elev 409.30 ft While Sampling
LOGGED BY A.Diop **CHECKED BY** A.Diop
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0	SS 1	25	1-3-4-4 (7)	SM		(SM) **(FILL) Silty, m-f, SAND, trace cobbles** loosely compact, dark brown, damp
2.0						413.3
	SS 2	73	3-3-7-8 (10)			(SM) **Silty, f SAND** loose, light brown, moist
5	SS 3	100	3-3-2-1 (5)	SM		▽ - wet at spoon tip from 6 feet
	SS 4	75	1-1-4-6 (5)			
8.0						407.3

Bottom of borehole at 8.0 feet.

GENERAL BH / TP / WELL - GINT STD US LAB COLOR.GDT - 7/9/25 11:09 - C:\USERS\RENAISSANCE\ONEDRIVE - RENAISSANCE GEOTECHNICAL ENGINEERING, PLLC\- PROJECTS\- 2024\24.0038 - SYR CENTRALIZED DEICING PAD\GINT\GINT - SYR DEICING PAD.GP.

Renaissance Geotechnical Engineering, PLLC
3049 Hamburg Street
Schenectady, NY 12303
Telephone: 518-902-9222

BORING NUMBER B-6

CLIENT C&S ENGINEERS, INC.
PROJECT NAME SYR CENTRALIZED DEICING PAD DESIGN
PROJECT NUMBER 24.0038
PROJECT LOCATION SYRACUSE HANCOCK INTERNATIONAL AIRPORT
DATE STARTED 11/6/24 **COMPLETED** 11/6/24
GROUND ELEVATION 415.9 ft **HOLE SIZE** 4.25 inches
DRILLING CONTRACTOR
GROUND WATER LEVELS:
DRILLING METHOD
▽ **AT TIME OF DRILLING** 6.00 ft / Elev 409.90 ft While Sampling
LOGGED BY A.Diop **CHECKED BY** A.Diop
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	Test Results and Remarks	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0							0.3 **Approximately 4 inches of TOPSOIL**	415.6
	SS 1	63	1-3-3-4 (6)		SM		(SM) **(FILL) Silty, m-f, SAND, trace cobbles** loosely compact, dark brown, damp	
							2.0	413.9
	SS 2	65	4-6-6-6 (12)		SM		(SM) **Silty, f SAND** medium dense, light reddish-brown, mottled, damp	
5	SS 3	75	4-3-1-1 (4)				- grades to very loose, brown with gray seams, from 4 feet	
							6.0 ▽	409.9
	SS 4	83	1-0-1-0 (1)	MC = 31% LL = NP PL = NP Fines = 86% Sand = 14%	ML		(ML) **SILT, little Sand** very loose, dark brown, wet	
							8.0	407.9

Bottom of borehole at 8.0 feet.

GENERAL BH / TP / WELL - GINT STD US LAB COLOR.GDT - 7/9/25 11:09 - C:\USERS\RENAISSANCE\ONEDRIVE - RENAISSANCE GEOTECHNICAL ENGINEERING, PLLC\- PROJECTS\- 2024\24.0038 - SYR CENTRALIZED DEICING PAD\GINT\GINT - SYR DEICING PAD.GP.

Renaissance Geotechnical Engineering, PLLC
3049 Hamburg Street
Schenectady, NY 12303
Telephone: 518-902-9222

BORING NUMBER B-8

CLIENT C&S ENGINEERS, INC.
PROJECT NAME SYR CENTRALIZED DEICING PAD DESIGN
PROJECT NUMBER 24.0038
PROJECT LOCATION SYRACUSE HANCOCK INTERNATIONAL AIRPORT
DATE STARTED 11/6/24 **COMPLETED** 11/6/24
GROUND ELEVATION 414.8 ft **HOLE SIZE** 4.25 inches
DRILLING CONTRACTOR
GROUND WATER LEVELS:
DRILLING METHOD
▽ **AT TIME OF DRILLING** 6.00 ft / Elev 408.80 ft While Sampling
LOGGED BY A.Diop **CHECKED BY** A.Diop
▼ **AT END OF DRILLING** 12.00 ft / Elev 402.80 ft Before HS Removal
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	Test Results and Remarks	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0							0.3 **Approximately 3 inches of TOPSOIL** 414.6
	SS 1	63	2-1-3-3 (4)		SM		(SM) **(FILL) Silty, m-f, SAND, trace gravel** loosely compact, dark brown, damp 2.0 412.8
	SS 2	75	4-4-6-7 (10)		SM		(SM) **Silty, f SAND** loose, light brown with calcareous seams, damp
5	SS 3	85	3-3-1-1 (4)				- grades to very loose, moist, from 4 feet 6.0 ▽ 408.8
	SS 4	73	5-5-6-7 (11)		SM		(SM) **Silty, very f SAND** medium dense, gray, wet
	SS 5	71	3-7-10-12 (17)				
10	SS 6	79	6-13-16-21 (29)	MC = 14%			11.5 403.3
	SS 7	71	10-6-4-3 (10)	LL = NP PL = NP Fines = 95% sand = 5%	ML		▼ (ML) **SILT, trace sand** dense, gray, dry - grades to loose from 13.5 feet 14.0 400.8

Bottom of borehole at 14.0 feet.

GENERAL BH / TP / WELL - GINT STD US LAB COLOR.GDT - 7/9/25 11:09 - C:\USERS\RENAISSANCE\ONEDRIVE - RENAISSANCE GEOTECHNICAL ENGINEERING, PLLC\- PROJECTS\- 2024\24.0038 - SYR CENTRALIZED DEICING PAD\GINT\GINT - SYR DEICING PAD.GP.

Renaissance Geotechnical Engineering, PLLC
3049 Hamburg Street
Schenectady, NY 12303
Telephone: 518-902-9222

BORING NUMBER B-9

CLIENT C&S ENGINEERS, INC.
PROJECT NAME SYR CENTRALIZED DEICING PAD DESIGN
PROJECT NUMBER 24.0038
PROJECT LOCATION SYRACUSE HANCOCK INTERNATIONAL AIRPORT
DATE STARTED 11/6/24 **COMPLETED** 11/6/24
GROUND ELEVATION 415.1 ft **HOLE SIZE** 4.25 inches
DRILLING CONTRACTOR
GROUND WATER LEVELS:
DRILLING METHOD
AT TIME OF DRILLING --- None
LOGGED BY A.Diop **CHECKED BY** A.Diop
AT END OF DRILLING --- None
NOTES
AFTER DRILLING --- None

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0						0.3 **Approximately 4 inches of TOPSOIL**	414.8
	SS 1	67	1-2-2-3 (4)	SM		(SM) **(FILL) Silty, m-f, SAND, trace cobbles** loosely compact, dark brown, damp	
						2.0	413.1
	SS 2	75	4-6-5-5 (11)	SM		(SM) **Silty, f SAND** medium dense, light reddish-brown, mottled, damp	
5	SS 3	79	1-1-3-5 (4)			- grades to very loose, brown with gray seams, from 4 feet	
						6.0	409.1
	SS 4	100	3-5-4-7 (9)	ML		(ML) **SILT, little Sand** very loose, dark brown, wet, interlayering with silty SAND	
						8.0	407.1

Bottom of borehole at 8.0 feet.

GENERAL BH / TP / WELL - GINT STD US LAB COLOR.GDT - 7/9/25 11:09 - C:\USERS\RENAISSANCE\ONEDRIVE - RENAISSANCE GEOTECHNICAL ENGINEERING, PLLC\- PROJECTS\- 2024\24.0038 - SYR CENTRALIZED DEICING PAD\GINT\GINT - SYR DEICING PAD.GP.

Renaissance Geotechnical Engineering, PLLC
3049 Hamburg Street
Schenectady, NY 12303
Telephone: 518-902-9222

BORING NUMBER B-10

CLIENT C&S ENGINEERS, INC.
PROJECT NAME SYR CENTRALIZED DEICING PAD DESIGN
PROJECT NUMBER 24.0038
PROJECT LOCATION SYRACUSE HANCOCK INTERNATIONAL AIRPORT
DATE STARTED 11/6/24 **COMPLETED** 11/6/24
GROUND ELEVATION 414.1 ft **HOLE SIZE** 4.25 inches
DRILLING CONTRACTOR
GROUND WATER LEVELS:
DRILLING METHOD
AT TIME OF DRILLING ---
LOGGED BY A.Diop **CHECKED BY** A.Diop
AT END OF DRILLING 2.50 ft / Elev 411.60 ft After HS Removal
NOTES
AFTER DRILLING 5.00 ft / Elev 409.10 ft Before HS Removal

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0						0.3 **Approximately 4 inches of TOPSOIL**	413.8
	SS 1	71	2-2-6-5 (8)	SM		(SM) **(FILL) Silty, m-f, SAND, trace cobbles** loosely compact, very dark brown, damp	
						2.0	412.1
	SS 2	83	5-4-4-3 (8)	SM		(SM) **Silty, f SAND** loose, light reddish-brown, mottled, damp	
5	SS 3	67	2-5-7-4 (12)			- grades to medium dense, brown with gray seams, from 4.5 feet	
						6.0	408.1
	SS 4	83	4-6-4-5 (10)	ML		(ML) **SILT, little sand** loose, dark brown, wet, interlayering with silty SAND	
						8.0	406.1

Bottom of borehole at 8.0 feet.

GENERAL BH / TP / WELL - GINT STD US LAB COLOR.GDT - 7/9/25 11:09 - C:\USERS\RENAISSANCE\ONEDRIVE - RENAISSANCE GEOTECHNICAL ENGINEERING, PLLC\- PROJECTS\- 2024\24.0038 - SYR CENTRALIZED DEICING PAD\GINT\GINT - SYR DEICING PAD.GP

Renaissance Geotechnical Engineering, PLLC
3049 Hamburg Street
Schenectady, NY 12303
Telephone: 518-902-9222

BORING NUMBER B-12

CLIENT C&S ENGINEERS, INC.
PROJECT NAME SYR CENTRALIZED DEICING PAD DESIGN
PROJECT NUMBER 24.0038
PROJECT LOCATION SYRACUSE HANCOCK INTERNATIONAL AIRPORT
DATE STARTED 11/4/24 **COMPLETED** 11/4/24
GROUND ELEVATION 417.2 ft **HOLE SIZE** 4.25 inches
DRILLING CONTRACTOR
GROUND WATER LEVELS:
DRILLING METHOD
▽ **AT TIME OF DRILLING** 8.00 ft / Elev 409.20 ft While Drilling
LOGGED BY A.Diop **CHECKED BY** A.Diop
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0.0							
						0.3 **Approximately 4 inches of TOPSOIL**	416.9
	SS 1	71	1-4-3-3 (7)			(SM) **Silty, f SAND** loose, light reddish-brown, mottled, damp	
2.5	SS 2	71	3-4-5-5 (9)				
				SM		- possible utility backfill at 4 feet	
5.0	SS 3	75	4-5-4-4 (9)				
7.5	SS 4	96	3-3-2-2 (5)				
						8.0 ▽	409.2
	SS 5	100	2-1-1-2 (2)			(SM) **Silty SAND** very loose, grayish-brown, wet	
10.0	SS 6	54	1-0-0-1 (0)	SM			
12.5	HS					- grades to loose from 13 feet	
15.0	SS 7	67	1-3-2-3 (5)				
						15.0	402.2

Bottom of borehole at 15.0 feet.

GENERAL BH / TP / WELL - GINT STD US LAB COLOR.GDT - 7/9/25 11:09 - C:\USERS\RENAISSANCE\ONEDRIVE - RENAISSANCE GEOTECHNICAL ENGINEERING, PLLC\- PROJECTS\- 2024\24.0038 - SYR CENTRALIZED DEICING PAD\GINT\GINT - SYR DEICING PAD.GP.

Renaissance Geotechnical Engineering, PLLC
3049 Hamburg Street
Schenectady, NY 12303
Telephone: 518-902-9222

BORING NUMBER CB-1/DCP-1

CLIENT C&S ENGINEERS, INC.
PROJECT NAME SYR CENTRALIZED DEICING PAD DESIGN
PROJECT NUMBER 24.0038
PROJECT LOCATION SYRACUSE HANCOCK INTERNATIONAL AIRPORT
DATE STARTED 11/5/24 **COMPLETED** 11/5/24
GROUND ELEVATION 415.8 ft **HOLE SIZE** 4.25 inches
DRILLING CONTRACTOR
GROUND WATER LEVELS:
DRILLING METHOD
AT TIME OF DRILLING --- None - Wet Soils
LOGGED BY A.Diop **CHECKED BY** A.Diop
AT END OF DRILLING --- None
NOTES
AFTER DRILLING --- None

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	Test Results and Remarks	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0	CD	100					**Approximately 16 inches of ASPHALTIC CEMENT Pavement** over	414.5
	SS 1	75	46-49-51-54 (100)	LL = NP PL = NP Fines = 8% SAND = 54%, Gravel = 38%	SW-SM		(SW-SM) **(Granular FILL) Well Graded SAND with Silt and Gravel**	411.5
5	SS 2	63	38-51-29-20 (80)		ML		(ML) **SILT, little Sand** extemely dense, brown, moist	409.3
	SS 3	83	9-12-15-16 (27)		SM		(SM) **Silty SAND** very dense, brown, wet	406.5
	SS 4	75	17-23-32-38 (55)					

Bottom of borehole at 9.3 feet.



GENERAL BH / TP / WELL - GINT STD US LAB COLOR.GDT - 7/9/25 11:09 - C:\USERS\RENAISSANCE\ONEDRIVE - RENAISSANCE GEOTECHNICAL ENGINEERING, PLLC\- PROJECTS\- 2024\24.0038 - SYR CENTRALIZED DEICING PAD\GINT\GINT - SYR DEICING PAD.GP.

Renaissance Geotechnical Engineering, PLLC
3049 Hamburg Street
Schenectady, NY 12303
Telephone: 518-902-9222

BORING NUMBER CB-2

CLIENT C&S ENGINEERS, INC.
PROJECT NAME SYR CENTRALIZED DEICING PAD DESIGN
PROJECT NUMBER 24.0038
PROJECT LOCATION SYRACUSE HANCOCK INTERNATIONAL AIRPORT
DATE STARTED 11/5/24 **COMPLETED** 11/5/24
GROUND ELEVATION 416.7 ft **HOLE SIZE** 4.25 inches
DRILLING CONTRACTOR
GROUND WATER LEVELS:
DRILLING METHOD
AT TIME OF DRILLING --- None
LOGGED BY A.Diop **CHECKED BY** A.Diop
AT END OF DRILLING --- None
NOTES
AFTER DRILLING --- None

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	Test Results and Remarks	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0	CD	100					**Approximately 14 inches of ASPHALTIC CEMENT Pavement** over	
							1.2	415.5
	SS 1	75	20-26-17-21 (43)	LL = NP PL = NP Fines = 11% Sand = 38%, GRAVEL = 51%	GP-GM		(GP-GM) **Appr. 12 inches of Crusher Run GRAVEL Base as Poorly Graded GRAVEL with Silt and Sand**	
							2.2	414.5
	SS 2	77	5-7-9-9 (16)		SM		(SM) **Silty SAND** very dense, brown, wet, silt interlayering - grades to medium dense from 3.5 feet	
5	SS 3	50	7-9-8-5 (17)				- grades to loose from 7 feet	
	SS 4	77	4-3-2-2 (5)					
							9.2	407.5

Bottom of borehole at 9.2 feet.



GENERAL BH / TP / WELL - GINT STD US LAB COLOR.GDT - 7/9/25 11:09 - C:\USERS\RENAISSANCE\ONEDRIVE - RENAISSANCE GEOTECHNICAL ENGINEERING, PLLC\- PROJECTS\- 2024\24.0038 - SYR CENTRALIZED DEICING PAD\GINT\GINT - SYR DEICING PAD.GP.

Renaissance Geotechnical Engineering, PLLC
3049 Hamburg Street
Schenectady, NY 12303
Telephone: 518-902-9222

BORING NUMBER CB-3

CLIENT C&S ENGINEERS, INC.
PROJECT NAME SYR CENTRALIZED DEICING PAD DESIGN
PROJECT NUMBER 24.0038
PROJECT LOCATION SYRACUSE HANCOCK INTERNATIONAL AIRPORT
DATE STARTED 11/6/24 **COMPLETED** 11/6/24
GROUND ELEVATION 415.9 ft **HOLE SIZE** 4.25 inches
DRILLING CONTRACTOR
GROUND WATER LEVELS:
DRILLING METHOD
AT TIME OF DRILLING --- None
LOGGED BY A.Diop **CHECKED BY** A.Diop
AT END OF DRILLING --- None
NOTES
AFTER DRILLING --- None

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	Test Results and Remarks	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0	CD	100					**Approximately 16.25 inches of ASPHALTIC CEMENT Pavement** over	
								1.4 / 414.6
	SS 1	69	26-30-25-18 (55)	LL = NP PL = NP Fines = 9% SAND = 46%, Gravel = 45%	SW-SM		(SW-SM) **Appr. 30 inches of Base as Well Graded SAND with Silt and Gravel over Separator Fabric**	
								3.9 / 412.1
5	SS 2	67	13-10-5-5 (15)		ML		(ML) **SILT with Sand** medium dense to loose, dark brown, moist	
	SS 3	75	3-3-6-9 (9)				- grades to dense around 7 feet	
	SS 4	67	11-15-15-16 (30)					
								9.4 / 406.6

Bottom of borehole at 9.4 feet.



GENERAL BH / TP / WELL - GINT STD US LAB COLOR.GDT - 7/9/25 11:09 - C:\USERS\RENAISSANCE\ONEDRIVE - RENAISSANCE GEOTECHNICAL ENGINEERING, PLLC\- PROJECTS\- 2024\24.0038 - SYR CENTRALIZED DEICING PAD\GINT\GINT - SYR DEICING PAD.GP.

Renaissance Geotechnical Engineering, PLLC
3049 Hamburg Street
Schenectady, NY 12303
Telephone: 518-902-9222

BORING NUMBER CB-4

CLIENT C&S ENGINEERS, INC.
PROJECT NAME SYR CENTRALIZED DEICING PAD DESIGN
PROJECT NUMBER 24.0038
PROJECT LOCATION SYRACUSE HANCOCK INTERNATIONAL AIRPORT
DATE STARTED 11/5/24 **COMPLETED** 11/5/24
GROUND ELEVATION 416.6 ft **HOLE SIZE** 4.25 inches
DRILLING CONTRACTOR
GROUND WATER LEVELS:
DRILLING METHOD
▽ **AT TIME OF DRILLING** 4.50 ft / Elev 412.10 ft While Drilling
LOGGED BY A.Diop **CHECKED BY** A.Diop
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	Test Results and Remarks	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0	CD 1	100					**Approximately 15 inches of ASPHALTIC CEMENT Pavement** over	
							1.3	415.4
	SS 1	75	35-52-39-33 (91)	LL = NP PL = NP Fines = 13% SAND = 44%, Gravel = 43%	SM		(SM) **Approximately 24 inches of Silty SAND with Gravel over Separator Fabric**	
							3.3	413.4
5	SS 2	58	7-7-7-9 (14)				(SM) **Silty, m-f, SAND** medium dense, dark brown, moist, strong glycol odors ▽	
	SS 3	60	6-8-12-13 (20)		SM		grades to dense from 6 feet	
	SS 4	63	15-18-17-16 (35)					
							9.3	407.4

Bottom of borehole at 9.3 feet.



GENERAL BH / TP / WELL - GINT STD US LAB COLOR.GDT - 7/9/25 11:09 - C:\USERS\RENAISSANCE\ONEDRIVE - RENAISSANCE GEOTECHNICAL ENGINEERING, PLLC\- PROJECTS\- 2024\24.0038 - SYR CENTRALIZED DEICING PAD\GINT\GINT - SYR DEICING PAD.GP.

Renaissance Geotechnical Engineering, PLLC
3049 Hamburg Street
Schenectady, NY 12303
Telephone: 518-902-9222

BORING NUMBER CB-5

CLIENT C&S ENGINEERS, INC.
PROJECT NAME SYR CENTRALIZED DEICING PAD DESIGN
PROJECT NUMBER 24.0038
PROJECT LOCATION SYRACUSE HANCOCK INTERNATIONAL AIRPORT
DATE STARTED 11/6/24 **COMPLETED** 11/6/24
GROUND ELEVATION 417.2 ft **HOLE SIZE** 4.25 inches
DRILLING CONTRACTOR
GROUND WATER LEVELS:
DRILLING METHOD
▽ **AT TIME OF DRILLING** 6.00 ft / Elev 411.20 ft While Sampling
LOGGED BY A.Diop **CHECKED BY** A.Diop
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	Test Results and Remarks	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0	CD	100					**Approximately 15.75 inches of ASPHALTIC CEMENT Pavement** over
						1.3	415.9
	SS 1	67	19-17-18-13 (35)	LL = NP PL = NP Fines = 8% Sand = 39%, GRAVEL = 53%	GP-GM		(GP-GM) **Appr. 24 inches of Base as Poorly Graded GRAVEL with Silt and Sand over Separator Fabric**
						3.3	413.9
5	SS 2	63	6-6-6-4 (12)				(ML) **SILT with Sand** medium dense, dark brown, moist
	SS 3	77	3-3-5-7 (8)		ML		- grades to loose from 5 feet ▽ - wet from 6 feet
	SS 4	69	4-5-4-4 (9)				
						9.3	407.9

Bottom of borehole at 9.3 feet.



GENERAL BH / TP / WELL - GINT STD US LAB COLOR.GDT - 7/9/25 11:09 - C:\USERS\RENAISSANCE\ONEDRIVE - RENAISSANCE GEOTECHNICAL ENGINEERING, PLLC\- PROJECTS\- 2024\24.0038 - SYR CENTRALIZED DEICING PAD\GINT\GINT - SYR DEICING PAD.GP.

Renaissance Geotechnical Engineering, PLLC
3049 Hamburg Street
Schenectady, NY 12303
Telephone: 518-902-9222

BORING NUMBER CB-6

CLIENT C&S ENGINEERS, INC.
PROJECT NAME SYR CENTRALIZED DEICING PAD DESIGN
PROJECT NUMBER 24.0038
PROJECT LOCATION SYRACUSE HANCOCK INTERNATIONAL AIRPORT
DATE STARTED 11/6/24 **COMPLETED** 11/6/24
GROUND ELEVATION 416 ft **HOLE SIZE** 4.25 inches
DRILLING CONTRACTOR
GROUND WATER LEVELS:
DRILLING METHOD
▽ **AT TIME OF DRILLING** 6.00 ft / Elev 410.00 ft While Sampling
LOGGED BY A.Diop **CHECKED BY** A.Diop
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	Test Results and Remarks	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0	CD	100				0.4	**Approximately 5 inches of ASPHALTIC CEMENT Pavement**	415.6
	SS 1	52	11-16-13-11 (29)	LL = NP PL = NP Fines = 12% SAND = 52%, Gravel = 36%	SP-SM	2.4	(SP-SM) **Appr. 24 inches of Run of Bank SAND and GRAVEL FILL as Poorly Graded SAND with Silt and Gravel**	413.6
	SS 2	75	8-6-7-7 (13)		SP-SM		(SP-SM) **Poorly Graded SAND with Silt** medium dense, very light brown, mottled, seasonal high water levels, damp	
5	SS 3	88	4-3-3-3 (6)	MC = 19% LL = NP PL = NP Fines = 8% SAND = 92%			- grades to loose, Brownish-Purple, moist between 4.5 feet and 7 feet ▽	
	SS 4	92	1-3-1-2 (4)			7.5		408.5
					ML	8.4	(ML) **Sandy SILT** very loose, gray, wet	407.6

Bottom of borehole at 8.4 feet.



GENERAL BH / TP / WELL - GINT STD US LAB COLOR.GDT - 7/9/25 11:09 - C:\USERS\RENAISSANCE\ONEDRIVE - RENAISSANCE GEOTECHNICAL ENGINEERING, PLLC\- PROJECTS\- 2024\24.0038 - SYR CENTRALIZED DEICING PAD\GINT\GINT - SYR DEICING PAD.GP...

Renaissance Geotechnical Engineering, PLLC
3049 Hamburg Street
Schenectady, NY 12303
Telephone: 518-902-9222

BORING NUMBER IT-1

CLIENT C&S ENGINEERS, INC.
PROJECT NAME SYR CENTRALIZED DEICING PAD DESIGN
PROJECT NUMBER 24.0038
PROJECT LOCATION SYRACUSE HANCOCK INTERNATIONAL AIRPORT
DATE STARTED 11/6/24 **COMPLETED** 11/6/24
GROUND ELEVATION 416.4 ft **HOLE SIZE** 4.25 inches
DRILLING CONTRACTOR
GROUND WATER LEVELS:
DRILLING METHOD
AT TIME OF DRILLING --- None
LOGGED BY A.Diop **CHECKED BY** A.Diop
AT END OF DRILLING --- None
NOTES INFILTRATION TEST AT 5 FEET
AFTER DRILLING --- None

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0						0.3 **Approximately 4 inches of TOPSOIL**	416.1
	SS 1	75	1-2-2-3 (4)	SM		(SM) **(FILL) Silty, f SAND, trace gravel** very loose, very dark brown, dry	
						2.0	414.4
	SS 2	58	4-6-7-6 (13)	SM		(SM) **Silty SAND, trace sandstone fragments** Medium dense, light reddish-brown, dry	
5	AU					5.0	411.4

Bottom of borehole at 5.0 feet.

GENERAL BH / TP / WELL - GINT STD US LAB COLOR.GDT - 7/9/25 11:09 - C:\USERS\RENAISSANCE\ONEDRIVE - RENAISSANCE GEOTECHNICAL ENGINEERING, PLLC\- PROJECTS\- 2024\24.0038 - SYR CENTRALIZED DEICING PAD\GINT\GINT - SYR DEICING PAD.GP.

Renaissance Geotechnical Engineering, PLLC
3049 Hamburg Street
Schenectady, NY 12303
Telephone: 518-902-9222

BORING NUMBER IT-2

CLIENT C&S ENGINEERS, INC.
PROJECT NAME SYR CENTRALIZED DEICING PAD DESIGN
PROJECT NUMBER 24.0038
PROJECT LOCATION SYRACUSE HANCOCK INTERNATIONAL AIRPORT
DATE STARTED 11/6/24 **COMPLETED** 11/6/24
GROUND ELEVATION 415.5 ft **HOLE SIZE** 4.25 inches
DRILLING CONTRACTOR
GROUND WATER LEVELS:
DRILLING METHOD
AT TIME OF DRILLING --- None
LOGGED BY A.Diop **CHECKED BY** A.Diop
AT END OF DRILLING --- None
NOTES INFILTRATION TEST AT 5 FEET
AFTER DRILLING --- None

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0							
						Approximately 6 inches of TOPSOIL	415.0
	SS 1	79	1-2-1-4 (3)	SM		(SM) **(FILL) Silty, f SAND, trace gravel** very loose, very dark brown, dry	
	SS 2	0	3-2-3-4 (5)				
5	AU						
							410.5

Bottom of borehole at 5.0 feet.

GENERAL BH / TP / WELL - GINT STD US LAB COLOR.GDT - 7/9/25 11:09 - C:\USERS\RENAISSANCE\ONEDRIVE - RENAISSANCE GEOTECHNICAL ENGINEERING, PLLC\- PROJECTS\- 2024\24.0038 - SYR CENTRALIZED DEICING PAD\GINT\GINT - SYR DEICING PAD.GP.

Renaissance Geotechnical Engineering, PLLC
3049 Hamburg Street
Schenectady, NY 12303
Telephone: 518-902-9222

TEST PIT NUMBER TP-1

CLIENT C&S ENGINEERS, INC.
PROJECT NAME SYR CENTRALIZED DEICING PAD DESIGN
PROJECT NUMBER 24.0038
PROJECT LOCATION SYRACUSE HANCOCK INTERNATIONAL AIRPORT
DATE STARTED 11/4/24 **COMPLETED** 11/4/24
GROUND ELEVATION 414.6 ft **TEST PIT SIZE** inches
EXCAVATION CONTRACTOR
GROUND WATER LEVELS:
EXCAVATION METHOD
AT TIME OF EXCAVATION --- None
LOGGED BY A.Diop **CHECKED BY** A.Diop
AT END OF EXCAVATION --- None
NOTES SANY35U, 24" BUCKET
AFTER EXCAVATION --- None

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0					
	TEST PIT			0.3 **Approximately 4 inches of TOPSOIL**	414.3
		SM		(SM) **(4 - 10 inches) Silty SAND** light brown	
				1.2	413.4
		SM		(SM) **(10 - 60 inches) Silty SAND** gray, moist to wet	
5				5.0	409.6

Bottom of test pit at 5.0 feet.

GENERAL BH / TP / WELL - GINT STD US LAB COLOR.GDT - 7/9/25 11:46 - C:\USERS\RENAISSANCE\ONEDRIVE - RENAISSANCE GEOTECHNICAL ENGINEERING, PLLC\- PROJECTS\- 2024\24.0038 - SYR CENTRALIZED DEICING PAD\GINT\GINT - SYR DEICING PAD.GP

Renaissance Geotechnical Engineering, PLLC
3049 Hamburg Street
Schenectady, NY 12303
Telephone: 518-902-9222

TEST PIT NUMBER TP-2

CLIENT C&S ENGINEERS, INC.
PROJECT NAME SYR CENTRALIZED DEICING PAD DESIGN
PROJECT NUMBER 24.0038
PROJECT LOCATION SYRACUSE HANCOCK INTERNATIONAL AIRPORT
DATE STARTED 11/5/24 **COMPLETED** 11/5/24
GROUND ELEVATION 416.7 ft **TEST PIT SIZE** inches
EXCAVATION CONTRACTOR
GROUND WATER LEVELS:
EXCAVATION METHOD
AT TIME OF EXCAVATION --- None
LOGGED BY A.Diop **CHECKED BY** A.Diop
AT END OF EXCAVATION --- None
NOTES SANY35U, 24" BUCKET
AFTER EXCAVATION --- None

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0					
	TEST PIT			0.4 **Approximately 5 inches of TOPSOIL**	416.3
		SM		(SM) **(5 - 26 inches) Silty SAND with Gravel and large Cobbles** light brown	
				2.2	414.5
		SM		(SM) **(26 - 60 inches) Silty SAND** gray, damp	
5				5.0	411.7

Bottom of test pit at 5.0 feet.

GENERAL BH / TP / WELL - GINT STD US LAB COLOR.GDT - 7/9/25 11:46 - C:\USERS\RENAISSANCE\ONEDRIVE - RENAISSANCE GEOTECHNICAL ENGINEERING, PLLC\- PROJECTS\- 2024\24.0038 - SYR CENTRALIZED DEICING PAD\GINT\GINT - SYR DEICING PAD.GP

Renaissance Geotechnical Engineering, PLLC
3049 Hamburg Street
Schenectady, NY 12303
Telephone: 518-902-9222

TEST PIT NUMBER TP-3

CLIENT C&S ENGINEERS, INC.
PROJECT NAME SYR CENTRALIZED DEICING PAD DESIGN
PROJECT NUMBER 24.0038
PROJECT LOCATION SYRACUSE HANCOCK INTERNATIONAL AIRPORT
DATE STARTED 11/4/24 **COMPLETED** 11/4/24
GROUND ELEVATION 415.5 ft **TEST PIT SIZE** inches
EXCAVATION CONTRACTOR
GROUND WATER LEVELS:
EXCAVATION METHOD
AT TIME OF EXCAVATION --- None
LOGGED BY A.Diop **CHECKED BY** A.Diop
AT END OF EXCAVATION --- None
NOTES SANY35U, 24" BUCKET
AFTER EXCAVATION --- None

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0					
	TEST PIT 1			**Approximately 5 inches of TOPSOIL**	415.1
				0.4 **(5 - 20 inches) (FILL) Silty SAND with cobbles, marble, brick and glass rubble** dark brown	
				1.7	413.8
		SM		(SM) **(20 - 36 inches) Silty SAND** light brown, damp	
				3.0	412.5
		SM		(SM) **(36 - 60 inches) Silty SAND** gray, moist	
5				5.0	410.5

Bottom of test pit at 5.0 feet.

GENERAL BH / TP / WELL - GINT STD US LAB COLOR.GDT - 7/9/25 11:46 - C:\USERS\RENAISSANCE\ONEDRIVE - RENAISSANCE GEOTECHNICAL ENGINEERING, PLLC\- PROJECTS\- 2024\24.0038 - SYR CENTRALIZED DEICING PAD\GINT\GINT - SYR DEICING PAD.GP.

Renaissance Geotechnical Engineering, PLLC
3049 Hamburg Street
Schenectady, NY 12303
Telephone: 518-902-9222

TEST PIT NUMBER TP-4

CLIENT C&S ENGINEERS, INC.
PROJECT NAME SYR CENTRALIZED DEICING PAD DESIGN
PROJECT NUMBER 24.0038
PROJECT LOCATION SYRACUSE HANCOCK INTERNATIONAL AIRPORT
DATE STARTED 11/4/24 **COMPLETED** 11/4/24
GROUND ELEVATION 415.7 ft **TEST PIT SIZE** inches
EXCAVATION CONTRACTOR
GROUND WATER LEVELS:
EXCAVATION METHOD
AT TIME OF EXCAVATION --- None
LOGGED BY A.Diop **CHECKED BY** A.Diop
AT END OF EXCAVATION --- None
NOTES SANY35U, 24" BUCKET
AFTER EXCAVATION --- None

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0					
	TEST PIT 1			**Approximately 12 inches of TOPSOIL**	
1.0					414.7
		SM		(SM) **(12 - 36 inches) (FILL) Silty SAND with cobbles** dark brown	
3.0					412.7
				(36 - 48 inches) SANDSTONE Cobbles light brown, mottled, damp	
4.0					411.7

Bottom of test pit at 4.0 feet.

GENERAL BH / TP / WELL - GINT STD US LAB COLOR.GDT - 7/9/25 11:46 - C:\USERS\RENAISSANCE\ONEDRIVE - RENAISSANCE GEOTECHNICAL ENGINEERING, PLLC\- PROJECTS\- 2024\24.0038 - SYR CENTRALIZED DEICING PAD\GINT\GINT - SYR DEICING PAD.GP

Appendix C

Gradation Curves & Index Summary

Renaissance Geotechnical Engineering, PLLC
2320 Nott Street, Box 9401
Schenectady, NY 12309
Telephone: 518-902-9222

SUMMARY OF LABORATORY RESULTS

CLIENT C&S ENGINEERS, INC. **PROJECT NAME** SYR CENTRALIZED DEICING PAD DESIGN

PROJECT NUMBER 24.0038 **PROJECT LOCATION** SYRACUSE HANCOCK INTERNATIONAL AIRPORT

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	Class-ification	Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
B-1	0.0							8.6			
B-2	4.0	NP	NP	NP	0.85	77	ML	20.3			
B-2	6.0							21.3			
B-6	6.0	NP	NP	NP	0.85	86	ML	31.3			
B-8	10.0							14.4			
B-8	12.0	NP	NP	NP	0.425	95	ML				
CB-1/DCP-1	1.3	NP	NP	NP	25	8	SW-SM				
CB-2	1.2	NP	NP	NP	50	11	GP-GM				
CB-3	1.4	NP	NP	NP	25	9	SW-SM				
CB-4	1.3	NP	NP	NP	25	13	SM				
CB-5	1.3	NP	NP	NP	25	8	GP-GM				
CB-6	0.4	NP	NP	NP	25	12	SP-SM				
CB-6	4.4	NP	NP	NP	0.85	8	SP-SM	19.3			

LAB SUMMARY - GINT STD US LAB COLOR.GDT - 1/12/25 14:45 - C:\USERS\RENAISSANCE\ONEDRIVE - RENAISSANCE GEOTECHNICAL ENGINEERING, PLLC\- PROJECTS\- 2024\24.0038 - SYR CENTRALIZED DEICING PAD\GINT\GINT - SYR DEICING PAD.GPJ

GRAIN SIZE DISTRIBUTION

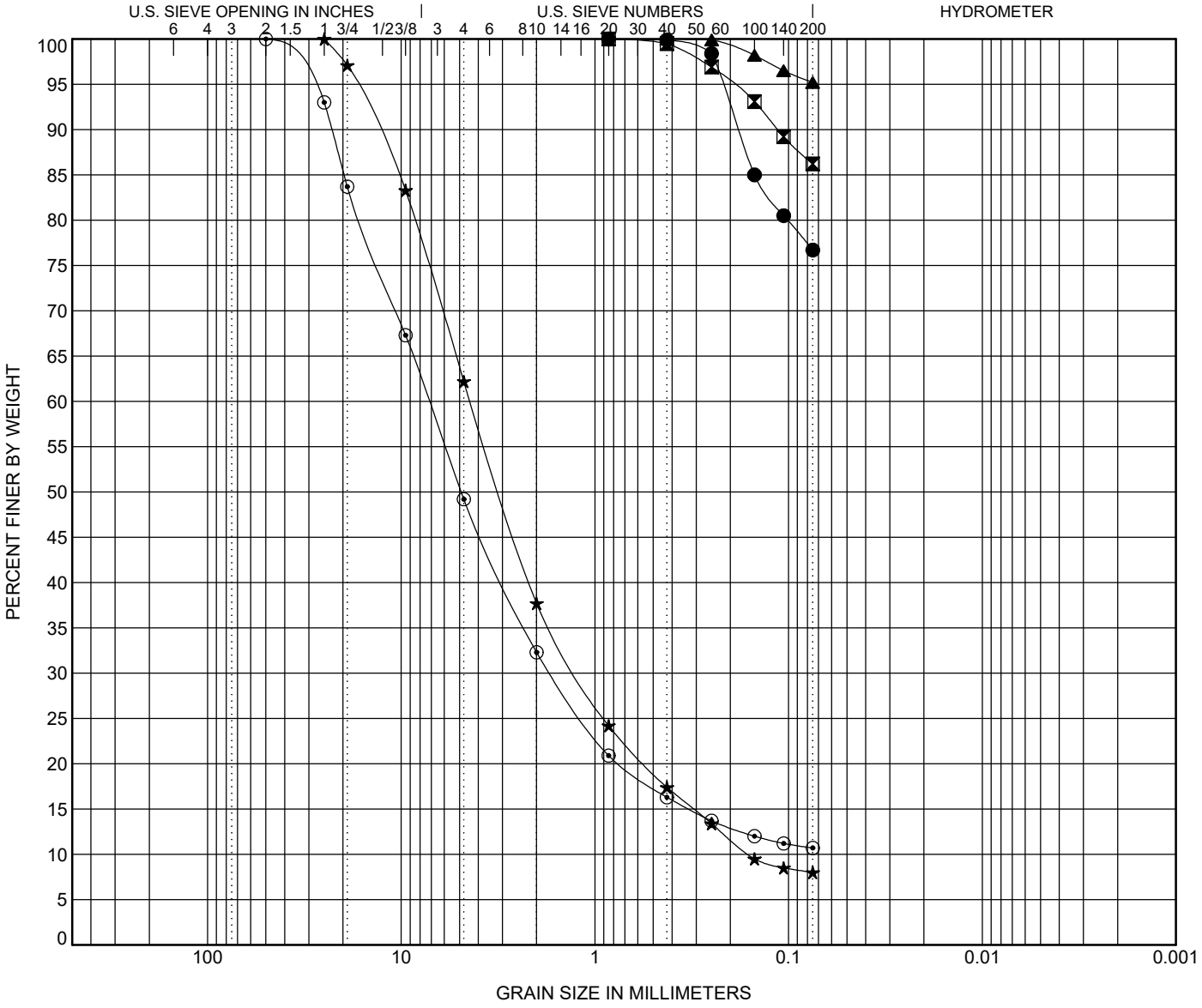
Renaissance Geotechnical Engineering, PLLC
2320 Nott Street, Box 9401
Schenectady, NY 12309
Telephone: 518-902-9222

CLIENT C&S ENGINEERS, INC.

PROJECT NAME SYR CENTRALIZED DEICING PAD DESIGN

PROJECT NUMBER 24.0038

PROJECT LOCATION SYRACUSE HANCOCK INTERNATIONAL AIRPORT



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	B-2	4.0	SILT with SAND(ML)	NP	NP	NP		
⊠	B-6	6.0	SILT(ML)	NP	NP	NP		
▲	B-8	12.0	SILT(ML)	NP	NP	NP		
★	CB-1/DCP-1	1.3	WELL-GRADED SAND with SILT and GRAVEL(SW-SM)	NP	NP	NP	2.14	27.44
⊙	CB-2	1.2	POORLY GRADED GRAVEL with SILT and SAND(GP-GM)	NP	NP	NP	8.53	155.45

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-2	4.0	0.85				0.0	23.3	76.7	
⊠	B-6	6.0	0.85				0.0	13.8	86.2	
▲	B-8	12.0	0.425				0.0	4.8	95.2	
★	CB-1/DCP-1	1.3	25	4.395	1.228	0.16	37.8	54.2	8.0	
⊙	CB-2	1.2	50	7.183	1.683		50.8	38.5	10.7	

GRAIN SIZE - GINT STD US LAB COLOR.GDT - 1/9/25 22:38 - C:\USERS\RENAISSANCE\ONEDRIVE - RENAISSANCE GEOTECHNICAL ENGINEERING, PLLC\- PROJECTS\- 2024\24.0038 - SYR CENTRALIZED DEICING PAD\GINT\GINT - SYR DEICING PAD.GPJ

GRAIN SIZE DISTRIBUTION

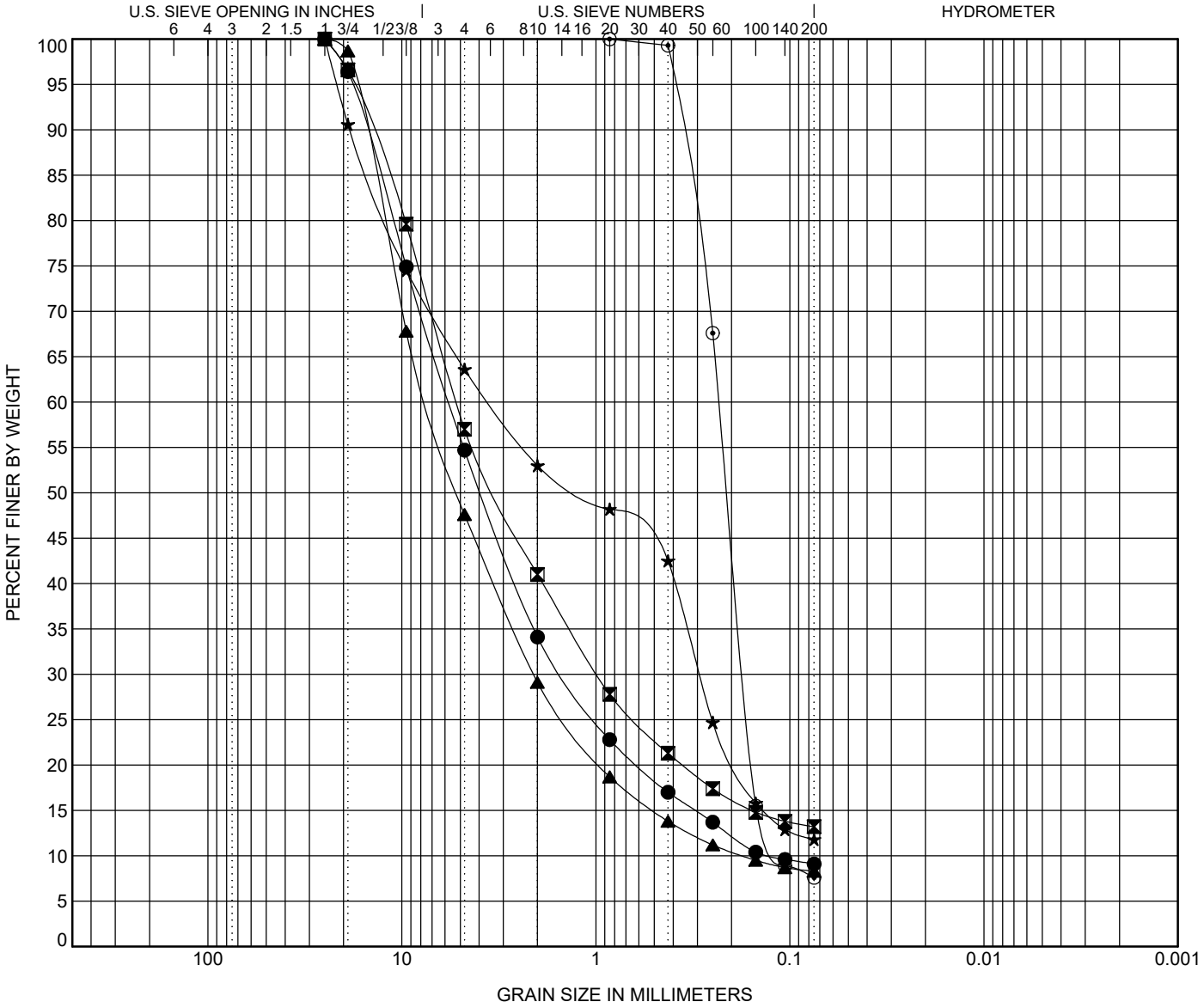
Renaissance Geotechnical Engineering, PLLC
2320 Nott Street, Box 9401
Schenectady, NY 12309
Telephone: 518-902-9222

CLIENT C&S ENGINEERS, INC.

PROJECT NAME SYR CENTRALIZED DEICING PAD DESIGN

PROJECT NUMBER 24.0038

PROJECT LOCATION SYRACUSE HANCOCK INTERNATIONAL AIRPORT



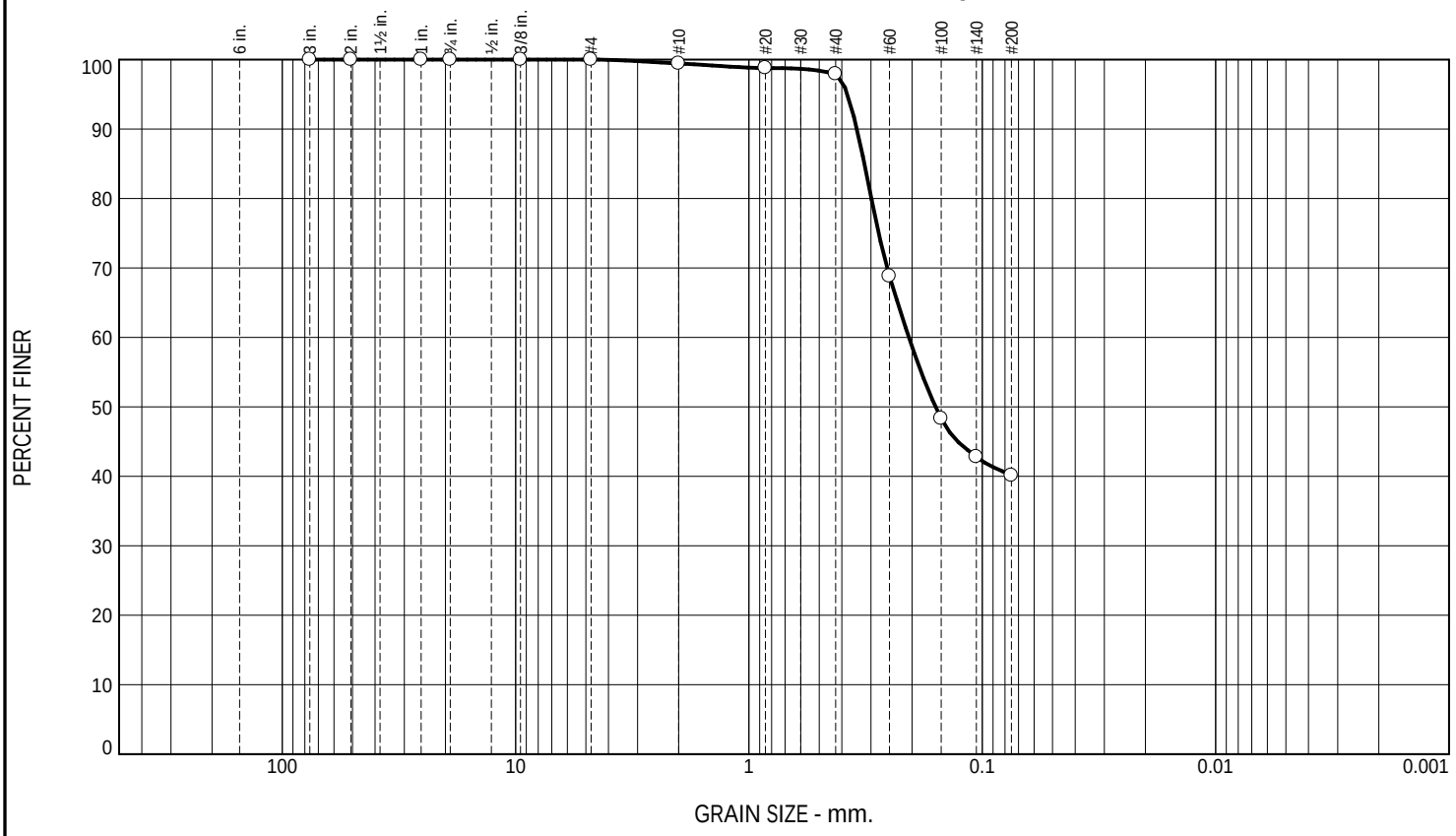
COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	CB-3	1.4	WELL-GRADED SAND with SILT and GRAVEL(SW-SM)	NP	NP	NP	2.99	45.18
⊠	CB-4	1.3	SILTY SAND with GRAVEL(SM)	NP	NP	NP		
▲	CB-5	1.3	POORLY GRADED GRAVEL with SILT and SAND(GP-GM)	NP	NP	NP	3.43	41.70
★	CB-6	0.4	POORLY GRADED SAND with SILT and GRAVEL(SP-SM)	NP	NP	NP	0.57	83.16
⊙	CB-6	4.4	POORLY GRADED SAND with SILT(SP-SM)	NP	NP	NP	1.15	2.07

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	CB-3	1.4	25	5.697	1.466	0.126	45.3	45.6	9.1	
⊠	CB-4	1.3	25	5.208	0.98		43.0	43.8	13.2	
▲	CB-5	1.3	25	7.269	2.086	0.174	52.4	39.3	8.3	
★	CB-6	0.4	25	3.541	0.293		36.4	51.8	11.8	
⊙	CB-6	4.4	0.85	0.232	0.173	0.112	0.0	92.4	7.6	

GRAIN SIZE - GINT STD US LAB COLOR.GDT - 1/9/25 22:38 - C:\USERS\RENAISSANCE\ONEDRIVE - RENAISSANCE GEOTECHNICAL ENGINEERING, PLLC\- PROJECTS\- 2024\24.0038 - SYR CENTRALIZED DEICING PAD\GINT\GINT - SYR DEICING PAD.GPJ

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	0.0	59.9	40.1					

SIEVE inches size	○ PERCENT FINER		
3	100.0		
2	100.0		
1	100.0		
.75	100.0		
.375	100.0		
	GRAIN SIZE		
D_{60}	0.2063		
D_{30}			
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	○ PERCENT FINER		
#4	100.0		
#10	99.4		
#20	98.8		
#40	97.9		
#60	68.8		
#100	48.3		
#140	42.8		
#200	40.1		

Material Description
○

REMARKS:
○

○ Location: Bulk 1

EINCK, Corp.

Timonium, MD

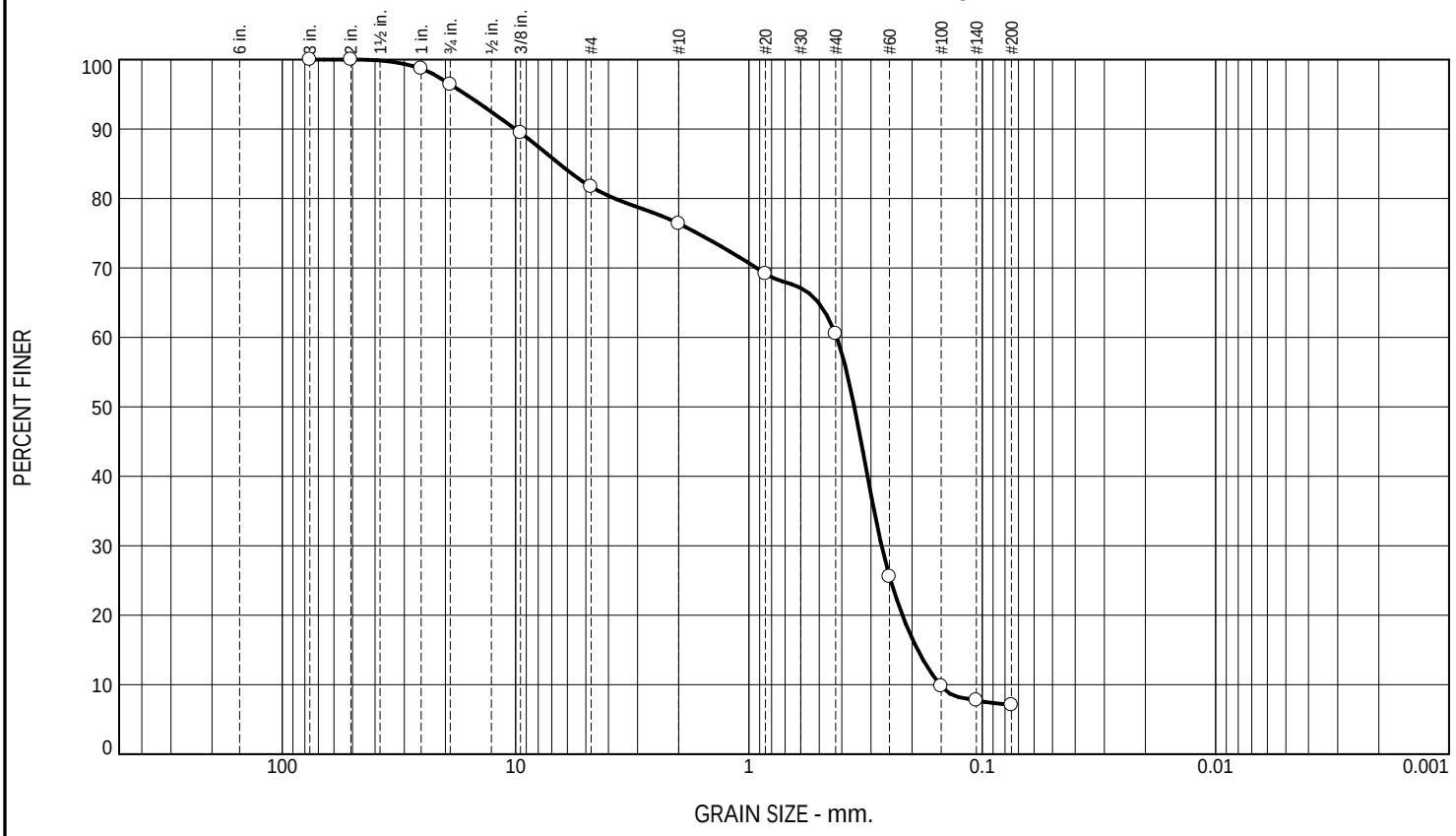
Client: Renaissance Geotechnical Engineering

Project:

Project No.: 24.0038

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	18.3	74.6	7.1					

SIEVE inches size	PERCENT FINER ○		
3	100.0		
2	100.0		
1	98.7		
.75	96.4		
.375	89.4		
	GRAIN SIZE		
D_{60}	0.4193		
D_{30}	0.2704		
D_{10}	0.1519		
	COEFFICIENTS		
C_c	1.15		
C_u	2.76		

SIEVE number size	PERCENT FINER ○		
#4	81.7		
#10	76.4		
#20	69.2		
#40	60.5		
#60	25.5		
#100	9.8		
#140	7.8		
#200	7.1		

Material Description
○

REMARKS:
○

○ Location: Bulk 2

EINCK, Corp.

Timonium, MD

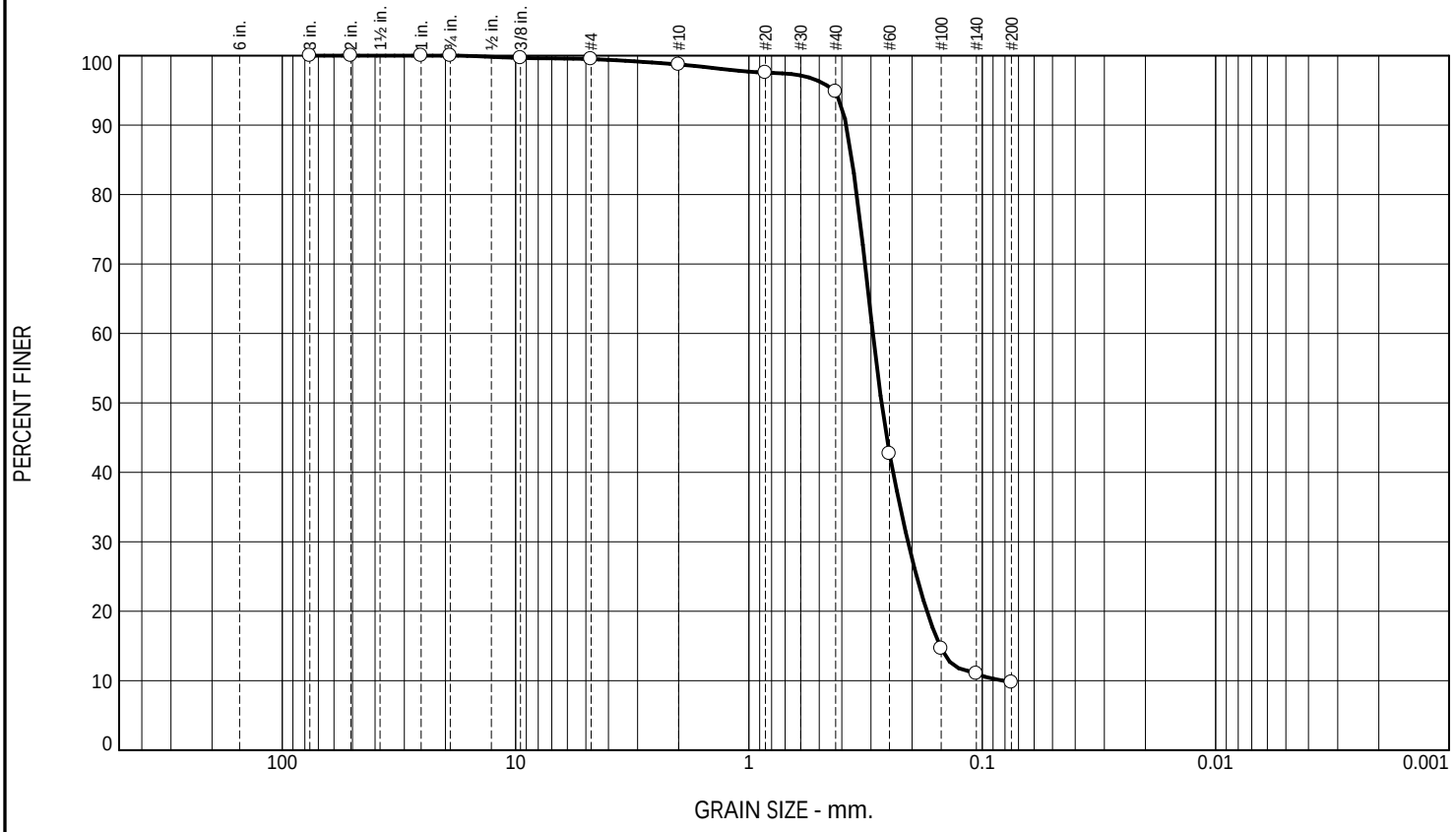
Client: Renaissance Geotechnical Engineering

Project:

Project No.: 24.0038

Figure

Particle Size Distribution Report



	+3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○	0.0	0.5	89.8	9.7					

SIEVE inches size	○		
	PERCENT FINER		
3	100.0		
2	100.0		
1	100.0		
.75	100.0		
.375	99.7		
	GRAIN SIZE		
D_{60}	0.2942		
D_{30}	0.2083		
D_{10}	0.0815		
	COEFFICIENTS		
C_c	1.81		
C_u	3.61		

SIEVE number size	○		
	PERCENT FINER		
#4	99.5		
#10	98.7		
#20	97.5		
#40	94.8		
#60	42.7		
#100	14.6		
#140	11.0		
#200	9.7		

Material Description
○

REMARKS:
○

○ Location: Bulk 3

EINCK, Corp.

Timonium, MD

Client: Renaissance Geotechnical Engineering

Project:

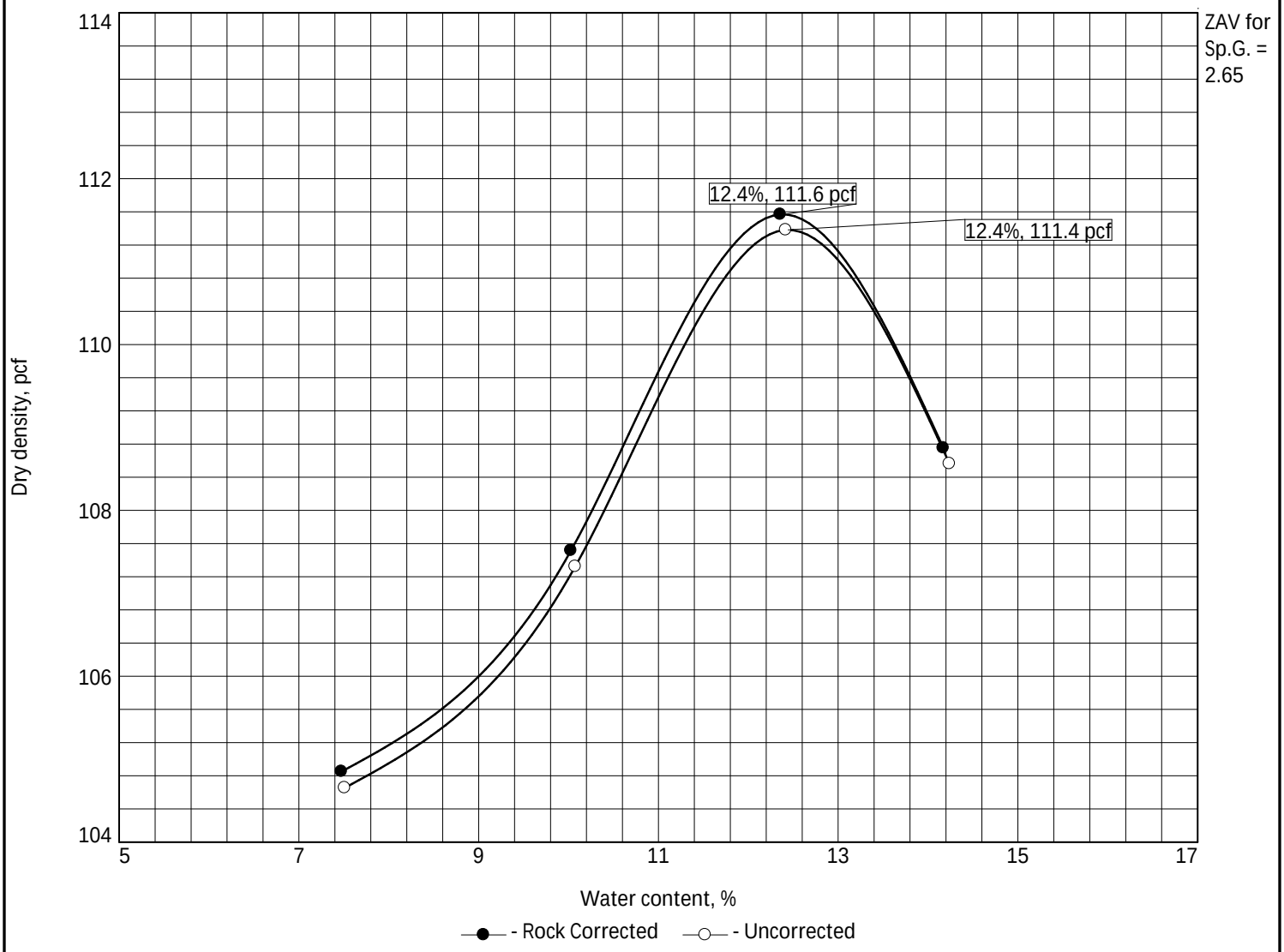
Project No.: 24.0038

Figure

Appendix D

Moisture-Density Relationship Results

COMPACTION TEST REPORT for Curve No. Bulk 3



Test specification: ASTM D 698-12 Method A Standard
ASTM D4718-15 Oversize Corr. Applied to Each Test Point

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
				2.65			0.5	9.7

ROCK CORRECTED TEST RESULTS	UNCORRECTED	MATERIAL DESCRIPTION
Maximum dry density = 111.6 pcf	111.4 pcf	
Optimum moisture = 12.4 %	12.4 %	

Project No. 24.0038 Client: Renaissance Geotechnical Engineering
Project:
Date:
○ Location: Bulk 3

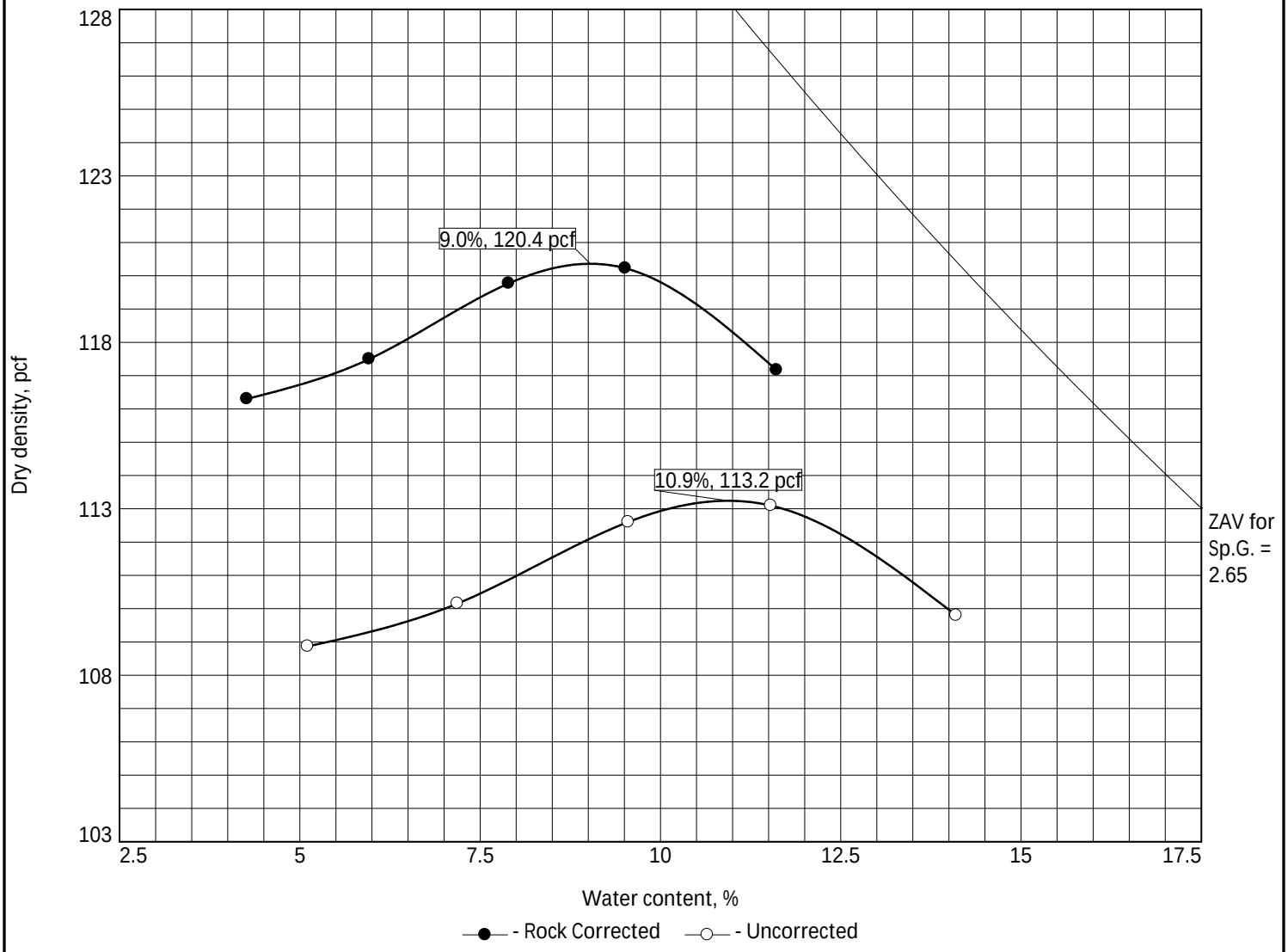
EINCK, Corp.

Timonium, MD

Remarks:

Figure

COMPACTION TEST REPORT for Curve No. Bulk 2



Test specification: ASTM D 698-12 Method A Standard
ASTM D4718-15 Oversize Corr. Applied to Each Test Point

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
				2.65			18.3	7.1

ROCK CORRECTED TEST RESULTS	UNCORRECTED	MATERIAL DESCRIPTION
Maximum dry density = 120.4 pcf	113.2 pcf	
Optimum moisture = 9.0 %	10.9 %	

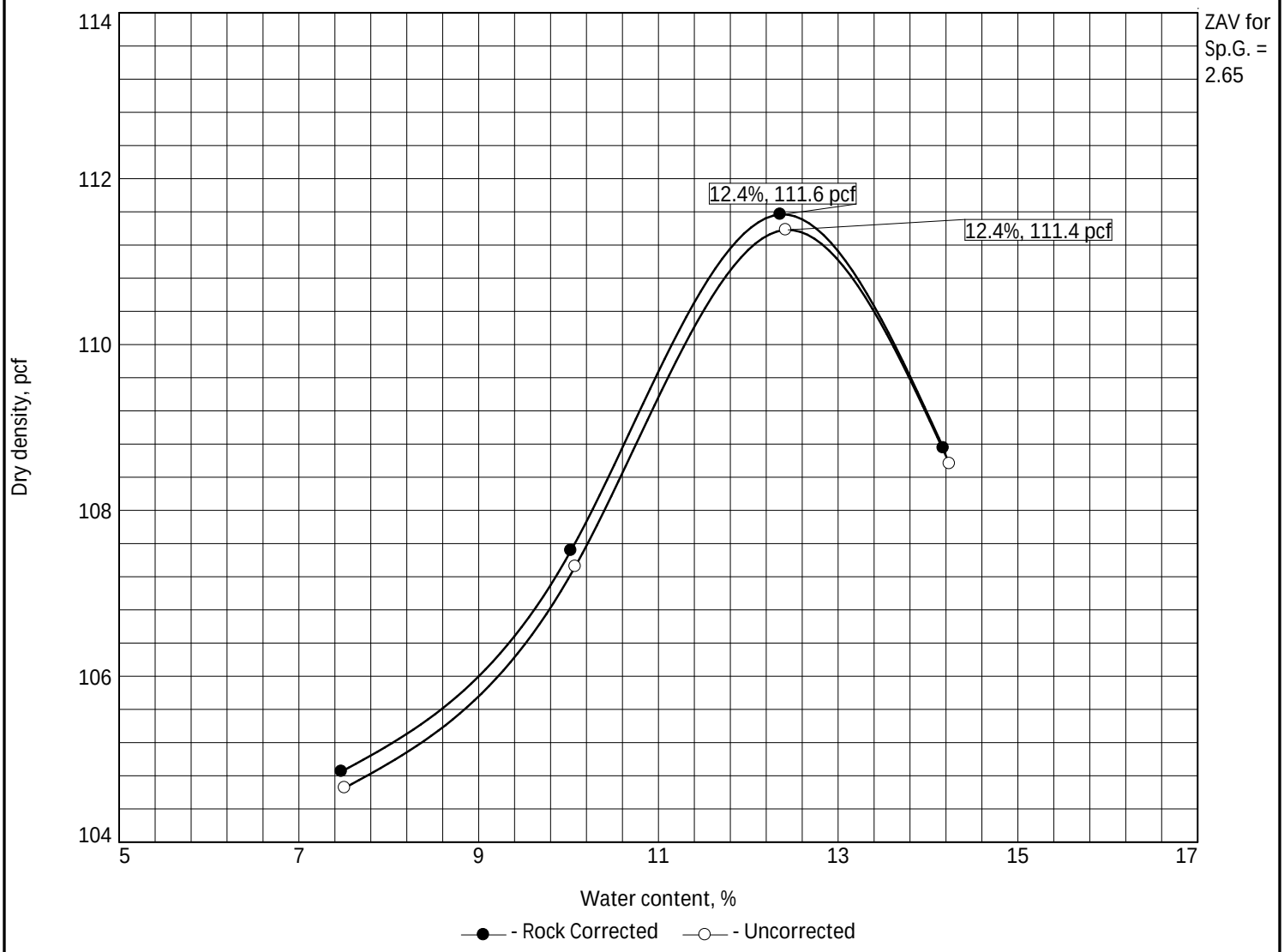
Project No. 24.0038 Client: Renaissance Geotechnical Engineering
Project:
Date:
○ Location: Bulk 2

EINCK, Corp.
Timonium, MD

Remarks:

Figure

COMPACTION TEST REPORT for Curve No. Bulk 3



Test specification: ASTM D 698-12 Method A Standard
ASTM D4718-15 Oversize Corr. Applied to Each Test Point

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
				2.65			0.5	9.7

ROCK CORRECTED TEST RESULTS	UNCORRECTED	MATERIAL DESCRIPTION
Maximum dry density = 111.6 pcf	111.4 pcf	
Optimum moisture = 12.4 %	12.4 %	

Project No. 24.0038 Client: Renaissance Geotechnical Engineering
Project:
Date:
○ Location: Bulk 3

EINCK, Corp.

Timonium, MD

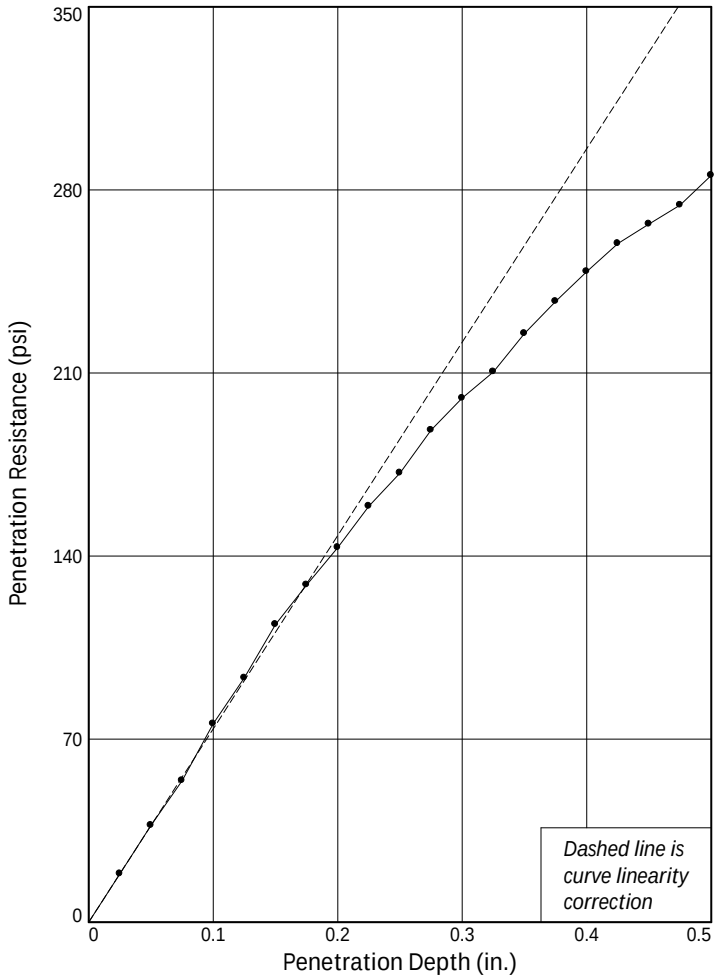
Remarks:

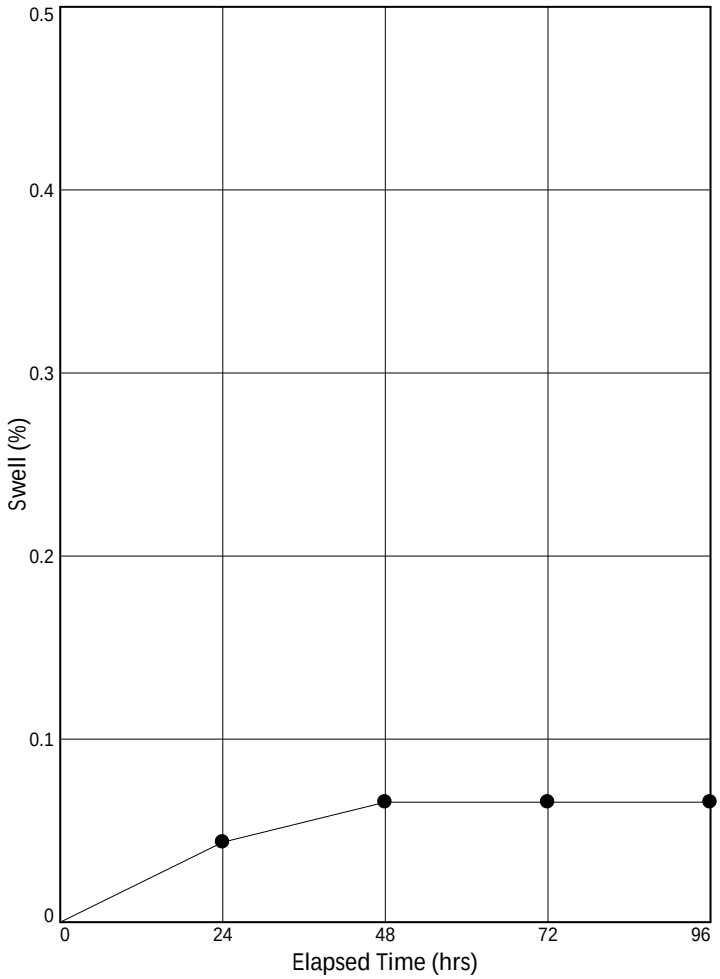
Figure

Appendix E

California Bearing Ratio (CBR) Results

BEARING RATIO TEST REPORT
ASTM D1883-14





	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ●	111.4	95.8	11.2	111.3	95.7	15.5	7.6	9.6	0.000	10	0.1
2 ▲											
3 ■											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
		116.3	11.0		

Project No: 24.0038
Project:
Location: Bulk 1

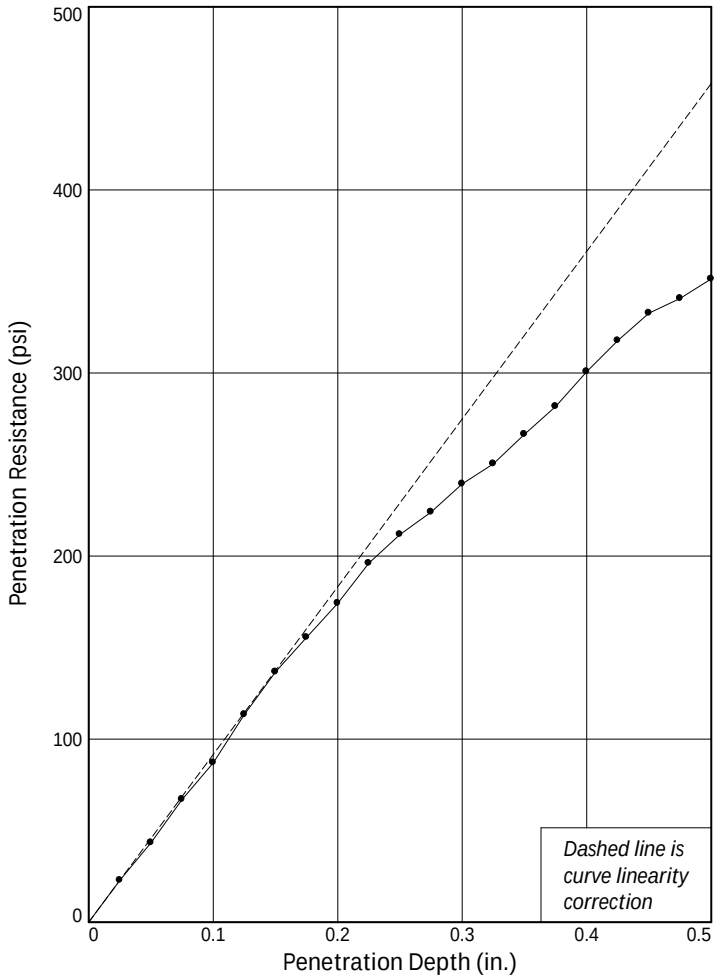
Date:

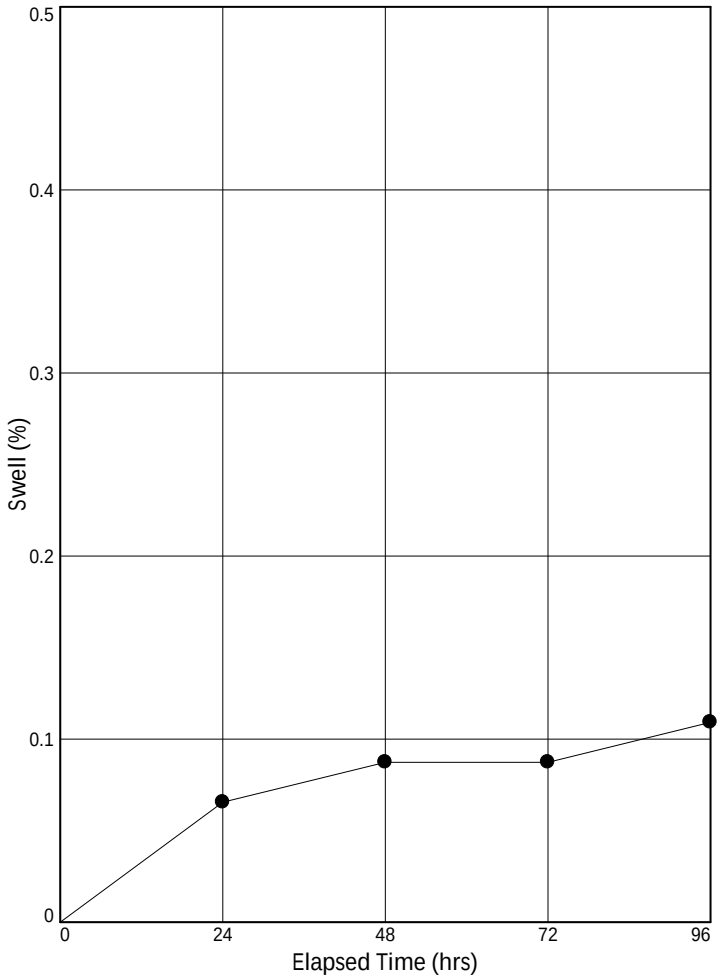
BEARING RATIO TEST REPORT
EINCK, Corp.

Test Remarks:

Figure _____

BEARING RATIO TEST REPORT
ASTM D1883-14





	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ●	108.1	89.8	10.6	108.0	89.7	13.2	8.7	11.6	0.000	10	0.1
2 ▲											
3 ■											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
		120.4	9.0		

Project No: 24.0038
Project:
Location: Bulk 2

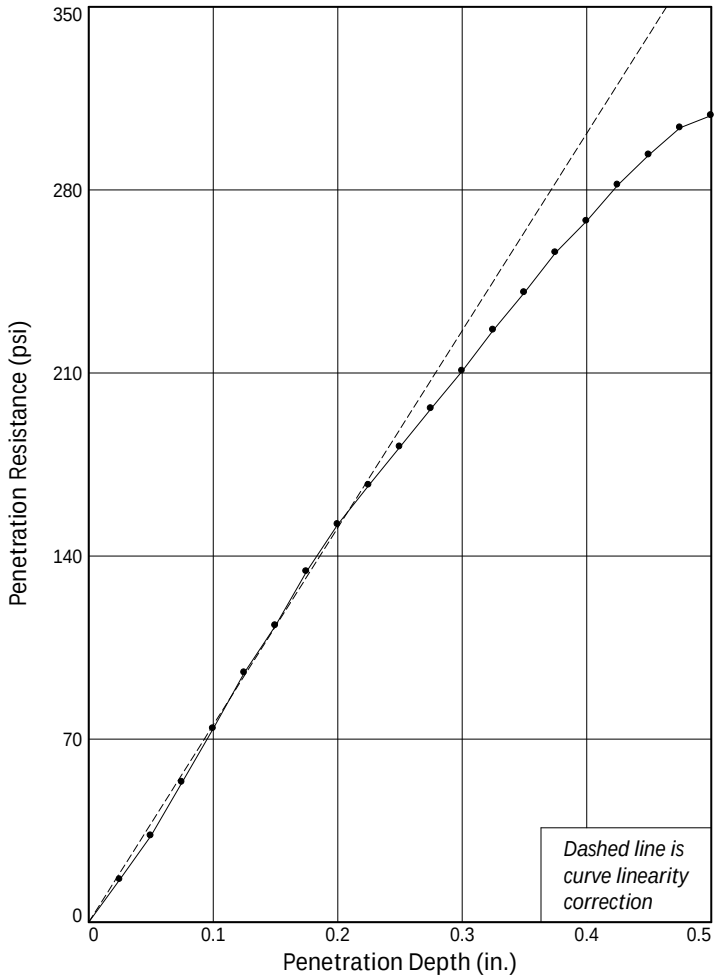
Date:

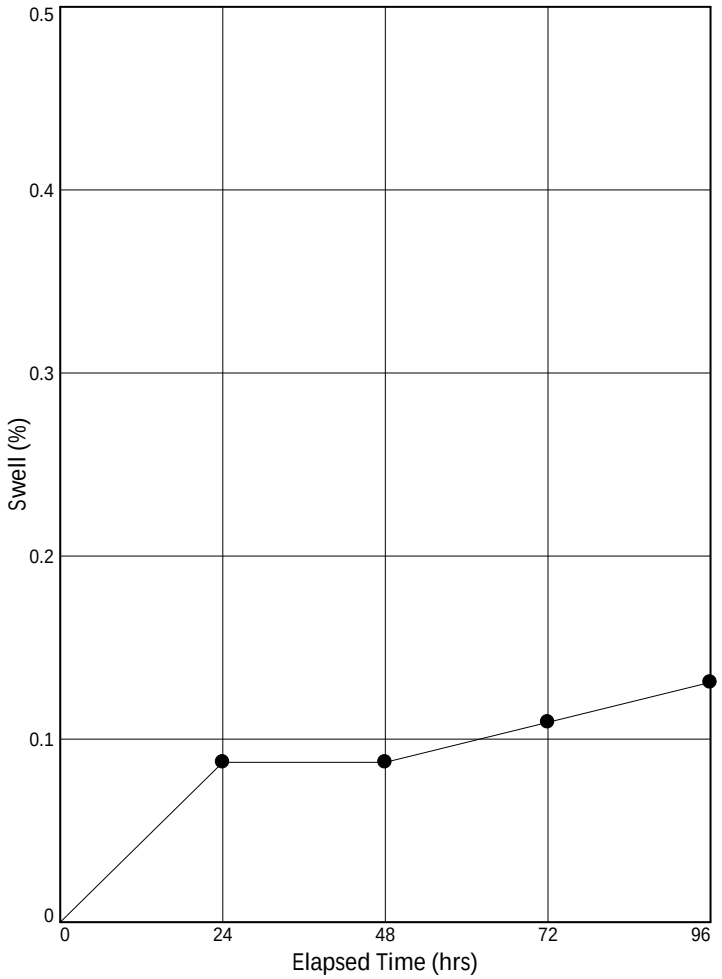
BEARING RATIO TEST REPORT
EINCK, Corp.

Test Remarks:

Figure _____

BEARING RATIO TEST REPORT
ASTM D1883-14





	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ●	106.2	95.2	12.5	106.0	95	17.1	7.4	10.1	0.000	10	0.1
2 ▲											
3 ■											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
		111.6	12.4		

Project No: 24.0038
Project:
Location: Bulk 3

Date:

BEARING RATIO TEST REPORT
EINCK, Corp.

Test Remarks:

Figure _____

Appendix F

DCP Test Results

DCP TEST DATA

File Name: DCP-1

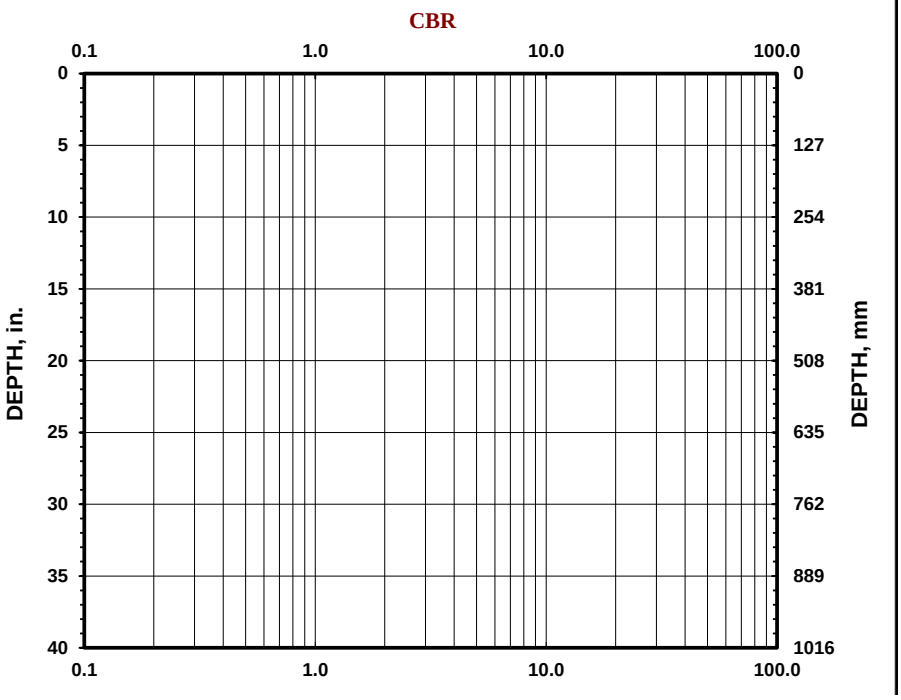
Project: *SYR-CENTRALIZED DEICING PAD* **Date:** 7-Nov-24

Location: DCP-1 **Soil Type(s):** Silty SAND (SM)

Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
100	0	1
0	0	1
0	0	1
0	0	1
0	0	1
0	0	1
0	0	1
0	0	1
0	0	1
0	0	1
0	0	1
0	0	1
		1
		1
		1
		1
		1
		1
		1



DCP TEST DATA

File Name: DCP-4

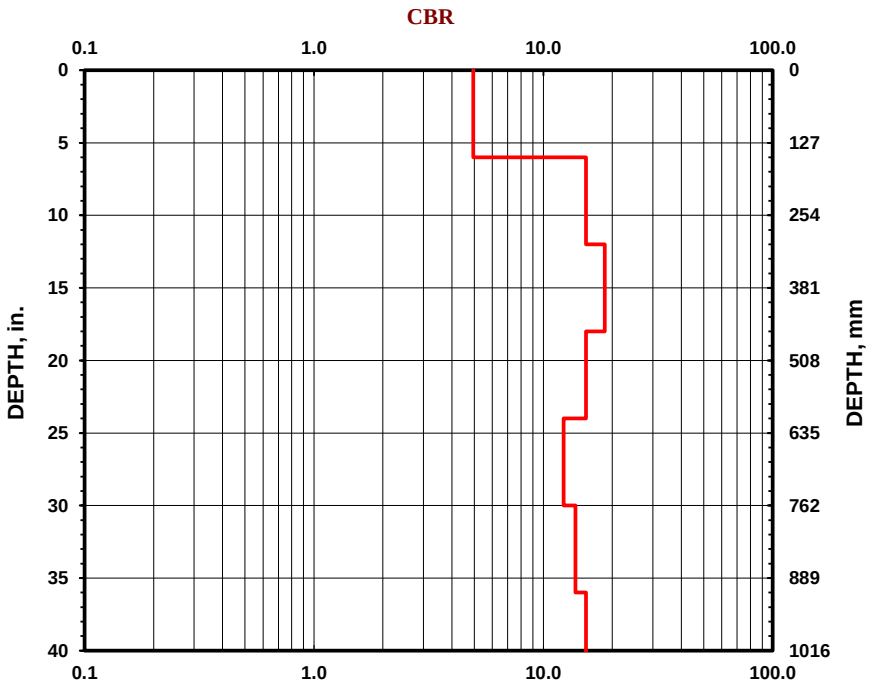
Project: *SYR-CENTRALIZED DEICING PAD* **Date:** 7-Nov-24

Location: DCP-4 **Soil Type(s):** Silty SAND (SM)

Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
4	152.4	1
11	304.8	1
13	457.2	1
11	609.6	1
9	762	1
10	914.4	1
11	1066.8	1
10	1219.2	1
9	1371.6	1
0	0	1
0	0	1
0	0	1
		1
		1
		1
		1
		1
		1
		1



DCP TEST DATA

File Name: DCP-6

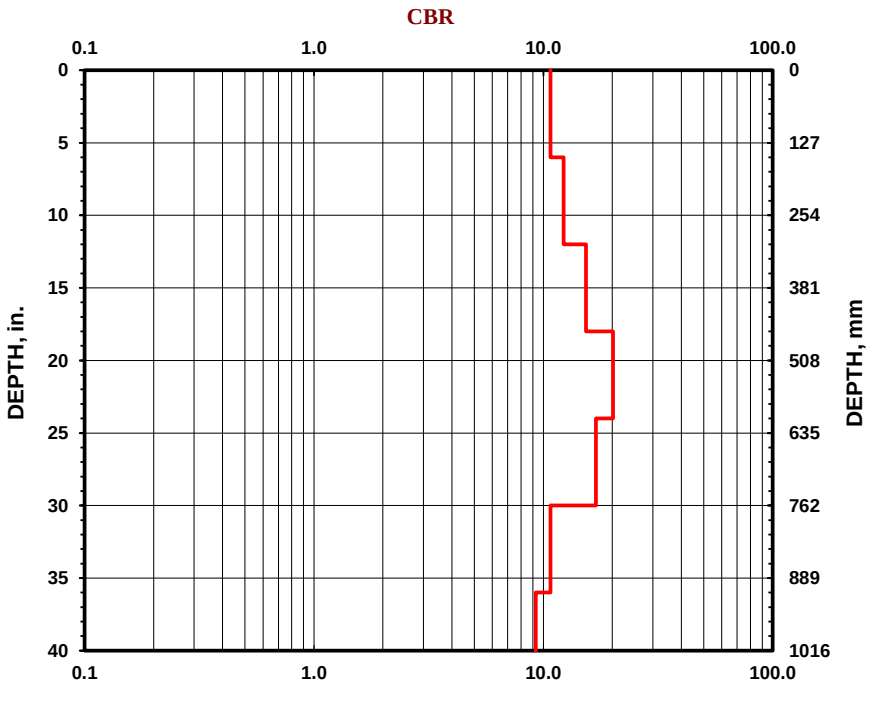
Project: *SYR-CENTRALIZED DEICING PAD* **Date:** 7-Nov-24

Location: DCP-6 **Soil Type(s):** Silty SAND (SM)

Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
8	152.4	1
9	304.8	1
11	457.2	1
14	609.6	1
12	762	1
8	914.4	1
7	1066.8	1
5	1219.2	1
1	1397	1
0	0	1
0	0	1
0	0	1
		1
		1
		1
		1
		1
		1
		1



Appendix G

Infiltration Test Results

RENAISSANCE GEOTECHNICAL ENGINEERING ™

RENAISSANCE GEOTECHNICAL ENGINEERING, PLLC

https://renaissancegeo.com



APPENDIX D OF THE NEW YORK STATE STORMWATER DESIGN MANUAL

PROJECT NAME:	SYR CENTRALIZED DEICING PAD
PROJECT LOCATION:	SYRACUSE, NEW YORK
RGE PROJECT NUMBER:	24.0038
SITE CONDITIONS:	SUNNY/CLEAR
RECOMMENDED INFILTRATION RATE	13 INCHES PER HOUR

TEST LOCATION:	IT-1		
INSTRUMENT USE:	PVC Well Pipe/Water Meter Indicator		
TESTED BY:	ALSENY DIOP, P.E.		
TEST DATE:	Wednesday, November 6, 2024		
SHEET NUMBER	1	OF	1

Test No.	Elapsed Time (minutes)	Elapsed Time (secondes)	Readings (ft)	$\Delta_{readings}$ (inches)	$\Delta_{readings}$ (feet)	Time (Hour)	Δ_{time} (Hours)	Infiltration Rate (Inch/Hour)
1	0	**0**	**3.15**	**0.00**	**0.00**	**0**	**0**	**N/A**
	17	12	4.05	10.80	0.90	0.29	0.29	37.67
	30	6	4.45	4.80	0.40	0.22	0.22	22.33
	45	27	4.80	4.20	0.35	0.26	0.26	16.42
	51	21	4.90	1.20	0.10	0.10	0.10	12.20
	57	35	5.00	1.20	0.10	0.10	0.10	11.55
2	**0**	**0**	**3.15**	**0.00**	**0.00**	**0.00**	**0.00**	**N/A**
	18	28	4.00	10.20	0.85	0.31	0.31	33.14
	21	37	4.10	1.20	0.10	0.05	0.05	22.86
	47	1	4.70	7.20	0.60	0.42	0.42	17.01
	52	32	4.80	1.20	0.10	0.09	0.09	13.05
	55	54	4.85	0.60	0.05	0.06	0.06	10.69
	59	22	4.90	0.60	0.05	0.06	0.06	10.38
3	**0**	**0**	**3.15**	**0.00**	**0.00**	**0.00**	**0.00**	**N/A**
	19	53	4.00	10.20	0.85	0.33	0.33	30.78
	23	20	4.10	1.20	0.10	0.06	0.06	20.87
	26	52	4.20	1.20	0.10	0.06	0.06	20.38
	50	19	4.70	6.00	0.50	0.39	0.39	15.35
	56	27	4.80	1.20	0.10	0.10	0.10	11.74
	63	30	4.90	1.20	0.10	0.12	0.12	10.21
4	**0**	**0**	**3.15**	**0.00**	**0.00**	**0.00**	**0.00**	**N/A**
	18	42	3.90	9.00	0.75	0.31	0.31	28.88
	21	59	4.00	1.20	0.10	0.05	0.05	21.93
	31	23	4.25	3.00	0.25	0.16	0.16	19.15
	57	23	4.75	6.00	0.50	0.43	0.43	13.85
	60	55	4.80	6.60	0.55	0.49	0.49	13.41

RENAISSANCE GEOTECHNICAL ENGINEERING ™

RENAISSANCE GEOTECHNICAL ENGINEERING, PLLC

https://renaissancegeo.com



APPENDIX D OF THE NEW YORK STATE STORMWATER DESIGN MANUAL

PROJECT NAME:	SYR CENTRALIZED DEICING PAD
PROJECT LOCATION:	SYRACUSE, NEW YORK
RGE PROJECT NUMBER:	24.0038
SITE CONDITIONS:	SUNNY/CLEAR
RECOMMENDED INFILTRATION RATE	8 INCHES PER HOUR

TEST LOCATION:	IT-2		
INSTRUMENT USE:	PVC Well Pipe/Water Meter Indicator		
TESTED BY:	ALSENY DIOP, P.E.		
TEST DATE:	Wednesday, November 6, 2024		
SHEET NUMBER	1	OF	1

Test No.	Elapsed Time (minutes)	Elapsed Time (secondes)	Readings (ft)	$\Delta_{readings}$ (inches)	$\Delta_{readings}$ (feet)	Time (Hour)	Δ_{time} (Hours)	Infiltration Rate (Inch/Hour)
1	0	**0**	**2.70**	**0.00**	**0.00**	**0**	**0**	**N/A**
	12	5	2.90	2.40	0.20	0.20	0.20	11.92
	25	51	3.10	2.40	0.20	0.23	0.23	10.46
	52	50	3.45	4.20	0.35	0.45	0.45	9.34
	57	34	3.50	0.60	0.05	0.08	0.08	7.61
	59	59	3.53	0.36	0.03	0.04	0.04	8.94
2	**0**	**0**	**2.70**	**0.00**	**0.00**	**0.00**	**0.00**	**N/A**
	16	40	2.95	3.00	0.25	0.28	0.28	10.80
	24	32	3.05	1.20	0.10	0.13	0.13	9.15
	28	8	3.10	0.60	0.05	0.06	0.06	10.00
	52	53	3.40	3.60	0.30	0.41	0.41	8.73
	57	32	3.45	0.60	0.05	0.08	0.08	7.74
3	**0**	**0**	**2.70**	**0.00**	**0.00**	**0.00**	**0.00**	**N/A**
	17	50	2.95	3.00	0.25	0.30	0.30	10.09
	25	45	3.05	1.20	0.10	0.13	0.13	9.09
	29	50	3.10	0.60	0.05	0.07	0.07	8.82
	60	21	3.45	4.20	0.35	0.51	0.51	8.26
4	**0**	**0**	**2.70**	**0.00**	**0.00**	**0.00**	**0.00**	**N/A**
	24	23	3.02	3.84	0.32	0.41	0.41	9.45
	30	48	3.10	0.96	0.08	0.11	0.11	8.98
	39	17	3.20	1.20	0.10	0.14	0.14	8.49
	62	25	3.45	3.00	0.25	0.39	0.39	7.78
	67	16	3.50	3.60	0.30	0.47	0.47	7.72

Appendix H

P-209 Gradation Limit Curves

GRAIN SIZE DISTRIBUTION

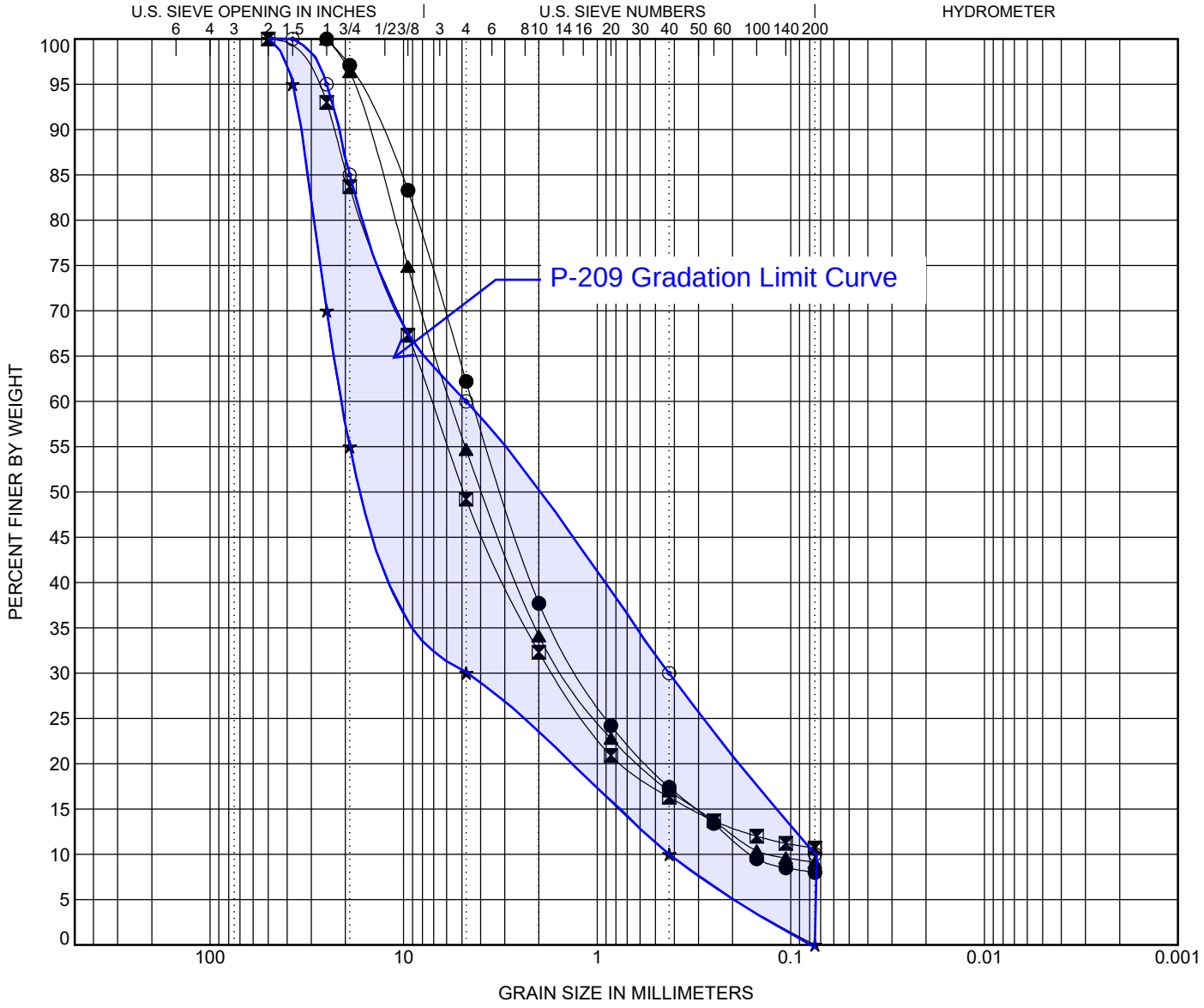
Renaissance Geotechnical Engineering, PLLC
2320 Nott Street, Box 9401
Schenectady, NY 12309
Telephone: 518-902-9222

CLIENT C&S ENGINEERS, INC.

PROJECT NAME SYR CENTRALIZED DEICING PAD DESIGN

PROJECT NUMBER 24.0038

PROJECT LOCATION SYRACUSE HANCOCK INTERNATIONAL AIRPORT



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	CB-1/DCP-1	1.3	WELL-GRADED SAND with SILT and GRAVEL(SW-SM)	NP	NP	NP	2.14	27.44
⊠	CB-2	1.2	POORLY GRADED GRAVEL with SILT and SAND(GP-GM)	NP	NP	NP	8.53	155.45
▲	CB-3	1.4	WELL-GRADED SAND with SILT and GRAVEL(SW-SM)	NP	NP	NP	2.99	45.18
★	P209 Lower limit	0.0	WELL-GRADED GRAVEL with SAND(GW)	NP	NP	NP	2.55	48.99
⊙	P209 Upper limit	0.0	POORLY GRADED SAND with SILT and GRAVEL(SP-SM)	NP	NP	NP	0.51	63.33

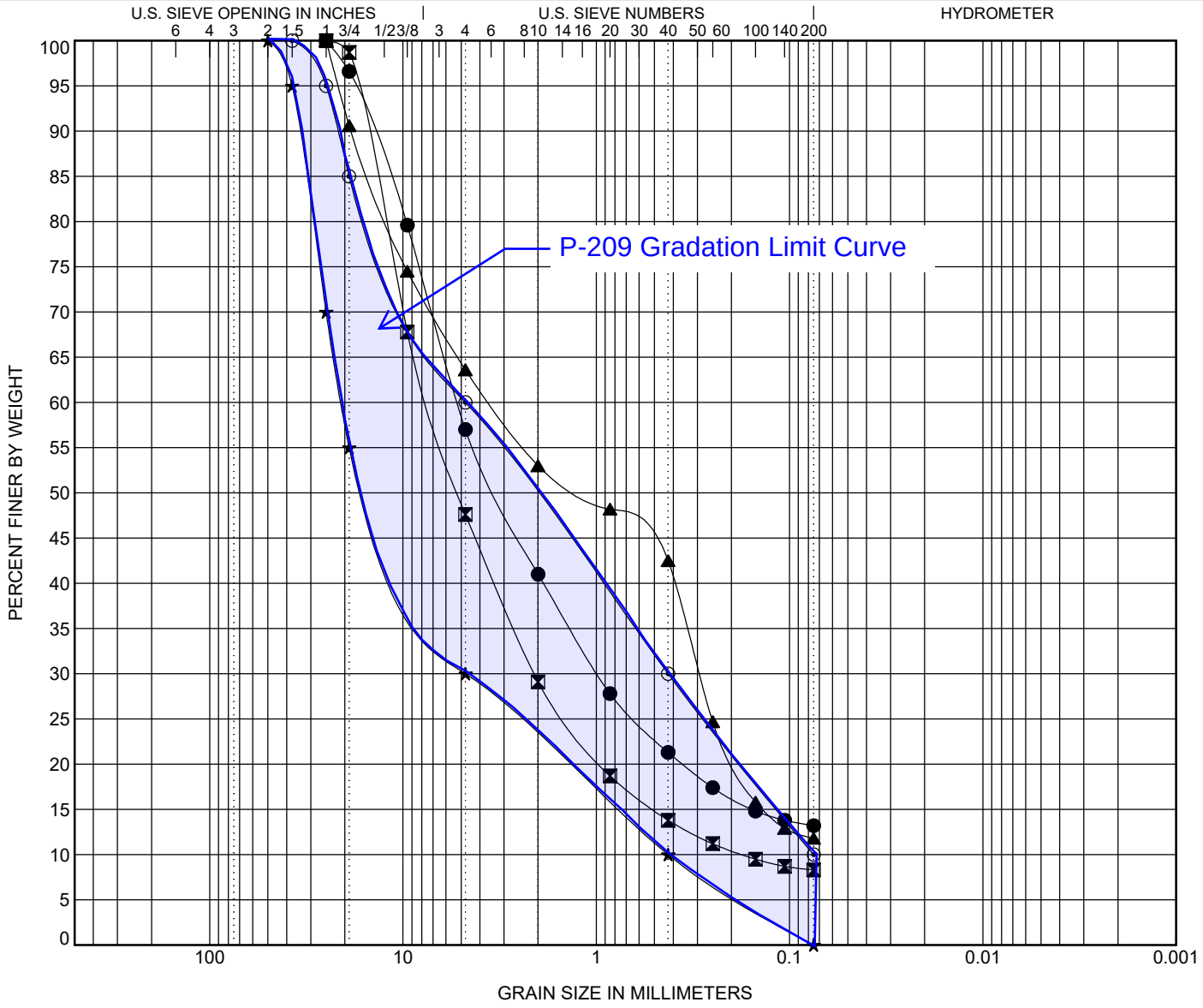
	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	CB-1/DCP-1	1.3	25	4.395	1.228	0.16	37.8	54.2	8.0	
⊠	CB-2	1.2	50	7.183	1.683		50.8	38.5	10.7	
▲	CB-3	1.4	25	5.697	1.466	0.126	45.3	45.6	9.1	
★	P209 Lower limit	0.0	50	20.82	4.75	0.425	70.0	30.0	0.0	
⊙	P209 Upper limit	0.0	37.5	4.75	0.425	0.075	40.0	50.0	10.0	

GRAIN SIZE - GINT STD US LAB COLOR.GDT - 1/12/25 18:44 - C:\USERS\RENAISSANCE\ONEDRIVE - RENAISSANCE GEOTECHNICAL ENGINEERING, PLLC\- PROJECTS\- 2024\24.0038 - SYR CENTRALIZED DEICING PAD\GINT\GINT - SYR DEICING PAD.GPJ

GRAIN SIZE DISTRIBUTION

Renaissance Geotechnical Engineering, PLLC
2320 Nott Street, Box 9401
Schenectady, NY 12309
Telephone: 518-902-9222

CLIENT C&S ENGINEERS, INC.
PROJECT NAME SYR CENTRALIZED DEICING PAD DESIGN
PROJECT NUMBER 24.0038
PROJECT LOCATION SYRACUSE HANCOCK INTERNATIONAL AIRPORT



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	CB-4	1.3	SILTY SAND with GRAVEL(SM)	NP	NP	NP		
⊠	CB-5	1.3	POORLY GRADED GRAVEL with SILT and SAND(GP-GM)	NP	NP	NP	3.43	41.70
▲	CB-6	0.4	POORLY GRADED SAND with SILT and GRAVEL(SP-SM)	NP	NP	NP	0.57	83.16
★	P209 Lower limi	0.0	WELL-GRADED GRAVEL with SAND(GW)	NP	NP	NP	2.55	48.99
⊙	P209 Upper limi	0.0	POORLY GRADED SAND with SILT and GRAVEL(SP-SM)	NP	NP	NP	0.51	63.33

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	CB-4	1.3	25	5.208	0.98		43.0	43.8	13.2	
⊠	CB-5	1.3	25	7.269	2.086	0.174	52.4	39.3	8.3	
▲	CB-6	0.4	25	3.541	0.293		36.4	51.8	11.8	
★	P209 Lower limi	0.0	50	20.82	4.75	0.425	70.0	30.0	0.0	
⊙	P209 Upper limi	0.0	37.5	4.75	0.425	0.075	40.0	50.0	10.0	

GRAIN SIZE - GINT STD US LAB COLOR.GDT - 1/12/25 18:45 - C:\USERS\RENAISSANCE\ONEDRIVE - RENAISSANCE GEOTECHNICAL ENGINEERING, PLLC\- PROJECTS\- 2024\24.0038 - SYR CENTRALIZED DEICING PAD\GINT\GINT - SYR DEICING PAD.GPJ

Appendix I

P-154 Aggregate Subbase Limit Curves

GRAIN SIZE DISTRIBUTION

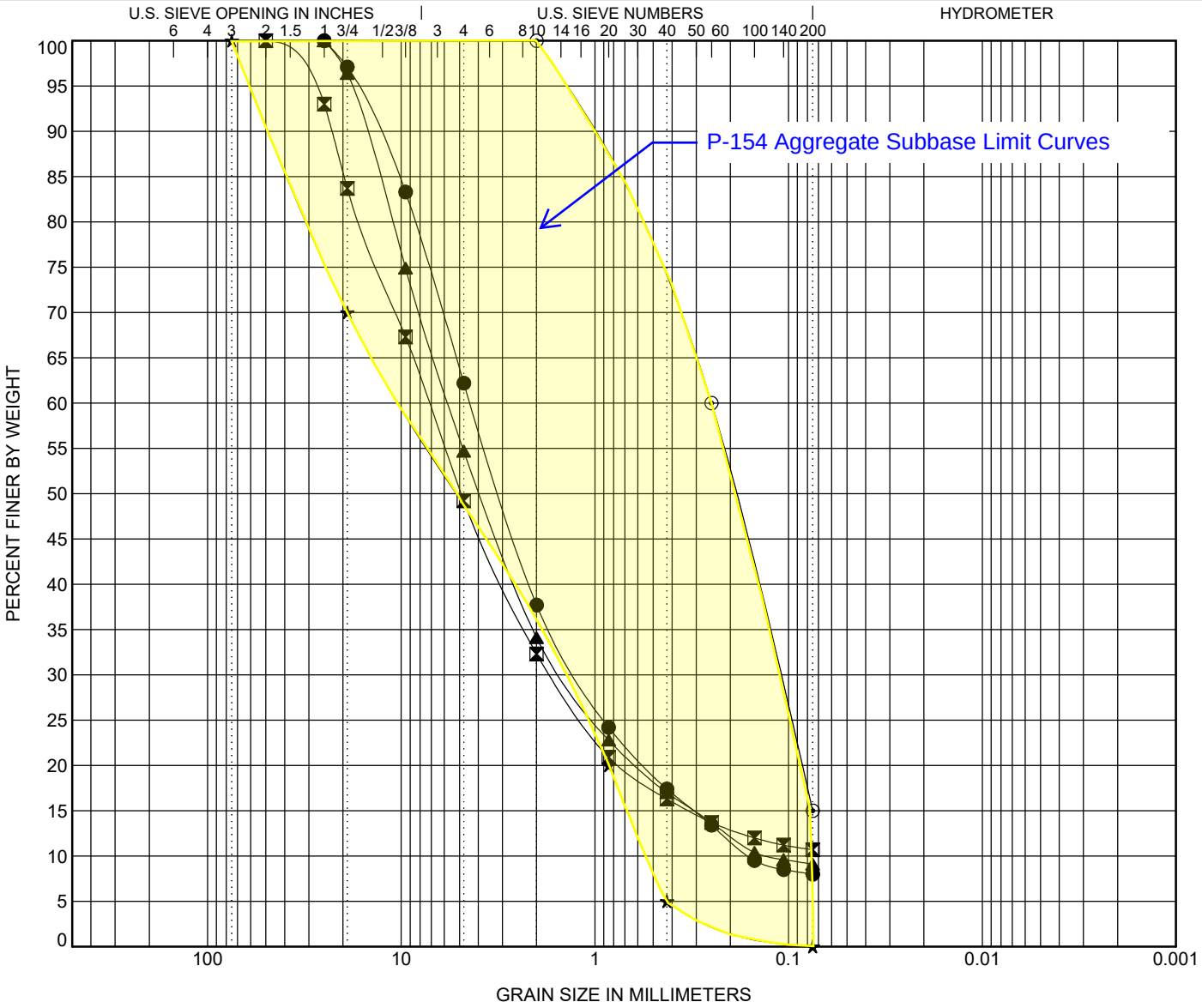
Renaissance Geotechnical Engineering, PLLC
2320 Nott Street, Box 9401
Schenectady, NY 12309
Telephone: 518-902-9222

CLIENT C&S ENGINEERS, INC.

PROJECT NAME SYR CENTRALIZED DEICING PAD DESIGN

PROJECT NUMBER 24.0038

PROJECT LOCATION SYRACUSE HANCOCK INTERNATIONAL AIRPORT



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	CB-1/DCP-1	1.3	WELL-GRADED SAND with SILT and GRAVEL(SW-SM)	NP	NP	NP	2.14	27.44
⊠	CB-2	1.2	POORLY GRADED GRAVEL with SILT and SAND(GP-GM)	NP	NP	NP	8.53	155.45
▲	CB-3	1.4	WELL-GRADED SAND with SILT and GRAVEL(SW-SM)	NP	NP	NP	2.99	45.18
★	P154 Sub Lower	0.0	POORLY GRADED GRAVEL with SAND(GP)	NP	NP	NP	0.46	19.06
⊙	P154 Sub Upper	0.0	SILTY SAND(SM)	NP	NP	NP		

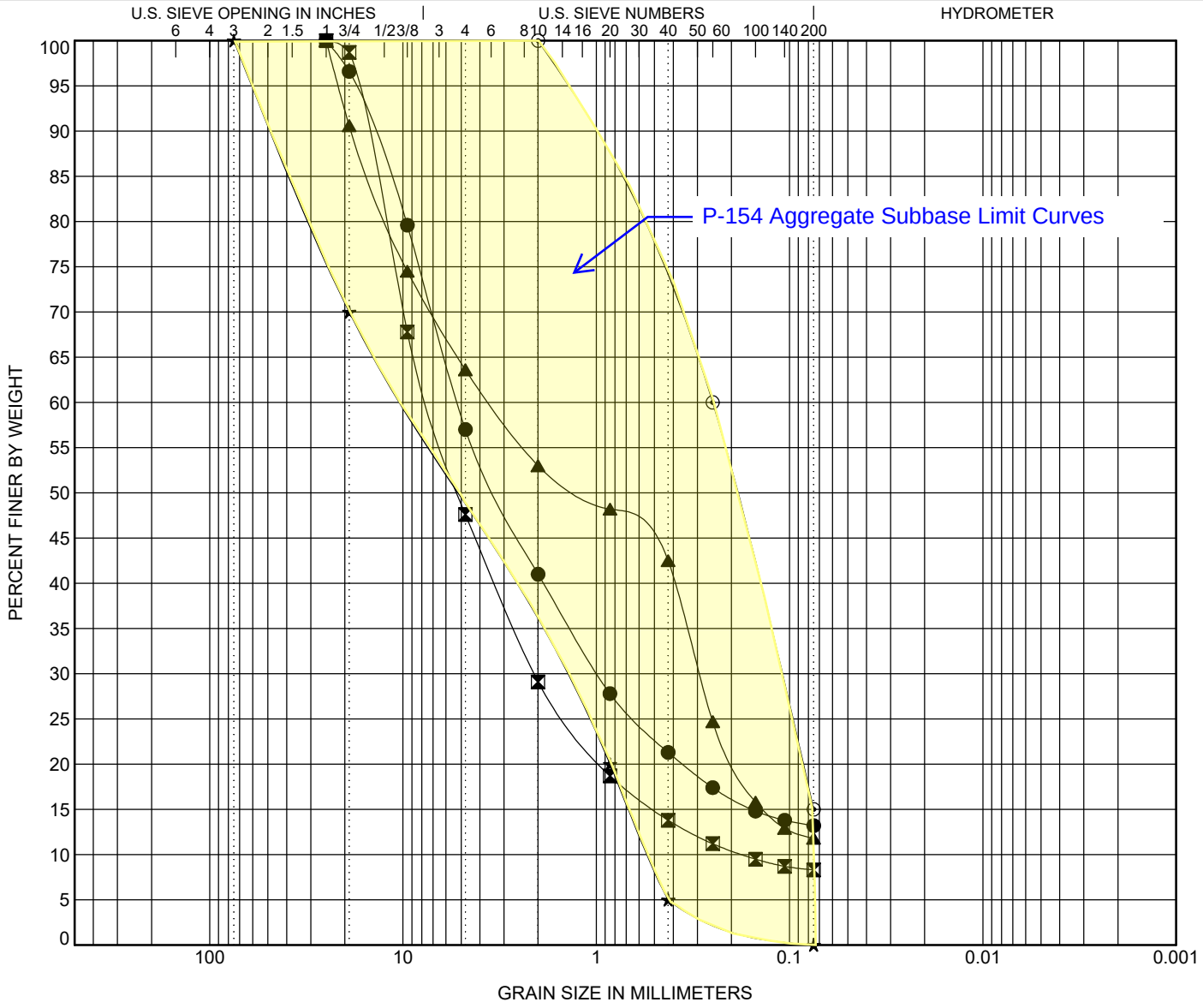
	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	CB-1/DCP-1	1.3	25	4.395	1.228	0.16	37.8	54.2	8.0	
⊠	CB-2	1.2	50	7.183	1.683		50.8	38.5	10.7	
▲	CB-3	1.4	25	5.697	1.466	0.126	45.3	45.6	9.1	
★	P154 Sub Lower	0.0	75	10.207	1.582	0.535	52.3	47.7	0.0	
⊙	P154 Sub Upper	0.0	2	0.25	0.112		0.0	85.0	15.0	

GRAIN SIZE - GINT STD US LAB COLOR.GDT - 1/12/25 18:27 - C:\USERS\RENAISSANCE\ONEDRIVE - RENAISSANCE GEOTECHNICAL ENGINEERING, PLLC\- PROJECTS\- 2024\24.0038 - SYR CENTRALIZED DEICING PAD\GINT\GINT - SYR DEICING PAD.GPJ

GRAIN SIZE DISTRIBUTION

Renaissance Geotechnical Engineering, PLLC
2320 Nott Street, Box 9401
Schenectady, NY 12309
Telephone: 518-902-9222

CLIENT C&S ENGINEERS, INC.
PROJECT NAME SYR CENTRALIZED DEICING PAD DESIGN
PROJECT NUMBER 24.0038
PROJECT LOCATION SYRACUSE HANCOCK INTERNATIONAL AIRPORT



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	CB-4	1.3	SILTY SAND with GRAVEL(SM)	NP	NP	NP		
⊠	CB-5	1.3	POORLY GRADED GRAVEL with SILT and SAND(GP-GM)	NP	NP	NP	3.43	41.70
▲	CB-6	0.4	POORLY GRADED SAND with SILT and GRAVEL(SP-SM)	NP	NP	NP	0.57	83.16
★	P154 Sub Lower	0.0	POORLY GRADED GRAVEL with SAND(GP)	NP	NP	NP	0.46	19.06
⊙	P154 Sub Upper	0.0	SILTY SAND(SM)	NP	NP	NP		

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	CB-4	1.3	25	5.208	0.98		43.0	43.8	13.2	
⊠	CB-5	1.3	25	7.269	2.086	0.174	52.4	39.3	8.3	
▲	CB-6	0.4	25	3.541	0.293		36.4	51.8	11.8	
★	P154 Sub Lower	0.0	75	10.207	1.582	0.535	52.3	47.7	0.0	
⊙	P154 Sub Upper	0.0	2	0.25	0.112		0.0	85.0	15.0	

GRAIN SIZE - GINT STD US LAB COLOR.GDT - 1/12/25 18:28 - C:\USERS\RENAISSANCE\ONEDRIVE - RENAISSANCE GEOTECHNICAL ENGINEERING, PLLC\- PROJECTS\- 2024\24.0038 - SYR CENTRALIZED DEICING PAD\GINT\GINT - SYR DEICING PAD.GPJ

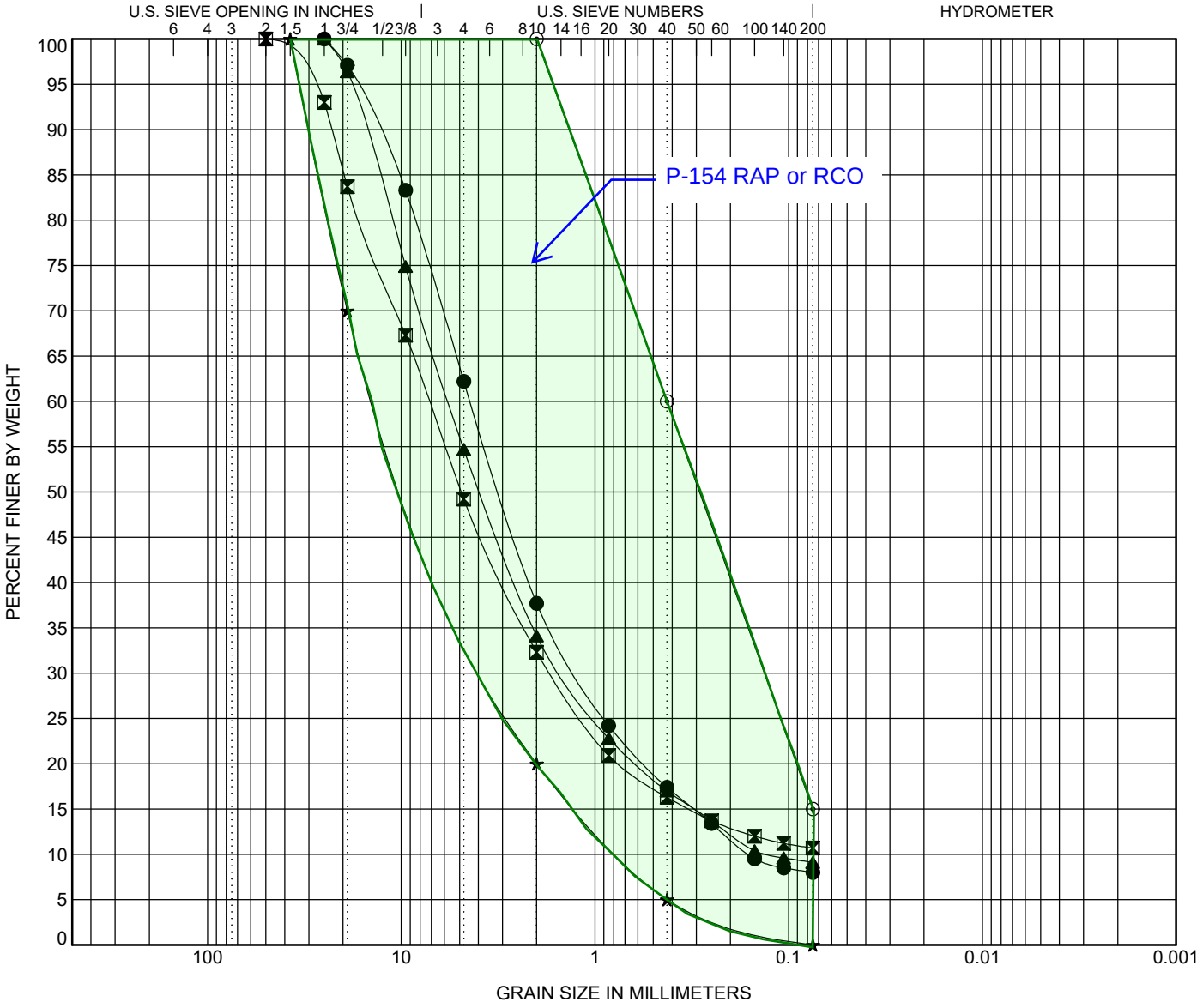
Appendix J

P-154 Recycled Asphalt or Concrete Pavement (RAP or RCO) Limits

GRAIN SIZE DISTRIBUTION

Renaissance Geotechnical Engineering, PLLC
2320 Nott Street, Box 9401
Schenectady, NY 12309
Telephone: 518-902-9222

CLIENT C&S ENGINEERS, INC.
PROJECT NAME SYR CENTRALIZED DEICING PAD DESIGN
PROJECT NUMBER 24.0038
PROJECT LOCATION SYRACUSE HANCOCK INTERNATIONAL AIRPORT



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	CB-1/DCP-1	1.3	WELL-GRADED SAND with SILT and GRAVEL(SW-SM)	NP	NP	NP	2.14	27.44
⊠	CB-2	1.2	POORLY GRADED GRAVEL with SILT and SAND(GP-GM)	NP	NP	NP	8.53	155.45
▲	CB-3	1.4	WELL-GRADED SAND with SILT and GRAVEL(SW-SM)	NP	NP	NP	2.99	45.18
★	P154 RAP Lowe	0.0	WELL-GRADED GRAVEL with SAND(GW)	NP	NP	NP	1.14	17.01
⊙	P154 RAP Uppe	0.0	SILTY SAND(SM)	NP	NP	NP		

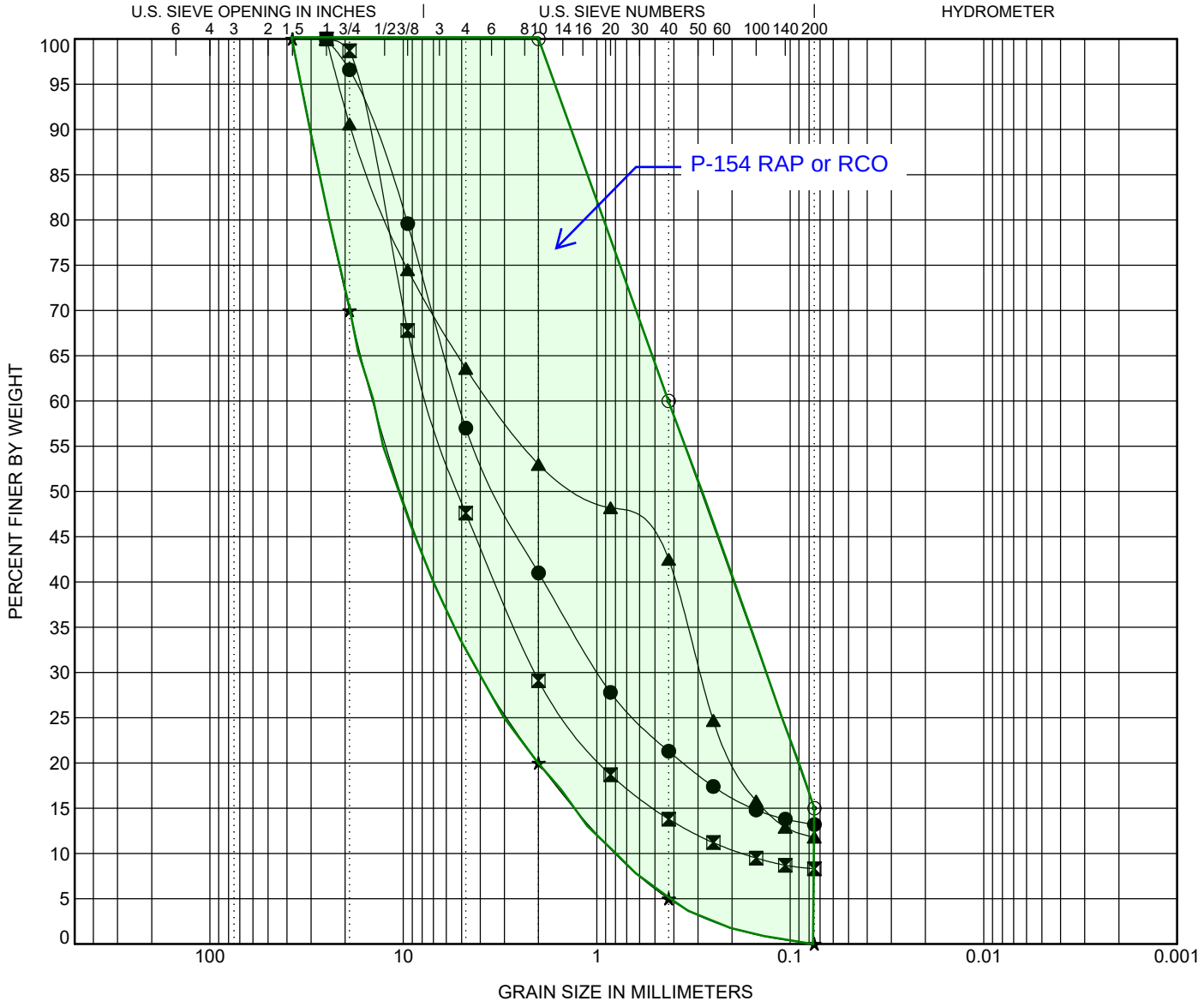
	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	CB-1/DCP-1	1.3	25	4.395	1.228	0.16	37.8	54.2	8.0	
⊠	CB-2	1.2	50	7.183	1.683		50.8	38.5	10.7	
▲	CB-3	1.4	25	5.697	1.466	0.126	45.3	45.6	9.1	
★	P154 RAP Lowe	0.0	37.5	12.112	3.137	0.712	60.8	39.2	0.0	
⊙	P154 RAP Uppe	0.0	2	0.425	0.134		0.0	85.0	15.0	

GRAIN SIZE - GINT STD US LAB COLOR.GDT - 1/12/25 16:01 - C:\USERS\RENAISSANCE\ONEDRIVE - RENAISSANCE GEOTECHNICAL ENGINEERING, PLLC\- PROJECTS\- 2024\24.0038 - SYR CENTRALIZED DEICING PAD\GINT\GINT - SYR DEICING PAD.GPJ

GRAIN SIZE DISTRIBUTION

Renaissance Geotechnical Engineering, PLLC
2320 Nott Street, Box 9401
Schenectady, NY 12309
Telephone: 518-902-9222

CLIENT C&S ENGINEERS, INC.
PROJECT NAME SYR CENTRALIZED DEICING PAD DESIGN
PROJECT NUMBER 24.0038
PROJECT LOCATION SYRACUSE HANCOCK INTERNATIONAL AIRPORT



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● CB-4	1.3	SILTY SAND with GRAVEL(SM)	NP	NP	NP		
⊠ CB-5	1.3	POORLY GRADED GRAVEL with SILT and SAND(GP-GM)	NP	NP	NP	3.43	41.70
▲ CB-6	0.4	POORLY GRADED SAND with SILT and GRAVEL(SP-SM)	NP	NP	NP	0.57	83.16
★ P154 RAP Lowe	0.0	WELL-GRADED GRAVEL with SAND(GW)	NP	NP	NP	1.14	17.01
⊙ P154 RAP Uppe	0.0	SILTY SAND(SM)	NP	NP	NP		

BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● CB-4	1.3	25	5.208	0.98		43.0	43.8	13.2	
⊠ CB-5	1.3	25	7.269	2.086	0.174	52.4	39.3	8.3	
▲ CB-6	0.4	25	3.541	0.293		36.4	51.8	11.8	
★ P154 RAP Lowe	0.0	37.5	12.112	3.137	0.712	60.8	39.2	0.0	
⊙ P154 RAP Uppe	0.0	2	0.425	0.134		0.0	85.0	15.0	

GRAIN SIZE - GINT STD US LAB COLOR.GDT - 1/12/25 16:16 - C:\USERS\RENAISSANCE\ONEDRIVE - RENAISSANCE GEOTECHNICAL ENGINEERING, PLLC\- PROJECTS\- 2024\24.0038 - SYR CENTRALIZED DEICING PAD\GINT\GINT - SYR DEICING PAD.GPJ

ASBESTOS, LEAD PAINT, AND PCB CAULK SURVEY REPORT

Syracuse Hancock International Airport
Former Firehouse Structure
1000 Col. Eileen Boulevard
Syracuse, New York

Prepared For:

C&S Company
499 Col. Eileen Collins Boulevard
Syracuse, New York

Prepared By:

Lu Engineers
280 East Broad Street, Suite 170
Rochester, New York 14604

December 2024

Project No. 4500-03

Lu Engineers
ENVIRONMENTAL • TRANSPORTATION • CIVIL

ASBESTOS, LEAD PAINT, AND PCB CAULK SURVEY REPORT

Syracuse Hancock International Airport
Former Firehouse Structure
1000 Col. Eileen Boulevard
Syracuse, New York

TABLE OF CONTENTS

Page

1.0 INTRODUCTION AND PROJECT OVERVIEW 1
1.1 Record Review 1

2.0 SITE INSPECTIONS 1
2.1 Asbestos 1
2.2 Lead Paint 2
2.3 PCB Caulk 3

3.0 ANALYTICAL RESULTS 3
3.1 Asbestos Results 3
3.2 Lead Paint Results 5
3.3 PCB Caulk Results 5

4.0 ASBESTOS MATERIALS AND APPROXIMATE QUANTITIES 6

5.0 LIMITATIONS OF THE INVESTIGATION 7

6.0 RECOMMENDATIONS 7
6.1 Asbestos Containing Materials 7
6.2 Lead Paint 8
6.3 PCB Caulk 8

ATTACHMENTS

ATTACHMENT A	Licenses and Certifications
ATTACHMENT B	Roof Core Profiles and Asbestos Inspection Summary Table
ATTACHMENT C	Sample Location Plans, Analytical Reports, and Chain of Custody Forms
ATTACHMENT D	Asbestos Location Plans
ATTACHMENT E	Site Photographs

1.0 INTRODUCTION AND PROJECT OVERVIEW

Lu Engineers was retained by C&S Companies to provide an asbestos, lead paint, and PCB caulk survey of the building located at 1000 Col. Eileen Boulevard, in Syracuse, New York. This survey was performed in anticipation of the upcoming demolition of the building.

The asbestos, lead paint, and PCB caulk survey was conducted on October 16, 2024, and November 13, 2024. The intent of this survey was to determine the presence and quantity of asbestos containing materials (ACMs), lead-based paint, and PCB containing caulk. The asbestos survey was conducted in accordance with New York State Department of Labor (NYSDOL) Industrial Code Rule (ICR) 56 by certified inspectors from Lu Engineers. A copy of Lu Engineers' license and inspectors' certifications can be found in Attachment A.

1.1 Records Review

Record drawings of the building or previous surveys were not available for review prior to conducting the asbestos survey.

2.0 SITE INSPECTION

2.1 Asbestos

One of the purposes of the visual inspection was to identify homogeneous areas of suspect asbestos containing materials that exist throughout the area of inspection, as defined in the scope of work. The Asbestos Hazard Emergency Response Act (AHERA) regulations define a homogeneous area as, "… an area of surfacing material, thermal insulation material, or miscellaneous material that is uniform in color and texture." Furthermore, homogeneous areas should consist of the same age and application.

The inspectors identified homogeneous areas that were present within the building. The suspect asbestos materials were given a homogeneous identification number based on color and texture of the material. A list of homogeneous area numbers of the materials encountered is included with the Asbestos Result Table in Section 3.1. Each material was given an identification (ID) number. The material ID number correlates with the ID number found on the bulk sample location plan in Attachment C. Roof core profiles are included in Attachment B.

Occupational Safety and Health Administration (OSHA) and 40 CFR 763 Subpart E – Asbestos Hazard Emergency Response Act (AHERA) bulk sampling protocols were followed.

- Three (3) samples of a homogenous surfacing material in quantities of 1,000 Square Feet (SF) or less were collected.

- Five (5) samples of a homogenous surfacing material in quantities greater than 1,000 SF but less than 5,000 SF were collected.
- Seven (7) samples of a homogenous surfacing material in quantities greater than 5,000 SF were collected.
- Three (3) samples of Thermal System Insulation (TSI) material were collected.
- Two (2) samples of each miscellaneous material were collected.

The suspect asbestos containing materials were extracted using various hand tools, containerized and labeled with unique sample identification numbers. Samples were submitted to the laboratory using standard chain of custody protocols.

Paradigm Environmental Services, Inc. was the New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) approved laboratory used for analysis. A copy of Paradigm's credentials is located in Attachment A.

Friable samples were analyzed using NYS ELAP Method 198.1, Polarized Light Microscopy (PLM). Non-friable organically bound (NOB) samples were analyzed using NYS ELAP Method 198.6 (PLM) and, if found to be negative, NYS ELAP Method 198.4, Transmission Electron Microscopy (TEM). All Samples were analyzed via stop positive protocols meaning that once a positive sample of a series was found, the other samples were not analyzed.

One hundred-seventeen (117) bulk samples were collected from the building as part of this project.

The sample identification number indicated on the Bulk Sample Location Plan corresponds to the homogeneous ID numbers which are also located on the laboratory analytical report and the chain of custody forms. The Bulk Sample Location Plan, laboratory analytical report and the chain of custody forms are included in Attachment C.

2.2 Lead Paint

Lu Engineers conducted a lead-based paint inspection for this project on October 16, 2024, and November 13, 2024.

A total of nine (9) bulk paint samples were collected from several painted surfaces. The sample locations are indicated on the Sample Location Plans included in Attachment C. The sample number indicated on the plans corresponds to the sample numbers on the laboratory analytical report and the chain of custody which are included in Attachment C.

The samples were submitted to Paradigm Environmental Services, Inc., an ELAP-certified laboratory. A copy of Paradigm's laboratory credentials is included in Attachment A. Results of Lu Engineer's visual assessment are included in Section 3.2.

2.3 PCB Caulk

Seven (7) suspect PCB caulks were sampled during Lu Engineer's site investigation. The sample locations are indicated on the Sample Location Plans included in Attachment C. The sample number indicated on the plans corresponds to the sample numbers on the laboratory analytical report and the chain of custody which are included in Attachment C.

The samples were submitted to EMSL Analytical, Inc, an NYSDOH certified laboratory. Bulk PCB samples were analyzed using EPA Method 8082. Paradigm's laboratory credentials are included in Attachment A.

3.0 ANALYTICAL RESULTS

3.1 Asbestos Results

As defined by the New York State Department of Labor (NYSDOL) 12 NYCRR 56, a sample is considered to be asbestos containing if it contains greater than 1% asbestos by weight based on laboratory analysis. The Occupational Safety and Health Administration (OSHA) 29 CFR 1926.1101 requires specific work practices and prohibitions if asbestos in any quantity, i.e., trace <1%, is present in potentially impacted materials.

A list of Homogeneous Areas (HA) identified for the building area surveyed is included below. The **bold** and ***italicized*** HA description indicates that the material is positive, based on the sample results.

Homogeneous Area No. (HA)	Description	Condition	Friability	Asbestos Content
1	Grey CMU Block	Fair	NF	NAD
2	Grey Mortar	Fair	F	NAD
3	White 2` x4` Suspended Ceiling Tiles with Pinholes	Fair	F	NAD
4	Yellow Carpet Mastic	Fair	F	NAD
5	Black Cove Base	Fair	NF	NAD
6	Tan Cove Base Mastic	Fair	F	NAD
7	White/Tan Floor Leveler	Fair	F	NAD
8	Wood Grain Linoleum Flooring	Fair	NF	NAD
9	Black Mastic	Fair	F	NAD
10	Tan Oatmeal 12" x12" Floor Tile	Fair	NF	NAD
11	Tan Floor Tile Mastic	Fair	F	NAD
12	***Pink Sink Undercoating***	***Fair***	***F***	***Chrysotile 3.2%***
13	***Grey/Yellow/White Paint***	***Fair***	***NF***	***Chrysotile 1.8%***
14	Red Paint	Fair	NF	NAD
15	Tan Peg Board	Fair	NF	NAD

Homogeneous Area No. (HA)	Description	Condition	Friability	Asbestos Content
16	Black Interior Window Glaze	Fair	NF	NAD
17	White Interior Window Glaze	Fair	NF	NAD
18	Black Vibration Cloth	Fair	NF	NAD
19	Tan Cloth Fiberglass Cover	Fair	NF	NAD
20	2" x2" Grey Ceramic Floor Tile	Fair	NF	NAD
21	Grey Grout	Fair	NF	NAD
22	***Grey Floor Tile Adhesive***	***Fair***	***NF***	***Chrysotile 2.2%***
23	Grey Sealant	Fair	NF	NAD
24	White Paint	Fair	NF	NAD
25	***Black Fire Stop Caulk***	***Fair***	***NF***	***Chrysotile 6.8%***
26	***Grey Window Glaze***	***Fair***	***NF***	***Actinolite/Tremolite 2.1%***
27	Grey Mag Pipe Insulation	Fair	F	NAD
28	***Tan Refractory Cement***	***Fair***	***F***	***Vermiculite Present***
29	Silver Paint	Fair	NF	NAD
30	White Paint	Fair	NF	NAD
31	Grey Mudded Elbows	Fair	F	NAD
32	Black Tar	Fair	NF	NAD
33	Brown Insulation Material	Fair	F	NAD
34	Black Tar Material	Fair	NF	NAD
35	Tan Cloth	Fair	NF	NAD
36	Black Vibration Cloth	Fair	NF	NAD
37	Grey Drywall	Fair	F	NAD
38	White Joint Compound	Fair	F	NAD
39	Yellow Carpet Mastic	Fair	NF	NAD
40	White/Bronz Duct Sealant	Fair	F	NAD
41	White 2`x4` Ceiling Tile	Fair	F	NAD
42	12"x12" Grey/Oatmeal Floor Tile	Fair	NF	NAD
43	Brown Cove Base	Fair	NF	NAD
44	Brown Cove Base Mastic	Fair	NF	NAD
45	Yellow Cove Base Mastic	Fair	NF	NAD
46	Silver Paint	Fair	NF	NAD
47	Black Paint	Fair	NF	NAD
48	***White Caulk***	***Fair***	***NF***	***Actinolite/ Tremolite 1.2%***
49	Silver Paint	Fair	NF	NAD
50	Black Padding	Fair	NF	NAD
51	***Grey Caulk***	***Fair***	***NF***	***Chrysotile 7.8%***
52	White Paint	Fair	NF	NAD
53	Black Vent Fabric	Fair	NF	NAD

Homogeneous Area No. (HA)	Description	Condition	Friability	Asbestos Content
54	***Grey Window Glaze***	***Fair***	***NF***	***Chrysotile 2.4%***
55	Grey Caulk	Fair	NF	NAD
56	***Black Tar Roof Flashing***	***Intact***	***NF***	***Chrysotile 16%***
57	Black Built up Roofing Material	Intact	NF	NAD

NAD – No Asbestos Detected
F – Friable; NF – Non-Friable

3.2 Lead Paint Results

According to the United States Environmental Protection Agency (EPA), paint is considered lead-based if the concentration is equal to or greater than 0.5% by weight.

According to the Occupational Safety and Health Administration (OSHA), lead means metallic lead, all inorganic lead compounds, and organic soaps with any concentrations of lead. Therefore, all samples collected are considered lead containing per OSHA standards.

Lu Engineers collected a total of nine (9) bulk lead paint samples from various locations of the building. The samples were submitted to Paradigm Environmental Services, Inc., an ELAP-certified laboratory. A list of the areas sampled for this survey is included below. The **bold** and ***italicized*** description indicates that the material is positive for lead per EPA standards, based on the sample results.

Sample No.	Description	Lead Conc. (% by Wt.)
LP-13	Grey/Yellow/White Paint	0.00514%
LP-14	Red Paint	0.0548%
LP-24	White Paint	0.0272%
LP-29	Silver Paint	0.00672%
LP-30	White Paint	< 0.00484%
LP-46	Silver Paint	0.00514%
LP-47	Black Paint	< 0.00484%
LP-49	Silver Paint	0.0147%
LP-52	White Paint	0.332%

3.3 PCB Caulk Results

EPA defines PCB bulk waste, “as waste derived from manufactured products containing PCBs in a non-liquid state, at any concentration where the concentration at the time of designation for disposal was > 50 ppm PCBs”. Solid wastes containing 50 ppm by weight or greater are listed hazardous wastes in New York State (6 NYCRR Part 371.4(C)).

The following table summarizes the PCB sampling results. A ***bold and italicized*** sample number indicates that the building material has a PCB concentration that is equal to or greater than 50 ppm based on analytical results.

Sample No.	Description	PCB Content (ppm)	Asbestos Containing
PCB-16	Black Window Glaze	ND	No
PCB-25	Black Fire Stop Caulk	ND	Yes
PCB-26	Grey Window Glaze	ND	No
PCB-48	White Caulk	ND	Yes
PCB-51	Grey Caulk	ND	No
PCB-54	Grey Window Glaze	ND	No
PCB-55	Grey Caulk	ND	No

ND = Non-Detected

4.0 ASBESTOS MATERIALS AND APPROXIMATE QUANTITIES

Asbestos exists throughout the inspected areas. Based on the analytical results, the following table identifies the Homogeneous Areas that contain asbestos along with the material description and approximate quantity.

Homogeneous Area No. (HA)	Description	Approximate Quantity
12	Pink Sink Undercoating on Sinks in Front Room (Area 1) Kitchen	4 SF
13	Grey/Yellow/White Paint in Front Room (Area 1) on Column	52 SF
22	Grey Floor Tile Adhesive in (Area 3) Locker Room (Note 1)	420 SF
25	Black Fire Stop Caulk in (Area 3) Locker Room, on Electrical Conduit in Northeast Corner of Ceiling	1 SF
26	Gray Window Glaze in (Area 3) Locker Room, on Northeast Door Window	4 LF
28	Tan Refractory Cement on Boiler	30 SF
48	White Caulk on Observation Deck Exterior (Upper Four Corners)	2 LF
51	Grey Exterior Caulk on Equipment Room Roof, on Electrical Conduit	1 SF
54	Grey Window Glaze on West Door Window (Interior and Exterior)	16 LF

Homogeneous Area No. (HA)	Description	Approximate Quantity
56	Black Tar Roof Flashing (Upper and Lower Roof, and Equipment Room Roof)	1300 SF

SF = Square Feet
LF = Linear Feet
Note 1 - Asbestos Containing Grey Floor Tile Adhesive Exists Under Grey 2"x2" Ceramic Floor Tile in the Locker Room Toilet/ Sink Area and is Homogeneous with the Floor and Walls in the Shower Room.

5.0 LIMITATIONS OF THE INVESTIGATION

This report has been prepared for the exclusive use of the client. This report relies on information supplied by the building owner, employees, tenants and other sources of information. Lu Engineers has prepared this report in accordance with generally accepted practices within the industry.

This report identifies and assesses the location, quantity, and condition of materials that were accessible and visible at the time of sampling. The condition of the suspect materials is based on the actual inspection date. The quantities indicated in the report are based on the visual inspection and are only estimates of the material present. Additional quantities may exist above ceilings, behind walls or in areas of the building beyond the scope of the survey.

This survey is not intended to be an abatement design. Per NYCRR 56, an abatement design must be completed by a certified Project Designer.

This survey is intended to be a pre-demolition survey. Destructive measures were taken with attempts to identify materials that may not be immediately visible.

6.0 RECOMMENDATIONS

6.1 Asbestos Containing Materials

Asbestos containing materials have been identified as part of this assessment as shown in Section 4.0. The locations of asbestos containing materials and a summary of quantities are included in Attachment D.

NYCRR 56 requires that a copy of this survey be submitted to the local agency where the demolition permit will be issued and the regional office of the New York State Department of Labor. Upon acceptance of this report, Lu Engineers can submit this report to the NYSDOL upon request of the client.

In accordance with 12 NYCRR 56, no renovation or demolition work shall be commenced by any owner or agent prior to completion of asbestos abatement performed by a licensed asbestos abatement contractor. NYSDOL regulations require that the asbestos containing material that

will be disturbed by the renovation or demolition be removed prior to any disturbance of the material.

If suspect asbestos containing materials not identified in this asbestos survey report are discovered during the demolition and/or renovation process; it is required that the presence, location and quantity of newly discovered material, be conveyed within twenty-four (24) hours of discovery to the building owner or their representative. All activities must cease in the area where the presumed asbestos containing material or suspect miscellaneous ACM is found, until a licensed asbestos contractor appropriately assesses and manages the discovered materials.

6.2 Lead Paint

According to the United States Environmental Protection Agency (USEPA), paint is considered lead based if the concentration is equal to or greater than 0.5% by weight. The Occupational Safety and Health Administration (OSHA) Regulation in 29 CFR 1926.62 considers any amount of lead in paint to be of concern. The regulation states that the employer shall assure that no employee is exposed to lead concentrations greater than fifty micrograms per cubic meter (50 mg/m^3) of air averaged over an eight hour period.

There was no lead paint identified as part of this survey.

6.3 PCB Caulk

Caulks containing 50 parts per million (ppm) by weight (on a dry weight basis for other than liquid wastes) or greater of PCBs may be listed as hazardous waste in accordance with New York State Department of Conservation regulations (6 NYCRR Part 371). PCB wastes are also regulated by EPA in the 40 CFR Part 761 regulations.

There were no PCB containing caulks identified as part of this survey.

ATTACHMENT A

License and Certifications

Lu Engineers
ENVIRONMENTAL • TRANSPORTATION • CIVIL

ASBESTOS, LEAD PAINT, and PCB CAULK SURVEY

SYRACUSE HANCOCK INTERNATIONAL AIRPORT
FORMER FIREHOUSE STRUCTURE
1000 COL EILEEN BOULEVARD
SYRACUSE, NEW YORK

WE ARE YOUR DOL

NEW YORK STATE | Department of Labor

DIVISION OF SAFETY & HEALTH LICENSE AND CERTIFICATE UNIT, STATE OFFICE CAMPUS, BLDG. 12, ALBANY, NY 12226

ASBESTOS HANDLING LICENSE

Joseph C. Lu Engineering, P.C.
280 E. Broad Street, Suite 170, Rochester, NY, 14604

License Number: 29286
License Class: RESTRICTED
Date of Issue: 05/01/2024
Expiration Date: 05/31/2025
Duly Authorized Representative: Mitchell Smith

This license has been issued in accordance with applicable provisions of Article 30 of the Labor Law of New York State and of the New York State Codes, Rules and Regulations (12 NYCRR Part 56). It is subject to suspension or revocation for a (1) serious violation of state, federal or local laws with regard to the conduct of an asbestos project, or (2) demonstrated lack of responsibility in the conduct of any job involving asbestos or asbestos material.

This license is valid only for the contractor named above and this license or a photocopy must be prominently displayed at the asbestos project worksite. This license verifies that all persons employed by the licensee on an asbestos project in New York State have been issued an Asbestos Certificate, appropriate for the type of work they perform, by the New York State Department of Labor.

Amy Phillips, Director
For the Commissioner of Labor

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2025
Issued April 01, 2024

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. STEVE DEVITO
PARADIGM ENVIRONMENTAL SERVICES INC
179 LAKE AVENUE
ROCHESTER, NY 14608

NY Lab Id No: 10958

is hereby APPROVED as an Environmental Laboratory for the category
ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved subcategories and/or analytes are listed below:

Miscellaneous

Asbestos in Friable Material	Item 198.1 of Manual
	EPA 600/M4/82/020
Asbestos in Non-Friable Material-PLM	Item 198.6 of Manual (NOB by PLM)
Asbestos in Non-Friable Material-TEM	Item 198.4 of Manual
Lead in Dust Wipes	EPA 6010C
Lead in Paint	EPA 6010C

Sample Preparation Methods

	EPA 3050B

Serial No.: 68645

Property of the New York State Department of Health. Certificates are valid only at the address shown and must be conspicuously posted by the laboratory. Continued accreditation depends on the laboratory's successful ongoing participation in the Program. Consumers may verify a laboratory's accreditation status online at https://apps.health.ny.gov/pubdoh/applinks/wc/elappublicweb/, by phone (518) 485-5570 or by email to elap@health.ny.gov.

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2025
Issued April 01, 2024

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. OWEN MCKENNA
EMSL ANALYTICAL INC
200 ROUTE 130 NORTH
CINNAMINSON, NJ 08077

NY Lab Id No: 10872

is hereby APPROVED as an Environmental Laboratory for the category
ENVIRONMENTAL ANALYSES AIR AND EMISSIONS
All approved subcategories and/or analytes are listed below:

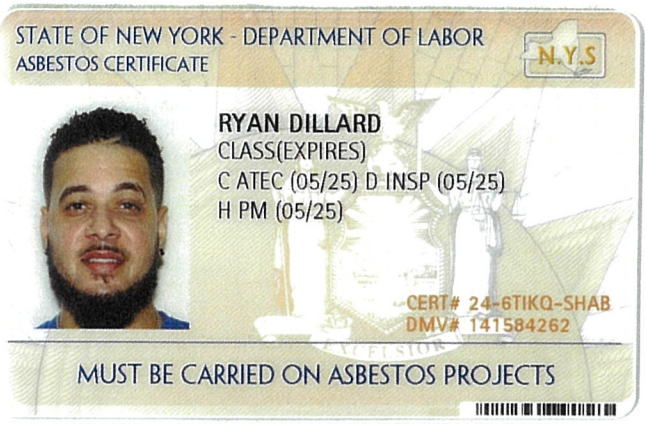
Chlorinated Hydrocarbon Pesticides	
Chlordane Total	NIOSH 5510
Metals I	
Lead, Total	NIOSH 7082
Metals II	
Mercury, Total	NIOSH 6009
Miscellaneous	
Asbestos	40 CFR 763 APX A No. III
	YAMATE,AGARWAL GIBB
	NIOSH 7402
Fibers	NIOSH 7400 A RULES
Particulate Matter	40 CFR PART 50 APP B
	40 CFR PART 50 APP J (PM10)
Polychlorinated Biphenyls	
PCBs and Aroclors	NIOSH 5503
Sample Preparation Methods	
	40 CFR PART 50 APP G

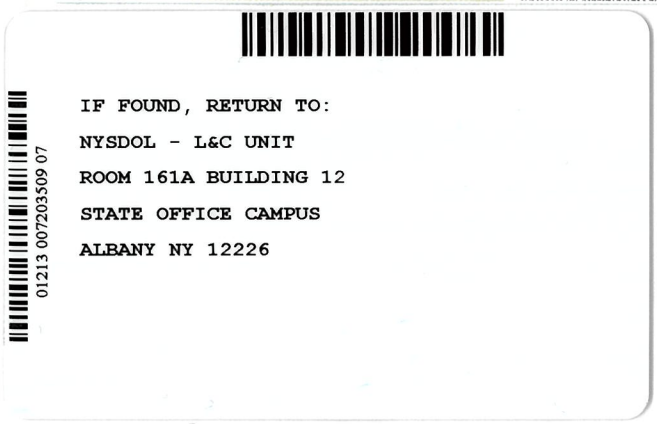
Serial No.: 68608

Property of the New York State Department of Health. Certificates are valid only at the address shown and must be conspicuously posted by the laboratory. Continued accreditation depends on the laboratory's successful ongoing

Lu Engineers
ENVIRONMENTAL • TRANSPORTATION • CIVIL

280 East Broad Street, Suite 170
Rochester, New York 14604

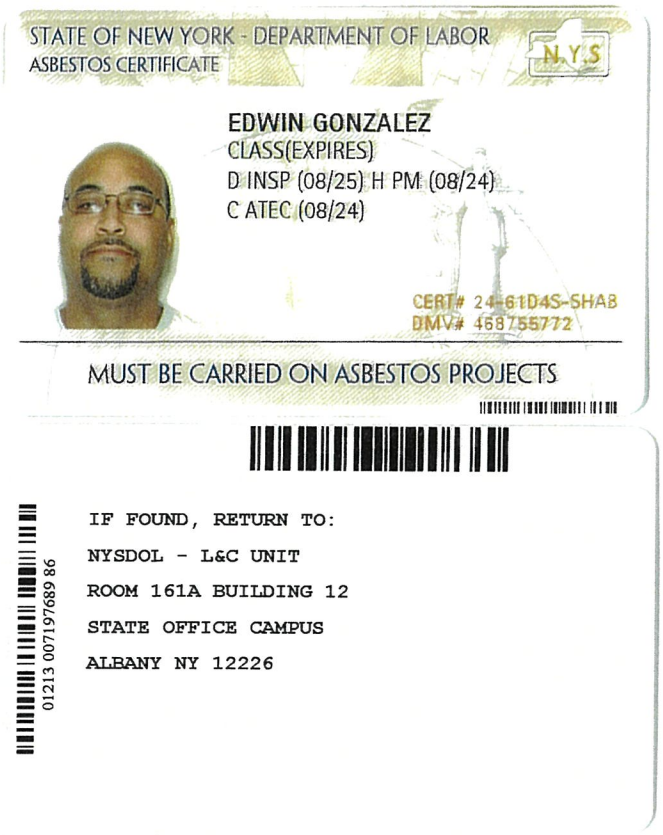

STATE OF NEW YORK - DEPARTMENT OF LABOR
ASBESTOS CERTIFICATE
N.Y.S
RYAN DILLARD
CLASS(EXPIRES)
C ATEC (05/25) D INSP (05/25)
H PM (05/25)
CERT# 24-6TIKQ-SHAB
DMV# 141584262
MUST BE CARRIED ON ASBESTOS PROJECTS


IF FOUND, RETURN TO:
NYSDOL - L&C UNIT
ROOM 161A BUILDING 12
STATE OFFICE CAMPUS
ALBANY NY 12226
01213 007203509 07

Ryan Dillard
C – Air Sampling Technician
D – Inspector
H – Project Monitor

Lu Engineers

280 East Broad Street, Suite 170
Rochester, New York 14604


STATE OF NEW YORK - DEPARTMENT OF LABOR
ASBESTOS CERTIFICATE

N.Y.S

EDWIN GONZALEZ
CLASS(EXPIRES)
D INSP (08/25) H PM (08/24)
C ATEC (08/24)

CERT# 24-61D4S-SHAB
DMV# 468755772

MUST BE CARRIED ON ASBESTOS PROJECTS

IF FOUND, RETURN TO:
NYSDOL - L&C UNIT
ROOM 161A BUILDING 12
STATE OFFICE CAMPUS
ALBANY NY 12226

01213 007197689 86

C – Air Sampling Technician
D – Inspector
H – Project Monitor

ATTACHMENT B

Roof Core Profiles and Asbestos Inspection Summary Table

Lu Engineers
ENVIRONMENTAL • TRANSPORTATION • CIVIL

ASBESTOS, LEAD PAINT, and PCB CAULK SURVEY

SYRACUSE HANCOCK INTERNATIONAL AIRPORT
FORMER FIREHOUSE STRUCTURE
1000 COL EILEEN BOULEVARD
SYRACUSE, NEW YORK

ROOF CORE PROFILES

Syracuse Hancock International Airport
Former Firehouse Structure
1000 Col. Eileen Boulevard, Syracuse, New York
December 2024

Core #1 – Upper Roof (Observation Deck) – 4" Depth

- Ballast Stone
- Black Tar Pitch
- ISO Foam
- Black Tar
- Iso Foam
- Metal Deck

Core #2 – Lower Roof (Main Roof) – 3" Depth

- Black Tar Pitch
- Brown Fiberboard
- Black Tar Pitch
- Metal Deck

Lu Project #4500-03

Lu Engineers
ENVIRONMENTAL • TRANSPORTATION • CIVIL

Note:

1. ***Bold & italicized*** layers indicate materials are positive for asbestos.

Asbestos Inspection Summary Table
1000 Col. Eileen Boulevard
Syracuse, New York

Homogeneous Area Description	Homogeneous Area ID No.	Floor & Location	Tested or Assumed	ACM (Y/N)	Approx. Quantity
Pink Sink Undercoating	12	Front Room (Area 1) Kitchen	Tested	Y	4 SF
				Total	**4 SF**
Grey/Yellow/White Paint	13	Front Room (Area 1) on Column	Tested	Y	52 SF
				Total	**52 SF**
Grey Floor Tile Adhesive	22	Locker Room (Area 3)	Tested	Y	420 SF
				Total	**420 SF**
Black Fire Stop Caulk	25	Locker Room (Area 3) on Electrical Conduit	Tested	Y	1 SF
				Total	**1 SF**
Grey Window Glaze	26	Locker Room (Area 3) on Northeast Door Window	Tested	Y	4 LF
				Total	**4 LF**
Tan Refractory Cement	28	Boiler Room, on Boiler	Tested	Y	30 SF
				Total	**30 SF**
White Caulk	48	Observation Deck Exterior, on Upper Four Corners	Tested	Y	2 LF
				Total	**2 SF**
Grey Caulk	51	Equipment Room Exterior (Roof) on Electrical Condu	Tested	Y	1 SF
				Total	**1 SF**
Grey Window Glaze	54	West Door Window, Interior and Exterior	Tested	Y	16 LF
				Total	**16 LF**
Black Tar Roof Flashing	56	Sloped Roof	Tested	Y	2,365 SF
		Second Story Roof			980 SF
				Total	**3,345 SF**
Black Tar Roof Flashing	56	Upper and Lower Roof, and Equipment Room Roof	Tested	Y	1,300 SF
				Total	**1,300 SF**

Lu Engineers
ENVIRONMENTAL • TRANSPORTATION • CIVIL

ATTACHMENT C

Sample Location Plans,
Analytical Reports and
Chain of Custody Forms

Lu Engineers
ENVIRONMENTAL • TRANSPORTATION • CIVIL

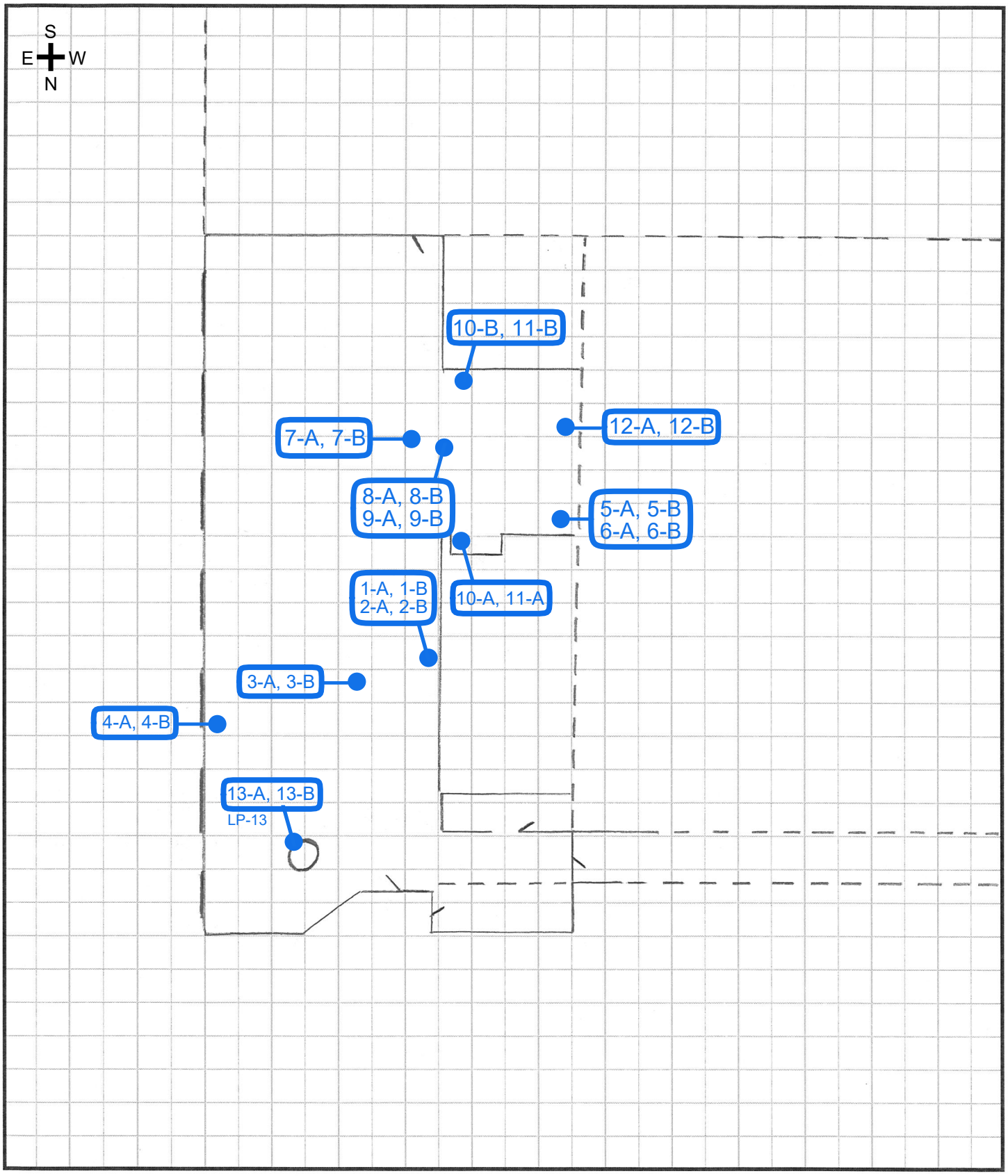
ASBESTOS, LEAD PAINT, and PCB CAULK SURVEY

SYRACUSE HANCOCK INTERNATIONAL AIRPORT
FORMER FIREHOUSE STRUCTURE
1000 COL EILEEN BOULEVARD
SYRACUSE, NEW YORK

Lu Engineers
ENVIRONMENTAL • TRANSPORTATION • CIVIL

BULK SAMPLE LOCATION PLAN

"Area 1" Front Room Entrance

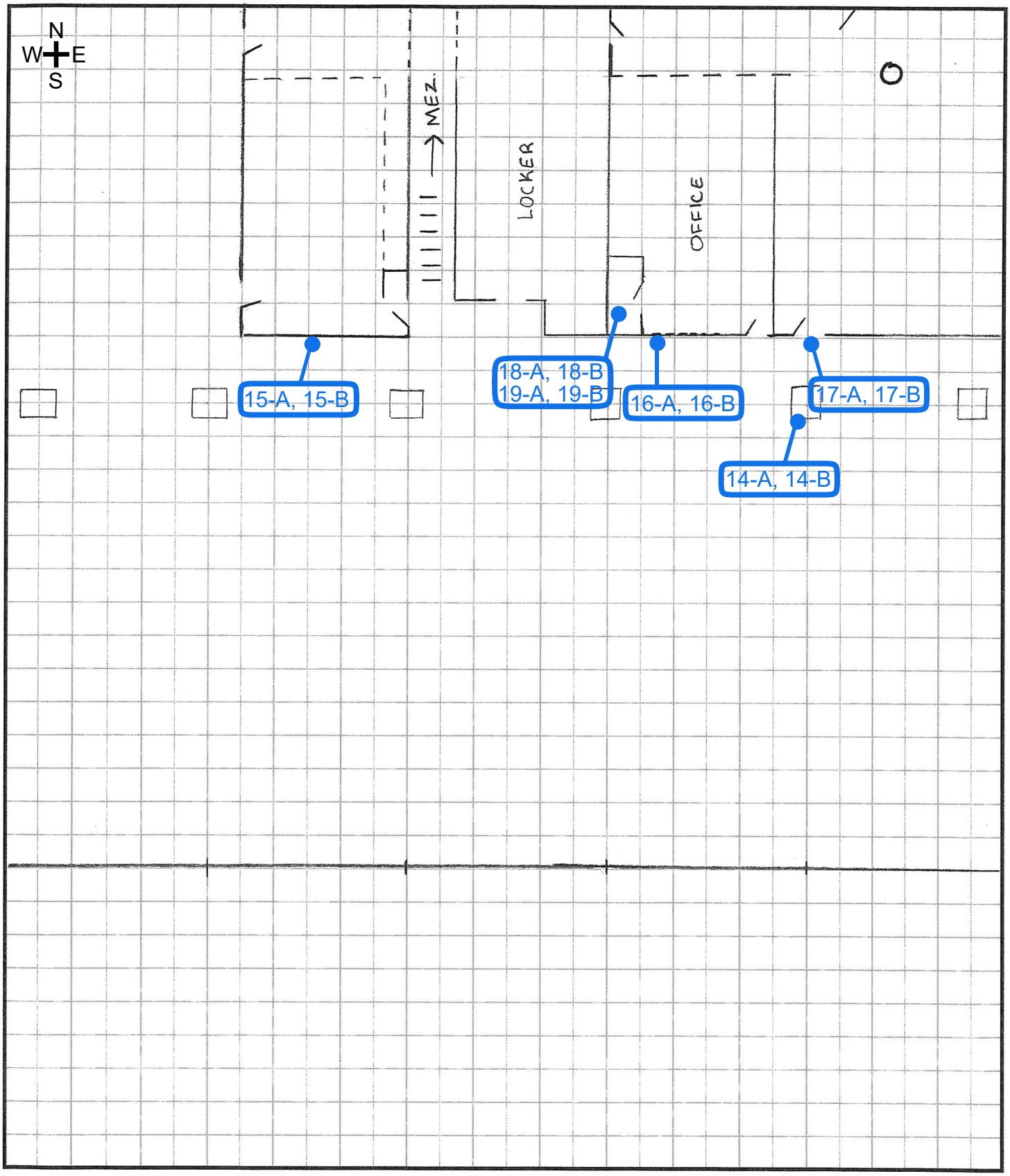


LEGEND: ● # = Approximate location of Bulk Sample

Lu Engineers
ENVIRONMENTAL • TRANSPORTATION • CIVIL

BULK SAMPLE LOCATION PLAN

"Area 2" Truck Bay

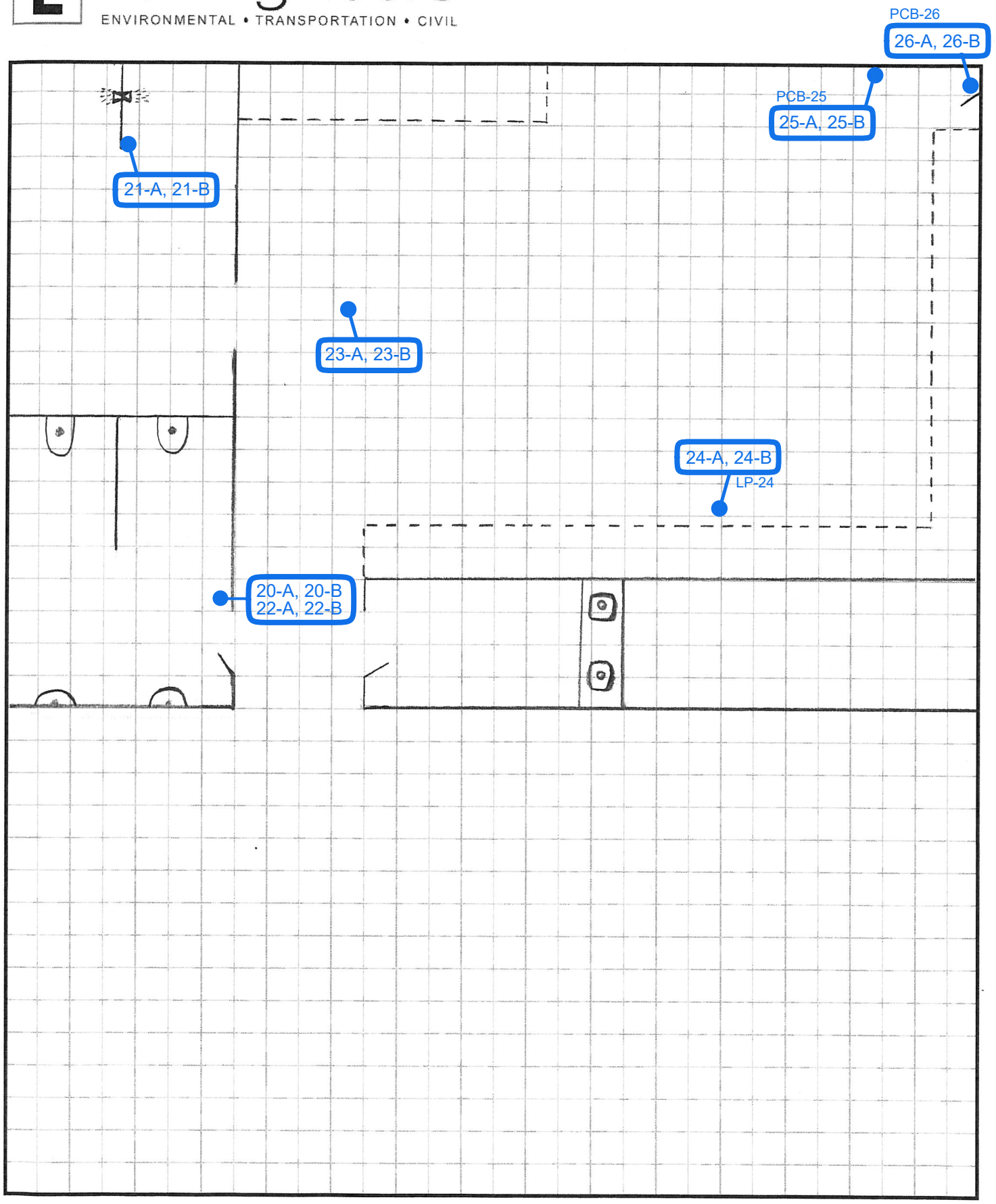


LEGEND: ●—[#] = Approximate location of Bulk Sample

Lu Engineers
ENVIRONMENTAL • TRANSPORTATION • CIVIL

BULK SAMPLE LOCATION PLAN

"Area 3" Locker Room



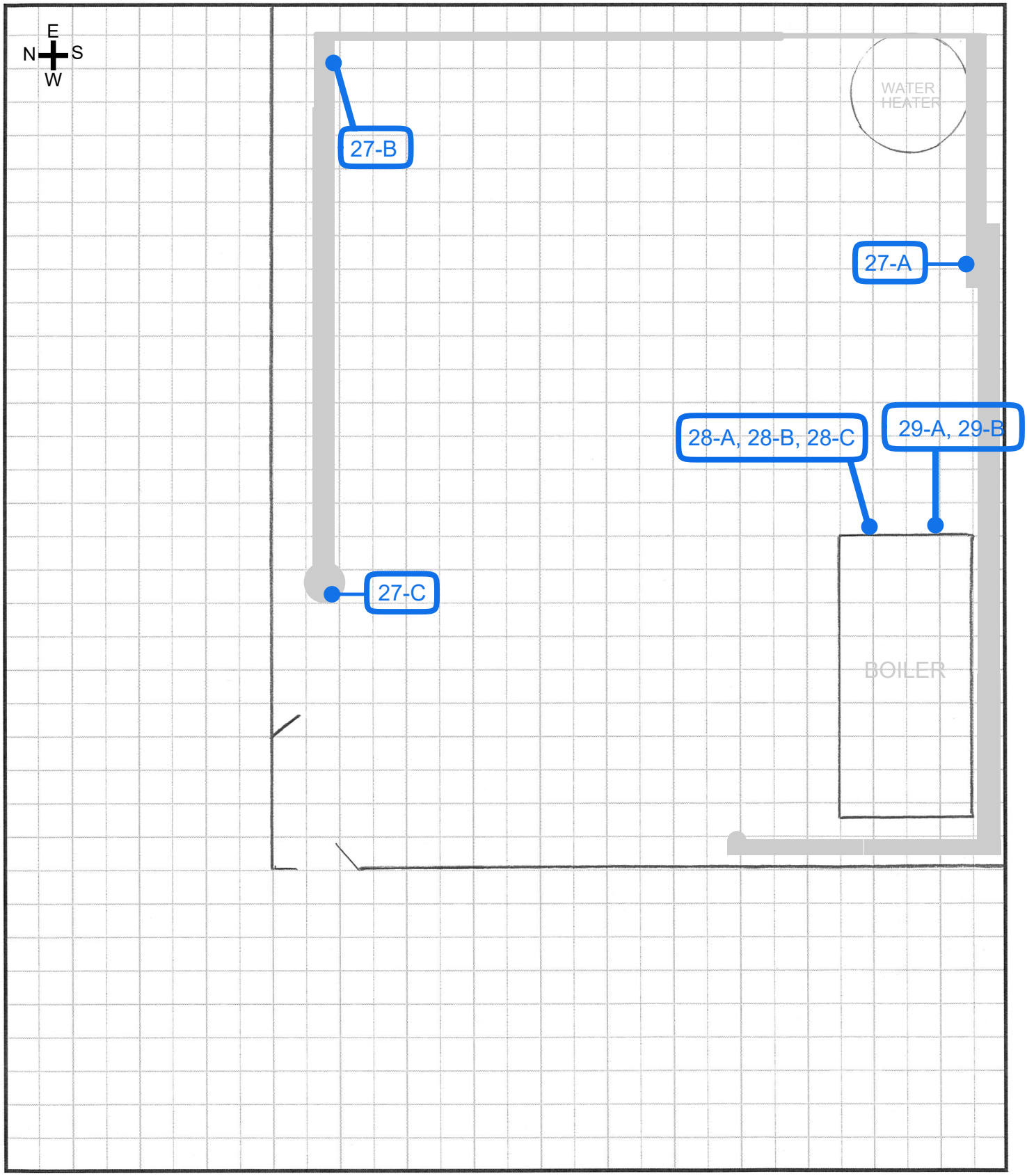
LEGEND: ●—[#] = Approximate location of Bulk Sample

N
W E
S

BULK SAMPLE LOCATION PLAN

"Area 4" Boiler Room

Lu Engineers
ENVIRONMENTAL • TRANSPORTATION • CIVIL

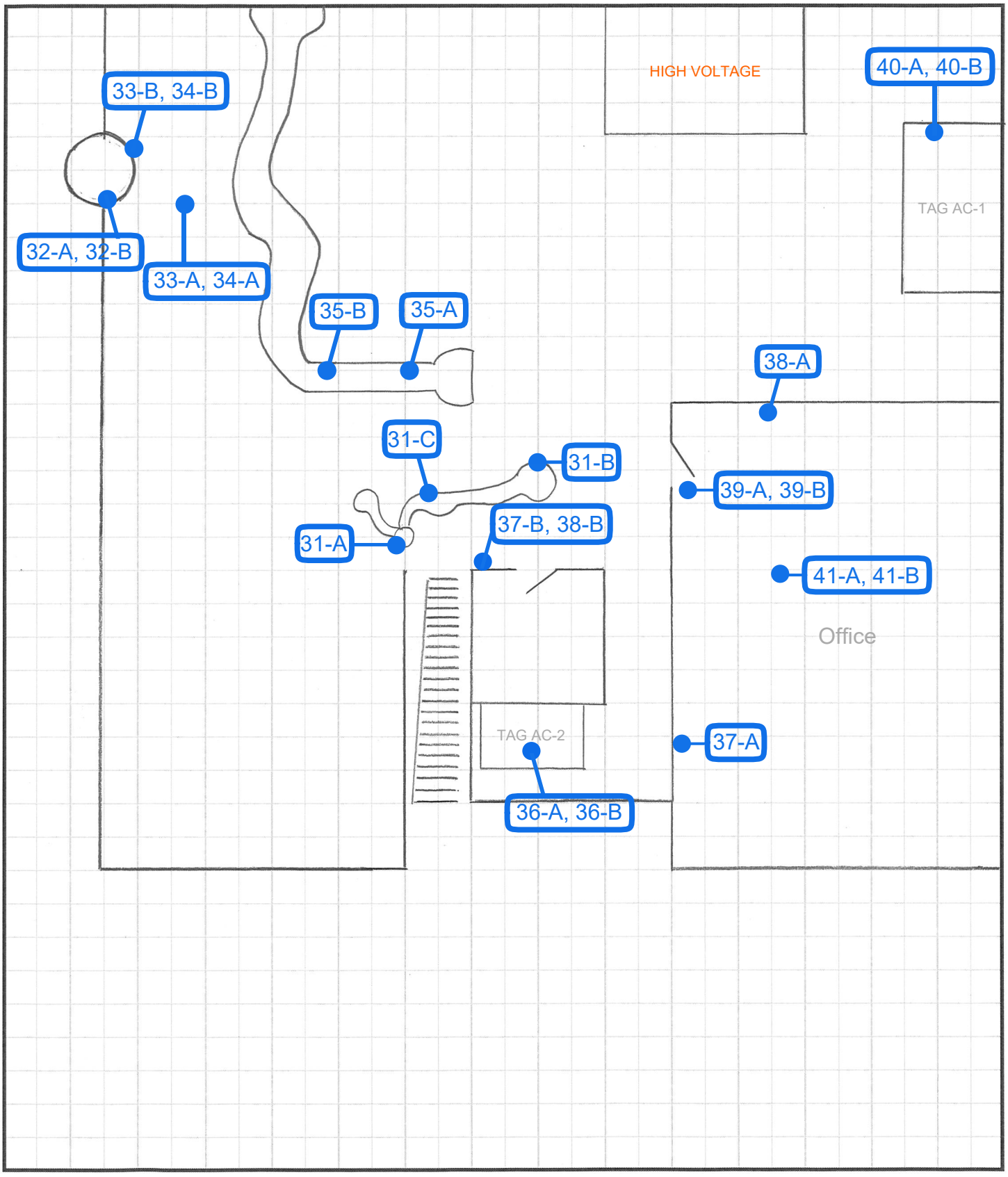


LEGEND: ●—[#] = Approximate location of Bulk Sample

BULK SAMPLE LOCATION PLAN

Mezzanine

Lu Engineers
ENVIRONMENTAL • TRANSPORTATION • CIVIL



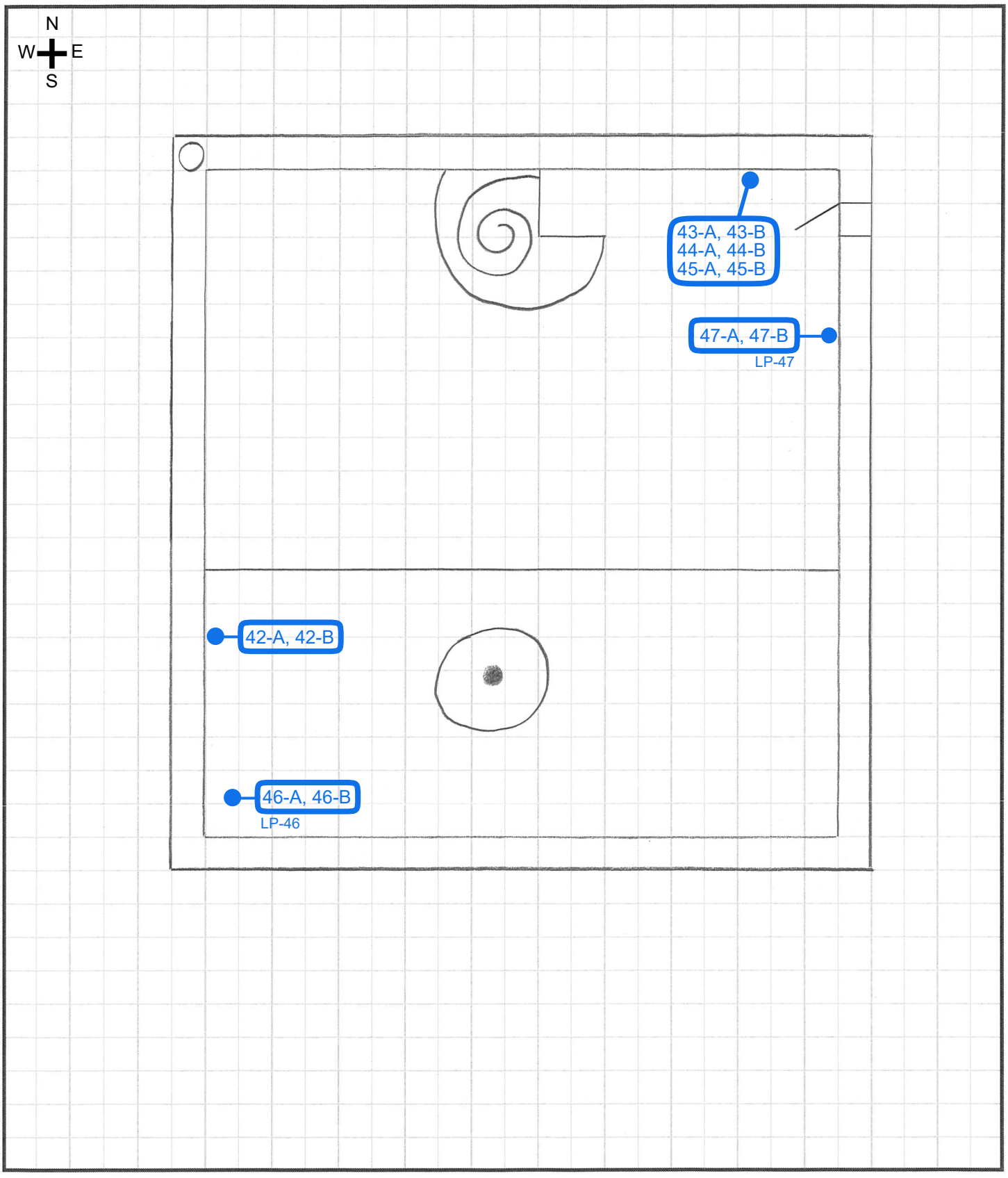
LEGEND: ●—[#] = Approximate location of Bulk Sample

N
W E
S

BULK SAMPLE LOCATION PLAN

Observation Deck

Lu Engineers
ENVIRONMENTAL • TRANSPORTATION • CIVIL



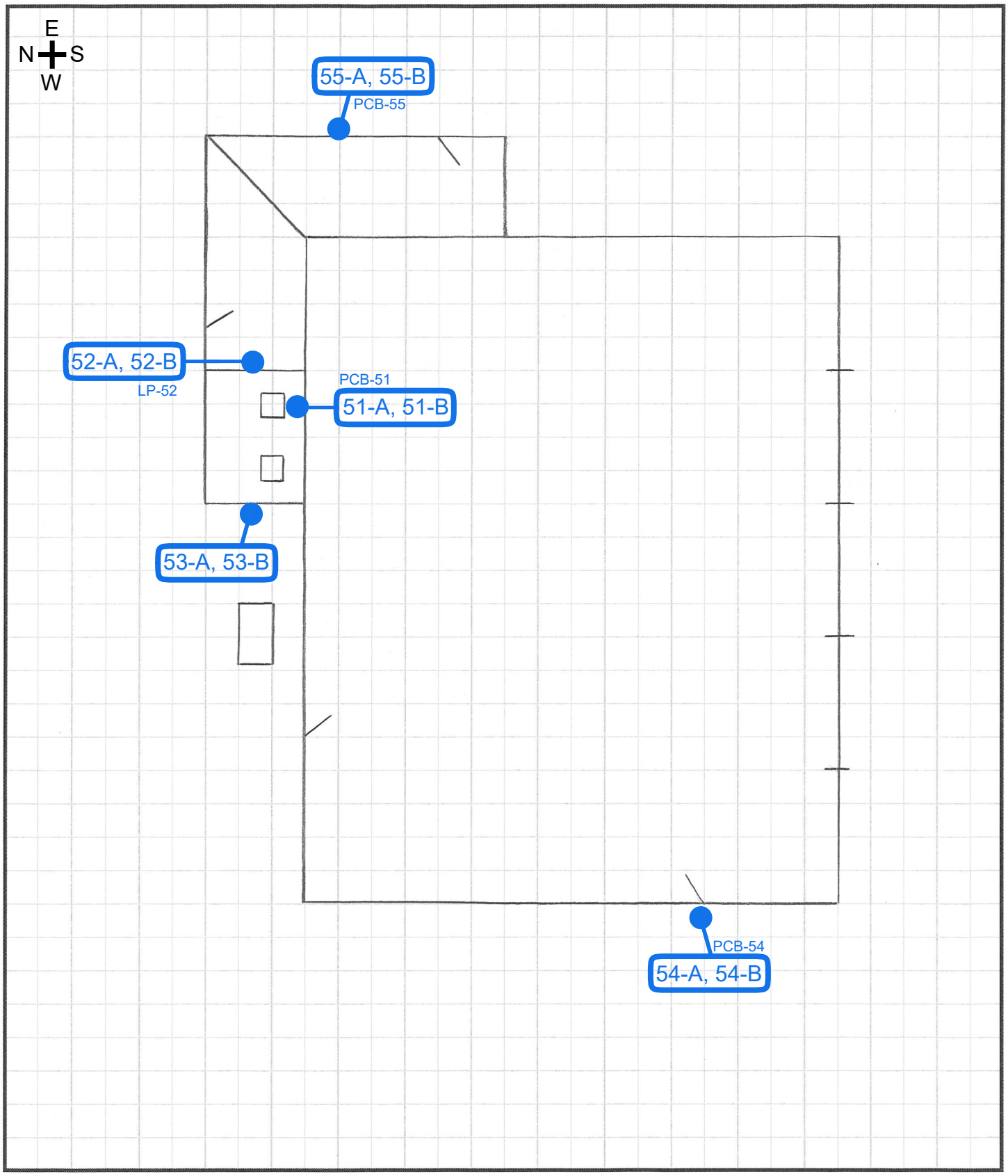
LEGEND: ●—[#] = Approximate location of Bulk Sample

BULK SAMPLE LOCATION PLAN

Exterior

Lu Engineers

ENVIRONMENTAL • TRANSPORTATION • CIVIL



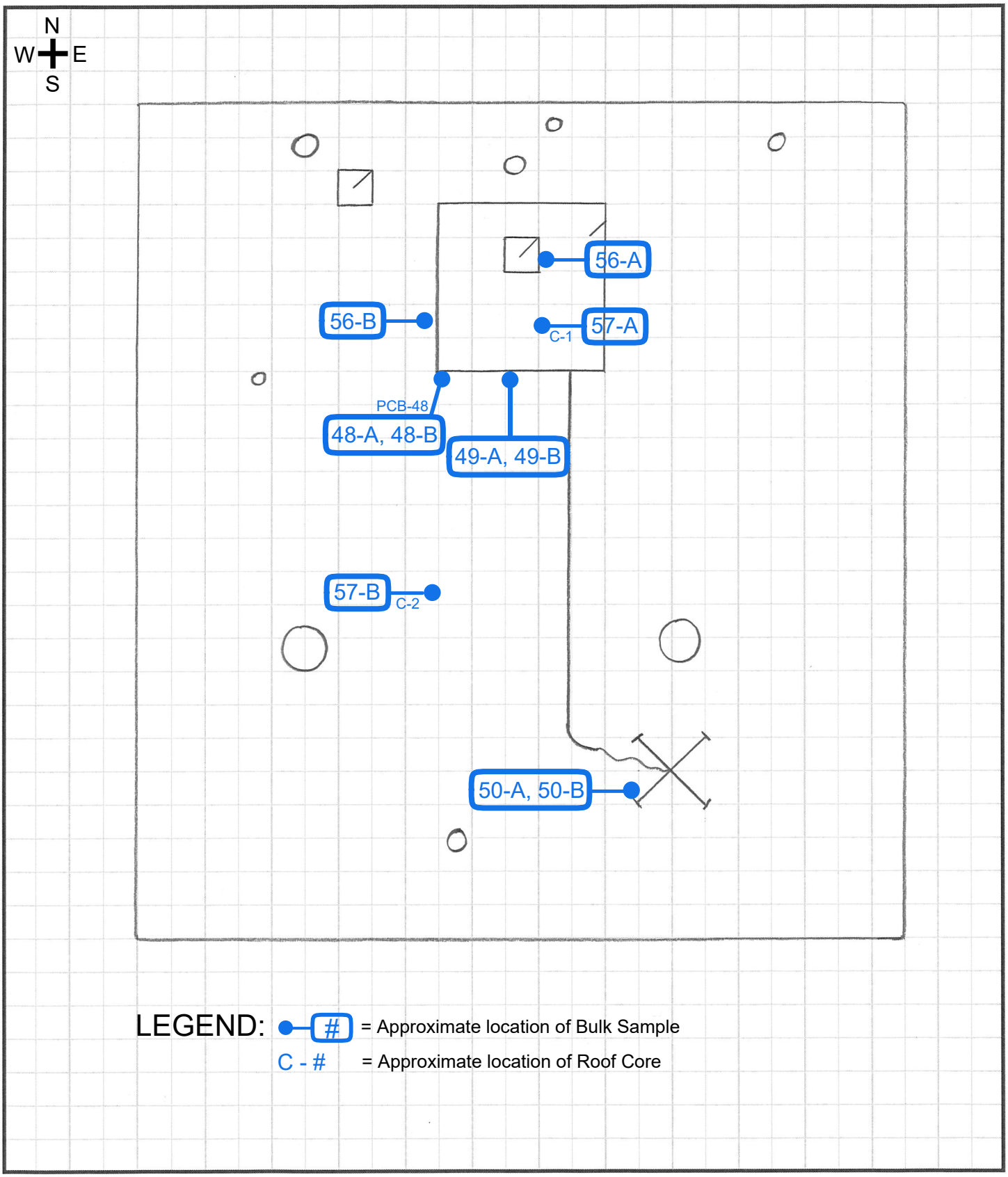
LEGEND: ● # = Approximate location of Bulk Sample

BULK SAMPLE LOCATION PLAN

Roof

Lu Engineers

ENVIRONMENTAL • TRANSPORTATION • CIVIL



LEGEND: ● # = Approximate location of Bulk Sample

C - # = Approximate location of Roof Core

PARADIGM
ENVIRONMENTAL SERVICES

179 Lake Avenue, Rochester, NY 14608 Office: (585) 647-2530

PLM & TEM BULK ASBESTOS ANALYSIS REPORT
via NYSDOH ELAP Method 198.1,198.4 and 198.6

Client: Lu Engineers
Location: Syracuse Hancock International Airport, Former Firehouse Structure
1000 Col Eileen Boulevard, Syracuse, New York
Sample Date: 10/16/2024

Job No: 8705-24
Page: 1 of 12

Client ID	Lab ID	Sampling Location	Description	PLM Asbestos Fibers Type & Percentage	PLM Total Asbestos	NOB	TEM Asbestos Fibers Type & Percentage	TEM Total Asbestos	PLM Non-Asbestos Fibers Type & Percentage	Non-Fibrous Matrix Material %
1-A	75942	Area 1 Front Room Entrance West Wall	Gray CMU Block	None Detected	0%		Not Required	N/A	None Detected	100%
1-B	75943	Area 1 Front Room Entrance West Wall	Gray CMU Block	None Detected	0%		Not Required	N/A	None Detected	100%
2-A	75944	Area 1 Front Room Entrance West Wall	Gray Mortar	None Detected	0%		Not Required	N/A	None Detected	100%
2-B	75945	Area 1 Front Room Entrance West Wall	Gray Mortar	None Detected	0%		Not Required	N/A	None Detected	100%
3-A	75946	Area 1 Front Room Entrance Ceiling	White Fibrous 2'x4' Pinhole Suspended Ceiling Tile	Inconclusive No Asbestos Detected	0%	#	Not Required	N/A	Mineral Wool 30%	70%
3-B	75947	Area 1 Front Room Entrance Ceiling	White Fibrous 2'x4' Pinhole Suspended Ceiling Tile	Inconclusive No Asbestos Detected	0%	#	Not Required	N/A	Mineral Wool 30%	70%
4-A	75948	Area 1 Front Room Entrance Floor	Yellow Carpet Mastic	Inconclusive No Asbestos Detected	0%	√	Not Required	N/A	None Detected	100%
4-B	75949	Area 1 Front Room Entrance Floor	Yellow Carpet Mastic	Inconclusive No Asbestos Detected	0%	√	Not Required	N/A	None Detected	100%
5-A	75950	Area 1 Front Room Entrance Kitchen	Black Cove Base	<1.0% Residue Remaining. PLM and TEM Not Required.	N/A	X	N/A	N/A	N/A	N/A
5-B	75951	Area 1 Front Room Entrance Kitchen	Black Cove Base	<1.0% Residue Remaining. PLM and TEM Not Required.	N/A	X	N/A	N/A	N/A	N/A

KEY TO NOB COLUMN SYMBOLS
No Symbol in the NOB column denotes sample analyzed by ELAP Method 198.1 (PLM).
√ NOB (non-friable organically bound)denotes material analyzed by ELAP Method 198.6 (PLM) and 198.4 (TEM) as noted.
V̂ denotes material analyzed by ELAP Method 198.6 (PLM) per NYSDOH. This Method does not remove vermiculite and may underestimate the level of asbestos present in a sample containing greater than 10% vermiculite.
 # denotes friable material analyzed by ELAP Method 198.6 (PLM) and 198.4 (TEM) as noted.
X denotes sample prepped only by ELAP Method 198.6.
**** Polarized-light microscopy is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Quantitative transmission electron microscopy is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos containing.**

PLM Bulk Asbestos Analysis by New York State Department of Health, ELAP Method 198.1 ,198.4 and 198.6 ("Polarized Light Microscopy and Transmission Electron Microscopy Methods for Identifying and Quantitating Asbestos in Bulk Samples and in Non-Friable Organically Bound Bulk Samples.")or EPA 600/M4-82-020 per 40 CFR 763 (NVLAP Lab Code 200530-0).

NVLAP TESTING

ELAP ID No.: 10958

Lab Code 200530-0 for PLM Analysis

Microscope: Olympus BH-2 #211874
PLM Analyst: T. Bush
Date of Analysis: 11/12/2024

Microscope: JEOL-100CX-II/#EM-156094-87
TEM Analyst: M. Lochner
Date of Analysis: 11/13/2024

Laboratory Results Approved By:
Asbestos Technical Director or Designee Fernanda Weinman

Paradigm Environmental Services, Inc. is not responsible for the data supplied by an independent inspector. National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the laboratory. This PLM report relates ONLY to the items tested. This report must not be used to claim product endorsement by NVLAP or any agency of the U.S. Government. Quality control data (including 95% confidence limits and/or laboratory and analysts' precision) is available upon request. All samples that were analyzed were received in acceptable condition.

PARADIGM
ENVIRONMENTAL SERVICES

179 Lake Avenue, Rochester, NY 14608 Office: (585) 647-2530

PLM & TEM BULK ASBESTOS ANALYSIS REPORT
via NYSDOH ELAP Method 198.1,198.4 and 198.6

Client: Lu Engineers **Job No:** 8705-24
Location: Syracuse Hancock International Airport, Former Firehouse Structure **Page:** 2 of 12
1000 Col Eileen Boulevard, Syracuse, New York
Sample Date: 10/16/2024

Client ID	Lab ID	Sampling Location	Description	PLM Asbestos Fibers Type & Percentage	PLM Total Asbestos	NOB	TEM Asbestos Fibers Type & Percentage	TEM Total Asbestos	PLM Non-Asbestos Fibers Type & Percentage	Non-Fibrous Matrix Material %
6-A	75952	Area 1 Front Room Entrance Kitchen	Tan Cove Base Mastic	Inconclusive No Asbestos Detected	0%	√	Not Required	N/A	None Detected	100%
6-B	75953	Area 1 Front Room Entrance Kitchen	Tan Cove Base Mastic	Inconclusive No Asbestos Detected	0%	√	Not Required	N/A	None Detected	100%
7-A	75954	Area 1 Front Room Entrance Under Carpet	White/Tan Floor Leveler	None Detected	0%		Not Required	N/A	None Detected	100%
7-B	75955	Area 1 Front Room Entrance Under Carpet	White/Tan Floor Leveler	None Detected	0%		Not Required	N/A	None Detected	100%
8-A	75956	Area 1 Front Room Entrance Kitchen	Brown Wood Grained Linoleum Flooring	<1.0% Residue Remaining. PLM and TEM Not Required.	N/A	X	N/A	N/A	N/A	N/A
8-B	75957	Area 1 Front Room Entrance Kitchen	Brown Wood Grained Linoleum Flooring	<1.0% Residue Remaining. PLM and TEM Not Required.	N/A	X	N/A	N/A	N/A	N/A
9-A	75958	Area 1 Front Room Entrance Kitchen Under HA #8	Black Mastic	Inconclusive No Asbestos Detected	0%	√	Not Required	N/A	None Detected	100%
9-B	75959	Area 1 Front Room Entrance Kitchen Under HA #8	Black Mastic	Inconclusive No Asbestos Detected	0%	√	Not Required	N/A	None Detected	100%
10-A	75960	Area 1 Front Room Entrance Kitchen	Tan Oatmeal 12"x12" Floor Tile	Inconclusive No Asbestos Detected	0%	√	Not Required	N/A	None Detected	100%
10-B	75961	Area 1 Front Room Entrance Kitchen	Tan Oatmeal 12"x12" Floor Tile	Inconclusive No Asbestos Detected	0%	√	Not Required	N/A	None Detected	100%

KEY TO NOB COLUMN SYMBOLS

No Symbol in the NOB column denotes sample analyzed by ELAP Method 198.1 (PLM).
√ NOB (non-friable organically bound)denotes material analyzed by ELAP Method 198.6 (PLM) and 198.4 (TEM) as noted.
Ṽ denotes material analyzed by ELAP Method 198.6 (PLM) per NYSDOH. This Method does not remove vermiculite and may underestimate the level of asbestos present in a sample containing greater than 10% vermiculite.
 # denotes friable material analyzed by ELAP Method 198.6 (PLM) and 198.4 (TEM) as noted.
X denotes sample prepped only by ELAP Method 198.6.
**** Polarized-light microscopy is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Quantitative transmission electron microscopy is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos containing.**

PLM Bulk Asbestos Analysis by New York State Department of Health, ELAP Method 198.1 ,198.4 and 198.6 ("Polarized Light Microscopy and Transmission Electron Microscopy Methods for Identifying and Quantitating Asbestos in Bulk Samples and in Non-Friable Organically Bound Bulk Samples.")or EPA 600/M4-82-020 per 40 CFR 763 (NVLAP Lab Code 200530-0).

NVLAP TESTING

ELAP ID No.: 10958

Lab Code 200530-0 for PLM Analysis

Microscope: Olympus BH-2 #211874
PLM Analyst: T. Bush
Date of Analysis: 11/12/2024

Microscope: JEOL-100CX-II #EM-156094-87
TEM Analyst: M. Lochner
Date of Analysis: 11/13/2024

Laboratory Results Approved By:
Asbestos Technical Director or Designee Fernanda Weinman

Paradigm Environmental Services, Inc. is not responsible for the data supplied by an independent inspector. National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the laboratory. This PLM report relates ONLY to the items tested. This report must not be used to claim product endorsement by NVLAP or any agency of the U.S. Government. Quality control data (including 95% confidence limits and/or laboratory and analysts' precision) is available upon request. All samples that were analyzed were received in acceptable condition.

PARADIGM
ENVIRONMENTAL SERVICES

179 Lake Avenue, Rochester, NY 14608 Office: (585) 647-2530

PLM & TEM BULK ASBESTOS ANALYSIS REPORT
via NYSDOH ELAP Method 198.1,198.4 and 198.6

Client: Lu Engineers
Location: Syracuse Hancock International Airport, Former Firehouse Structure
1000 Col Eileen Boulevard, Syracuse, New York
Sample Date: 10/16/2024

Job No: 8705-24
Page: 3 of 12

Client ID	Lab ID	Sampling Location	Description	PLM Asbestos Fibers Type & Percentage	PLM Total Asbestos	NOB	TEM Asbestos Fibers Type & Percentage	TEM Total Asbestos	PLM Non-Asbestos Fibers Type & Percentage	Non-Fibrous Matrix Material %
11-A	75962	Area 1 Front Room Entrance Kitchen	Tan Floor Tile Mastic	Inconclusive No Asbestos Detected	0%	√	Not Required	N/A	None Detected	100%
11-B	75963	Area 1 Front Room Entrance Kitchen	Tan Floor Tile Mastic	Inconclusive No Asbestos Detected	0%	√	Not Required	N/A	None Detected	100%
12-A	75964	Area 1 Front Room Entrance Kitchen	Pink Sink Undercoating	Chrysotile 3.2%	3.2%	√	Not Required	N/A	None Detected	96.8%
12-B	75965	Area 1 Front Room Entrance Kitchen	Pink Sink Undercoating	STOP	POSITIVE	X	SAMPLE	NOT	ANALYZED	N/A
13-A	75966	Area 1 Front Room Entrance on Column	Gray/Yellow/ White Paint	Inconclusive Trace Chrysotile Detected	<1.0%	√	Chrysotile 1.4%	1.4%	None Detected	98.6%
13-B	75967	Area 1 Front Room Entrance on Column	Gray/Yellow/ White Paint	Inconclusive Trace Chrysotile Detected	<1.0%	√	Chrysotile 1.8%	1.8%	None Detected	98.2%
14-A	75968	Area 2 Truck Bay on Structural Steele Support Beams	Red Paint	Inconclusive No Asbestos Detected	0%	√	Not Required	N/A	None Detected	100%
14-B	75969	Area 2 Truck Bay on Structural Steele Support Beams	Red Paint	Inconclusive No Asbestos Detected	0%	√	Not Required	N/A	None Detected	100%
15-A	75970	Area 2 Truck Bay North Wall	Tan Fibrous Peg Board	None Detected	0%		Not Required	N/A	Cellulose 100%	0%
15-B	75971	Area 2 Truck Bay North Wall	Tan Fibrous Peg Board	None Detected	0%		Not Required	N/A	Cellulose 100%	0%

KEY TO NOB COLUMN SYMBOLS
No Symbol in the NOB column denotes sample analyzed by ELAP Method 198.1 (PLM).
√ NOB (non-friable organically bound)denotes material analyzed by ELAP Method 198.6 (PLM) and 198.4 (TEM) as noted.
V̌ denotes material analyzed by ELAP Method 198.6 (PLM) per NYSDOH. This Method does not remove vermiculite and may underestimate the level of asbestos present in a sample containing greater than 10% vermiculite.
 # denotes friable material analyzed by ELAP Method 198.6 (PLM) and 198.4 (TEM) as noted.
X denotes sample prepped only by ELAP Method 198.6.
**** Polarized-light microscopy is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Quantitative transmission electron microscopy is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos containing.**

PLM Bulk Asbestos Analysis by New York State Department of Health, ELAP Method 198.1 ,198.4 and 198.6 ("Polarized Light Microscopy and Transmission Electron Microscopy Methods for Identifying and Quantitating Asbestos in Bulk Samples and in Non-Friable Organically Bound Bulk Samples.")or EPA 600/M4-82-020 per 40 CFR 763 (NVLAP Lab Code 200530-0).

NVLAP TESTING

Lab Code 200530-0 for PLM Analysis

ELAP ID No.: 10958

Microscope: Olympus BH-2 #211874
PLM Analyst: T. Bush
Date of Analysis: 11/12/2024

Microscope: JEOL-100CX-II #EM-156094-87
TEM Analyst: M. Lochner
Date of Analysis: 11/13/2024

Laboratory Results Approved By
Asbestos Technical Director or Designee Fernanda Weinman

Paradigm Environmental Services, Inc. is not responsible for the data supplied by an independent inspector. National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the laboratory. This PLM report relates ONLY to the items tested. This report must not be used to claim product endorsement by NVLAP or any agency of the U.S. Government. Quality control data (including 95% confidence limits and/or laboratory and analysts' precision) is available upon request. All samples that were analyzed were received in acceptable condition.

PARADIGM
ENVIRONMENTAL SERVICES

179 Lake Avenue, Rochester, NY 14608 Office: (585) 647-2530

PLM & TEM BULK ASBESTOS ANALYSIS REPORT
via NYSDOH ELAP Method 198.1,198.4 and 198.6

Client: Lu Engineers **Job No:** 8705-24
Location: Syracuse Hancock International Airport, Former Firehouse Structure **Page:** 4 of 12
1000 Col Eileen Boulevard, Syracuse, New York
Sample Date: 10/16/2024

Client ID	Lab ID	Sampling Location	Description	PLM Asbestos Fibers Type & Percentage	PLM Total Asbestos	NOB	TEM Asbestos Fibers Type & Percentage	TEM Total Asbestos	PLM Non-Asbestos Fibers Type & Percentage	Non-Fibrous Matrix Material %
16-A	75972	Area 2 Truck Bay Office Window	Black Interior Window Glaze	Inconclusive No Asbestos Detected	0%	√	Not Required	N/A	None Detected	100%
16-B	75973	Area 2 Truck Bay Office Window	Black Interior Window Glaze	Inconclusive No Asbestos Detected	0%	√	Not Required	N/A	None Detected	100%
17-A	75974	Area 2 Truck Bay Entrance Door Window	White Interior Window Glaze	Inconclusive No Asbestos Detected	0%	√	Not Required	N/A	None Detected	100%
17-B	75975	Area 2 Truck Bay Entrance Door Window	White Interior Window Glaze	Inconclusive No Asbestos Detected	0%	√	Not Required	N/A	None Detected	100%
18-A	75976	Area 2 Truck Bay Office Closet	Black Vibration Membrane	Inconclusive No Asbestos Detected	0%	√	Not Required	N/A	None Detected	100%
18-B	75977	Area 2 Truck Bay Office Closet on Air Duct	Black Vibration Membrane	<1.0% Residue Remaining. PLM and TEM Not Required.	N/A	X	N/A	N/A	N/A	N/A
19-A	75978	Area 2 Truck Bay Office Closet on Air Duct	Tan Fibrous Cloth Fiberglass Cover	None Detected	0%		Not Required	N/A	Cellulose 100%	0%
19-B	75979	Area 2 Truck Bay Office Closet on Air Duct	Tan Fibrous Cloth Fiberglass Cover	None Detected	0%		Not Required	N/A	Cellulose 100%	0%
20-A	75980	Area 3 Locker Room by Toilets	Gray 2'x2' Ceramic Floor Tile	None Detected	0%		Not Required	N/A	None Detected	100%
20-B	75981	Area 3 Locker Room by Toilets	Gray 2'x2' Ceramic Floor Tile	None Detected	0%		Not Required	N/A	None Detected	100%

KEY TO NOB COLUMN SYMBOLS

No Symbol in the NOB column denotes sample analyzed by ELAP Method 198.1 (PLM).
√ NOB (non-friable organically bound)denotes material analyzed by ELAP Method 198.6 (PLM) and 198.4 (TEM) as noted.
V̌ denotes material analyzed by ELAP Method 198.6 (PLM) per NYSDOH. This Method does not remove vermiculite and may underestimate the level of asbestos present in a sample containing greater than 10% vermiculite.
 # denotes friable material analyzed by ELAP Method 198.6 (PLM) and 198.4 (TEM) as noted.
X denotes sample prepped only by ELAP Method 198.6.
**** Polarized-light microscopy is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials.**
Quantitative transmission electron microscopy is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos containing.

PLM Bulk Asbestos Analysis by New York State Department of Health, ELAP Method 198.1 ,198.4 and 198.6 ("Polarized Light Microscopy and Transmission Electron Microscopy Methods for Identifying and Quantitating Asbestos in Bulk Samples and in Non-Friable Organically Bound Bulk Samples.")or EPA 600/M4-82-020 per 40 CFR 763 (NVLAP Lab Code 200530-0).

NVLAP TESTING

Lab Code 200530-0 for PLM Analysis

ELAP ID No.: 10958

Microscope: Olympus BH-2 #211874
PLM Analyst: T. Bush
Date of Analysis: 11/12/2024

Microscope: JEOL-100CX-II #EM-156094-87
TEM Analyst: M. Lochner
Date of Analysis: 11/13/2024

Laboratory Results Approved By:
Asbestos Technical Director or Designee Fernanda Weinman

Paradigm Environmental Services, Inc. is not responsible for the data supplied by an independent inspector. National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the laboratory. This PLM report relates ONLY to the items tested. This report must not be used to claim product endorsement by NVLAP or any agency of the U.S. Government. Quality control data (including 95% confidence limits and/or laboratory and analysts' precision) is available upon request. All samples that were analyzed were received in acceptable condition.

PARADIGM
ENVIRONMENTAL SERVICES

179 Lake Avenue, Rochester, NY 14608 Office: (585) 647-2530

PLM & TEM BULK ASBESTOS ANALYSIS REPORT
via NYSDOH ELAP Method 198.1,198.4 and 198.6

Client: Lu Engineers
Location: Syracuse Hancock International Airport, Former Firehouse Structure
1000 Col Eileen Boulevard, Syracuse, New York
Sample Date: 10/16/2024

Job No: 8705-24

Client ID	Lab ID	Sampling Location	Description	PLM Asbestos Fibers Type & Percentage	PLM Total Asbestos	NOB	TEM Asbestos Fibers Type & Percentage	TEM Total Asbestos	PLM Non-Asbestos Fibers Type & Percentage	Non-Fibrous Matrix Material %
21-A	75982	Area 3 Locker Room by Showers	Gray Grout	None Detected	0%		Not Required	N/A	None Detected	100%
21-B	75983	Area 3 Locker Room by Showers	Gray Grout	None Detected	0%		Not Required	N/A	None Detected	100%
22-A	75984	Area 3 Locker Room by Toilets	Gray Floor Tile Adhesive	Chrysotile 2.2%	2.2%	√	Not Required	N/A	None Detected	97.8%
22-B	75985	Area 3 Locker Room by Toilets	Gray Floor Tile Adhesive	STOP	POSITIVE	X	SAMPLE	NOT	ANALYZED	N/A
23-A	75986	Area 3 Locker Room on Air Duct Seams	Gray Sealant	Inconclusive No Asbestos Detected	0%	√	Not Required	N/A	None Detected	100%
23-B	75987	Area 3 Locker Room on Air Duct Seams	Gray Sealant	Inconclusive No Asbestos Detected	0%	√	Not Required	N/A	None Detected	100%
24-A	75988	Area 3 Locker Room on Air Duct	White Paint	Inconclusive No Asbestos Detected	0%	√	Not Required	N/A	None Detected	100%
24-B	75989	Area 3 Locker Room on Air Duct	White Paint	Inconclusive No Asbestos Detected	0%	√	Not Required	N/A	None Detected	100%
25-A	75990	Area 3 Locker Room on Electrical Conduit	Black Fire Stop Caulk	Chrysotile 6.8%	6.8%	√	Not Required	N/A	None Detected	93.2%
25-B	75991	Area 3 Locker Room on Electrical Conduit	Black Fire Stop Caulk	STOP	POSITIVE	X	SAMPLE	NOT	ANALYZED	N/A

KEY TO NOB COLUMN SYMBOLS
No Symbol in the NOB column denotes sample analyzed by ELAP Method 198.1 (PLM).
√ NOB (non-friable organically bound)denotes material analyzed by ELAP Method 198.6 (PLM) and 198.4 (TEM) as noted.
V̌ denotes material analyzed by ELAP Method 198.6 (PLM) per NYSDOH. This Method does not remove vermiculite and may underestimate the level of asbestos present in a sample containing greater than 10% vermiculite.
 # denotes friable material analyzed by ELAP Method 198.6 (PLM) and 198.4 (TEM) as noted.
X denotes sample prepped only by ELAP Method 198.6.
**** Polarized-light microscopy is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials.**
Quantitative transmission electron microscopy is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos containing.

PLM Bulk Asbestos Analysis by New York State Department of Health, ELAP Method 198.1 ,198.4 and 198.6 ("Polarized Light Microscopy and Transmission Electron Microscopy Methods for Identifying and Quantitating Asbestos in Bulk Samples and in Non-Friable Organically Bound Bulk Samples.")or EPA 600/M4-82-020 per 40 CFR 763 (NVLAP Lab Code 200530-0).

NVLAP TESTING

ELAP ID No.: 10958

Lab Code 200530-0 for PLM Analysis

Microscope: Olympus BH-2 #211874
PLM Analyst: T. Bush
Date of Analysis: 11/12/2024

Microscope: JEOL-100CX-II #EM-156094-87
TEM Analyst: M. Lochner
Date of Analysis: 11/13/2024

Laboratory Results Approved By:
Asbestos Technical Director or Designee Fernanda Weinman

Paradigm Environmental Services, Inc. is not responsible for the data supplied by an independent inspector. National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the laboratory. This PLM report relates ONLY to the items tested. This report must not be used to claim product endorsement by NVLAP or any agency of the U.S. Government. Quality control data (including 95% confidence limits and/or laboratory and analysts' precision) is available upon request. All samples that were analyzed were received in acceptable condition.

PARADIGM
ENVIRONMENTAL SERVICES

179 Lake Avenue, Rochester, NY 14608 Office: (585) 647-2530

PLM & TEM BULK ASBESTOS ANALYSIS REPORT
via NYSDOH ELAP Method 198.1,198.4 and 198.6

Client: Lu Engineers **Job No:** 8705-24
Location: Syracuse Hancock International Airport, Former Firehouse Structure **Page:** 6 of 12
1000 Col Eileen Boulevard, Syracuse, New York
Sample Date: 10/16/2024

Client ID	Lab ID	Sampling Location	Description	PLM Asbestos Fibers Type & Percentage	PLM Total Asbestos	N O B	TEM Asbestos Fibers Type & Percentage	TEM Total Asbestos	PLM Non-Asbestos Fibers Type & Percentage	Non-Fibrous Matrix Material %
26-A	75992	Area 3 Locker Room on Northeast Door	Gray Window Glaze	Inconclusive No Asbestos Detected	0%	√	Actinolite/ Tremolite 2.1%	2.1%	None Detected	97.9%
26-B	75993	Area 3 Locker Room on Northeast Door	Gray Window Glaze	Inconclusive No Asbestos Detected	0%	√	Stop Positive ** No TEM	N/A	None Detected	100%
27-A	75994	Area 4 Boiler Room	Gray Fibrous Mag Pipe Insulation	None Detected	0%		Not Required	N/A	Mineral Wool 35%	65%
27-B	75995	Area 4 Boiler Room	Gray Fibrous Mag Pipe Insulation	None Detected	0%		Not Required	N/A	Mineral Wool 35%	65%
27-C	75996	Area 4 Boiler Room	Gray Fibrous Mag Pipe Insulation	None Detected	0%		Not Required	N/A	Mineral Wool 35%	65%
28-A	75997	Area 4 Boiler Room Inside Boiler	Tan Refractory Cement	Sample Must Be Treated As ACM Unless Analyzed by SM-V 198.8	N/A		N/A	N/A	Vermiculite Present	N/A
28-B	75998	Area 4 Boiler Room Inside Boiler	Tan Refractory Cement	Sample Must Be Treated As ACM Unless Analyzed by SM-V 198.8	N/A		N/A	N/A	Vermiculite Present	N/A
28-C	75999	Area 4 Boiler Room Inside Boiler	Tan Refractory Cement	Sample Must Be Treated As ACM Unless Analyzed by SM-V 198.8	N/A		N/A	N/A	Vermiculite Present	N/A
29-A	76000	Area 4 Boiler Room on Boiler Door	Silver Paint	Inconclusive No Asbestos Detected	0%	√	Not Required	N/A	None Detected	100%
29-B	76001	Area 4 Boiler Room on Boiler Door	Silver Paint	Inconclusive No Asbestos Detected	0%	√	Not Required	N/A	None Detected	100%

KEY TO NOB COLUMN SYMBOLS
No Symbol in the NOB column denotes sample analyzed by ELAP Method 198.1 (PLM).
√ NOB (non-friable organically bound)denotes material analyzed by ELAP Method 198.6 (PLM) and 198.4 (TEM) as noted.
Ṽ denotes material analyzed by ELAP Method 198.6 (PLM) per NYSDOH. This Method does not remove vermiculite and may underestimate the level of asbestos present in a sample containing greater than 10% vermiculite.
 # denotes friable material analyzed by ELAP Method 198.6 (PLM) and 198.4 (TEM) as noted.
X denotes sample prepped only by ELAP Method 198.6.
**** Polarized-light microscopy is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Quantitative transmission electron microscopy is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos containing.**

PLM Bulk Asbestos Analysis by New York State Department of Health, ELAP Method 198.1 ,198.4 and 198.6 ("Polarized Light Microscopy and Transmission Electron Microscopy Methods for Identifying and Quantitating Asbestos in Bulk Samples and in Non-Friable Organically Bound Bulk Samples.")or EPA 600/M4-82-020 per 40 CFR 763 (NVLAP Lab Code 200530-0).

NVLAP TESTING

ELAP ID No.: 10958

Lab Code 200530-0 for PLM Analysis

Microscope: Olympus BH-2 #211874
PLM Analyst: T. Bush
Date of Analysis: 11/12/2024

Microscope: JEOL-100CX-II #EM-156094-87
TEM Analyst: M. Lochner
Date of Analysis: 11/13/2024

Laboratory Results Approved By:
Asbestos Technical Director or Designee Fernanda Weinman

Paradigm Environmental Services, Inc. is not responsible for the data supplied by an independent inspector. National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the laboratory. This PLM report relates ONLY to the items tested. This report must not be used to claim product endorsement by NVLAP or any agency of the U.S. Government. Quality control data (including 95% confidence limits and/or laboratory and analysts' precision) is available upon request. All samples that were analyzed were received in acceptable condition.

Bulk Sample Chain of Custody

Lu Engineers
ENVIRONMENTAL • TRANSPORTATION • CIVIL

Project Name: Syracuse Hancock International Airport Former Firehouse Structure	**Lu Project # 4500-03** 8705-24 1 of 6
Site Address: 1000 Col Eileen Boulevard Syracuse, New York 13212	**Laboratory Name:** Paradigm Environmental Services 7/129
Results to: **Lu Engineers** **280 East Broad Street, Suite 170** **Rochester, NY 14604**	**Sample Type** ☒ NYS ELAP PLM/TEM ☐ PLM Only ☐ TEM Only
	Laboratory Address: 179 Lake Avenue Rochester, New York
Email: msmith@luengineers.com, rdillard@luengineers.com, egonzalez@luengineers.com	**Turn Around Time** ☐ Immediate ☐ 12 HR ☐ 24 HR 11.13 ☐ 48 HR ☐ 72 HR ☑ 5 Day
	Comments: **STOP POSITIVE**

FIELD ID	SAMPLE LOCATION	MATERIAL	NOTES
1-A	Area 1 (Front Room Entrance, West Wall)	Grey CMU Block	75942
1-B	Area 1 (Front Room Entrance, West Wall)	Grey CMU Block	943
2-A	Area 1 (Front Room Entrance, West Wall)	Grey Mortar	944
2-B	Area 1 (Front Room Entrance, West Wall)	Grey Mortar	945
3-A	Area 1 (Front Room Entrance, Ceiling)	White 2'x4' Suspended Ceiling Tiles with Pinholes	946
3-B	Area 1 (Front Room Entrance, Ceiling)	White 2'x4' Suspended Ceiling Tiles with Pinholes	947
4-A	Area 1 (Front Room Entrance, Floor)	Yellow Carpet Mastic	948
4-B	Area 1 (Front Room Entrance, Floor)	Yellow Carpet Mastic	949
5-A	Area 1 (Front Room Entrance, Kitchen)	Black Cove Base	950
5-B	Area 1 (Front Room Entrance, Kitchen)	Black Cove Base	951

Date Sampled: 10-16-24

Inspector: R. Dillard / E. Gonzalez

Relinquished By _____ Date/Time 11-6-24

Received By _____ Date/Time 11.6.24 0919

Bulk Sample Chain of Custody

Lu Engineers
ENVIRONMENTAL • TRANSPORTATION • CIVIL

Project Name: Syracuse Hancock International Airport Former Firehouse Structure	**Lu Project # 4500-03** 8705-24 2of6
Site Address: 1000 Col Eileen Boulevard Syracuse, New York 13212	**Laboratory Name:** Paradigm Environmental Services 88125
Results to: **Lu Engineers** **280 East Broad Street, Suite 170** **Rochester, NY 14604**	**Laboratory Address:** 179 Lake Avenue Rochester, New York
Sample Type ☒ NYS ELAP PLM/TEM ☐ PLM Only ☐ TEM Only	**Turn Around Time** ☐ Immediate ☐ 12 HR ☐ 24 HR 11.13 ☐ 48 HR ☐ 72 HR ☑ 5 Day
Email: msmith@luengineers.com, rdillard@luengineers.com, egonzalez@luengineers.com	Comments: **STOP POSITIVE**

FIELD ID	SAMPLE LOCATION	MATERIAL	NOTES
6-A	Area 1 (Front Room Entrance, Kitchen)	Tan Cove Base Mastic	75952
6-B	Area 1 (Front Room Entrance, Kitchen)	Tan Cove Base Mastic	953
7-A	Area 1 (Front Room Entrance, Under Carpet)	White/Tan Floor Leveler	954
7-B	Area 1 (Front Room Entrance, Under Carpet)	White/Tan Floor Leveler	955
8-A	Area 1 (Front Room Entrance, Kitchen)	Wood Grain Linoleum Flooring	956
8-B	Area 1 (Front Room Entrance, Kitchen)	Wood Grain Linoleum Flooring	957
9-A	Area 1 (Front Room Entrance, Kitchen)	Black Mastic	Under HA#8 958
9-B	Area 1 (Front Room Entrance, Kitchen)	Black Mastic	Under HA#8 959
10-A	Area 1 (Front Room Entrance, Kitchen)	Tan Oatmeal 12"x12" Floor Tile	960
10-B	Area 1 (Front Room Entrance, Kitchen)	Tan Oatmeal 12"x12" Floor Tile	961

Date Sampled: 10-16-24

Inspector: R. Dillard / E. Gonzalez

Relinquished By _____ Date/Time 11-6-24

Received By _____ Date/Time 11.6.24 0919

Bulk Sample Chain of Custody

Lu Engineers
ENVIRONMENTAL • TRANSPORTATION • CIVIL

Project Name: Syracuse Hancock International Airport Former Firehouse Structure	**Lu Project # 4500-03** 8705-24 3 of 6
Site Address: 1000 Col Eileen Boulevard Syracuse, New York 13212	**Laboratory Name:** Paradigm Environmental Services 9 of 12
Results to: **Lu Engineers** **280 East Broad Street, Suite 170** **Rochester, NY 14604**	**Sample Type** ☒ NYS ELAP PLM/TEM ☐ PLM Only ☐ TEM Only
	Laboratory Address: 179 Lake Avenue Rochester, New York
Email: msmith@luengineers.com, rdillard@luengineers.com, egonzalez@luengineers.com	**Turn Around Time** ☐ Immediate ☐ 12 HR ☐ 24 HR 11.13 ☐ 48 HR ☐ 72 HR ☑ 5 Day
	Comments: **STOP POSITIVE**

FIELD ID	SAMPLE LOCATION	MATERIAL	NOTES
11-A	Area 1 (Front Room Entrance, Kitchen)	Tan Floor Tile Mastic	75962
11-B	Area 1 (Front Room Entrance, Kitchen)	Tan Floor Tile Mastic	963
12-A	Area 1 (Front Room Entrance, Kitchen)	Pink Sink Undercoating	964
12-B	Area 1 (Front Room Entrance, Kitchen)	Pink Sink Undercoating	965
13-A	Area 1 (Front Room Entrance, on Column)	Grey/Yellow/White Paint	966
13-B	Area 1 (Front Room Entrance, on Column)	Grey/Yellow/White Paint	967
14-A	Area 2 (Truck Bay, on Structural Steele Support Beams)	Red Paint	968
14-B	Area 2 (Truck Bay, on Structural Steele Support Beams)	Red Paint	969
15-A	Area 2 (Truck Bay, North Wall)	Tan Peg Board	970
15-B	Area 2 (Truck Bay, North Wall)	Tan Peg Board	971

Date Sampled: 10-16-24

Inspector: R. Dillard / E. Gonzalez

Relinquished By _____ Date/Time 10-6-24

Received By _____ Date/Time 11.6.24 0919

Bulk Sample Chain of Custody

Lu Engineers
ENVIRONMENTAL • TRANSPORTATION • CIVIL

Project Name: Syracuse Hancock International Airport Former Firehouse Structure	**Lu Project # 4500-03** 8705-24 4 of 6
Site Address: 1000 Col Eileen Boulevard Syracuse, New York 13212	**Laboratory Name:** Paradigm Environmental Services 10 & 12
Results to: **Lu Engineers** **280 East Broad Street, Suite 170** **Rochester, NY 14604**	**Sample Type** ☒ NYS ELAP PLM/TEM ☐ PLM Only ☐ TEM Only
	Laboratory Address: 179 Lake Avenue Rochester, New York
Email: msmith@luengineers.com, rdillard@luengineers.com, egonzalez@luengineers.com	**Turn Around Time** ☐ Immediate ☐ 12 HR ☐ 24 HR 11.13 ☐ 48 HR ☐ 72 HR ☑ 5 Day
	Comments: **STOP POSITIVE**

FIELD ID	SAMPLE LOCATION	MATERIAL	NOTES
16-A	Area 2 (Truck Bay, Office Window)	Black Interior Window Glaze	75972
16-B	Area 2 (Truck Bay, Office Window)	Black Interior Window Glaze	973
17-A	Area 2 (Truck Bay, Entrance Door Window)	White Interior Window Glaze	974
17-B	Area 2 (Truck Bay, Entrance Door Window)	White Interior Window Glaze	975
18-A	Area 2 (Truck Bay, Office Closet)	Black Vibration Membrane	976
18-B	Area 2 (Truck Bay, Office Closet) on Air Duct	Black Vibration Membrane	977
19-A	Area 2 (Truck Bay, Office Closet) on Air Duct	Tan Cloth Fiberglass Cover	978
19-B	Area 2 (Truck Bay, Office Closet) on Air Duct	Tan Cloth Fiberglass Cover	979
20-A	Area 3 (Locker Room) by Toilets	2"x2" Grey Ceramic Floor Tile	980
20-B	Area 3 (Locker Room) by Toilets	2"x2" Grey Ceramic Floor Tile	981

Date Sampled: 10-16-24

Inspector: R. Dillard / E. Gonzalez

Relinquished By _____ Date/Time 11-6-24

Received By _____ Date/Time 11.6.24 0919

Bulk Sample Chain of Custody

Lu Engineers
ENVIRONMENTAL • TRANSPORTATION • CIVIL

Project Name: Syracuse Hancock International Airport Former Firehouse Structure	**Lu Project # 4500-03** 8705-24 5of6
Site Address: 1000 Col Eileen Boulevard Syracuse, New York 13212	**Laboratory Name:** Paradigm Environmental Services 11/8/24
Results to: **Lu Engineers** **280 East Broad Street, Suite 170** **Rochester, NY 14604**	**Sample Type** ☒ NYS ELAP PLM/TEM ☐ PLM Only ☐ TEM Only
	Laboratory Address: 179 Lake Avenue Rochester, New York
Email: msmith@luengineers.com, rdillard@luengineers.com, egonzalez@luengineers.com	**Turn Around Time** ☐ Immediate ☐ 12 HR ☐ 24 HR 11.13 ☐ 48 HR ☐ 72 HR ☑ 5 Day
	Comments: **STOP POSITIVE**

FIELD ID	SAMPLE LOCATION	MATERIAL	NOTES
21-A	Area 3 (Locker Room) by Showers	Grey Gout	75982
21-B	Area 3 (Locker Room) by Showers	Grey Gout	983
22-A	Area 3 (Locker Room) by Toilets	Grey Floor Tile Adhesive	984
22-B	Area 3 (Locker Room) by Toilets	Grey Floor Tile Adhesive	985
23-A	Area 3 (Locker Room) on Air Duct Seams	Grey Sealant	986
23-B	Area 3 (Locker Room) on Air Duct Seams	Grey Sealant	987
24-A	Area 3 (Locker Room) on Air Duct	White Paint	988
24-B	Area 3 (Locker Room) on Air Duct	White Paint	989
25-A	Area 3 (Locker Room) on Electrical Conduit	Black Fire Stop Caulk	990
25-B	Area 3 (Locker Room) on Electrical Conduit	Black Fire Stop Caulk	991

Date Sampled: 10-16-24

Inspector: R. Dillard / E. Gonzalez

Relinquished By _____ Date/Time 11-6-24

Received By _____ Date/Time 11.6.24 0919

Bulk Sample Chain of Custody

Lu Engineers
ENVIRONMENTAL • TRANSPORTATION • CIVIL

Project Name: Syracuse Hancock International Airport Former Firehouse Structure	**Lu Project # 4500-03** 8705-24 6 of 6
Site Address: 1000 Col Eileen Boulevard Syracuse, New York 13212	**Laboratory Name:** Paradigm Environmental Services 12/129
Results to: **Lu Engineers** **280 East Broad Street, Suite 170** **Rochester, NY 14604**	**Sample Type** ☒ NYS ELAP PLM/TEM ☐ PLM Only ☐ TEM Only
	Laboratory Address: 179 Lake Avenue Rochester, New York
Email: msmith@luengineers.com, rdillard@luengineers.com, egonzalez@luengineers.com	**Turn Around Time** ☐ Immediate ☐ 12 HR ☐ 24 HR 11:59 ☐ 48 HR ☐ 72 HR ☑ 5 Day
	Comments: **STOP POSITIVE**

FIELD ID	SAMPLE LOCATION	MATERIAL	NOTES
26-A	Area 3 (Locker Room) on Northeast Door	Grey Window Glaze	75992
26-B	Area 3 (Locker Room) on Northeast Door	Grey Window Glaze	993
27-A	Area 4 (Boiler Room)	Grey Mag Pipe Insulation	994
27-B	Area 4 (Boiler Room)	Grey Mag Pipe Insulation	995
27-C	Area 4 (Boiler Room)	Grey Mag Pipe Insulation	996
28-A	Area 4 (Boiler Room) Inside Boiler	Tan Refractory Cement	997
28-B	Area 4 (Boiler Room) Inside Boiler	Tan Refractory Cement	998
28-C	Area 4 (Boiler Room) Inside Boiler	Tan Refractory Cement	999
29-A	Area 4 (Boiler Room) on Boiler Door	Silver Paint	76000
29-B	Area 4 (Boiler Room) on Boiler Door	Silver Paint	001

Date Sampled: 10-16-24

Inspector: R. Dillard

Relinquished By _____ Date/Time 11-6-24

Received By _____ Date/Time 11.6.24 0919

PARADIGM
ENVIRONMENTAL SERVICES

179 Lake Avenue, Rochester, NY 14608 Office: (585) 647-2530

PLM & TEM BULK ASBESTOS ANALYSIS REPORT
via NYSDOH ELAP Method 198.1,198.4 and 198.6

Client: Lu Engineers
Location: Syracuse Hancock International Airport, Former Firehouse Structure
1000 Col Eileen Boulevard, Syracuse, New York
Sample Date: 11/13/2024

Job No: 8958-24

Client ID	Lab ID	Sampling Location	Description	PLM Asbestos Fibers Type & Percentage	PLM Total Asbestos	NOB	TEM Asbestos Fibers Type & Percentage	TEM Total Asbestos	PLM Non-Asbestos Fibers Type & Percentage	Non-Fibrous Matrix Material %
30-A	78375	Mezzanine Ceiling	White Paint	Inconclusive No Asbestos Detected	0%	√	None Detected	<1.0%	None Detected	100%
30-B	78376	Mezzanine Ceiling	White Paint	Inconclusive No Asbestos Detected	0%	√	None Detected	<1.0%	None Detected	100%
31-A	78377	Mezzanine on Vertical Pipe by Stairwell	Gray Fibrous Mudded Elbow	None Detected	0%		Not Required	N/A	Mineral Wool 30%	70%
31-B	78378	Mezzanine on Vertical Pipe by Stairwell	Gray Fibrous Mudded Elbow	None Detected	0%		Not Required	N/A	Mineral Wool 30%	70%
31-C	78379	Mezzanine on Vertical Pipe by Stairwell	Gray Fibrous Mudded Elbow	None Detected	0%		Not Required	N/A	Mineral Wool 30%	70%
32-A	78380	Mezzanine West on Round Vertical Air Duct	Black Tar	Inconclusive No Asbestos Detected	0%	√	None Detected	<1.0%	None Detected	100%
32-B	78381	Mezzanine West on Round Vertical Air Duct	Black Tar	Inconclusive No Asbestos Detected	0%	√	None Detected	<1.0%	None Detected	100%
33-A	78382	Mezzanine Above Metal Ceiling 2nd Layer of Main Roof Deck	Brown Fibrous Fiberboard Insulation	None Detected	0%		Not Required	N/A	Cellulose 100%	0%
33-B	78383	Mezzanine Above Metal Ceiling 2nd Layer of Main Roof Deck	Brown Fibrous Fiberboard Insulation	None Detected	0%		Not Required	N/A	Cellulose 100%	0%

KEY TO NOB COLUMN SYMBOLS
No Symbol in the NOB column denotes sample analyzed by ELAP Method 198.1 (PLM).
√ NOB (non-friable organically bound)denotes material analyzed by ELAP Method 198.6 (PLM) and 198.4 (TEM) as noted.
V̄ denotes material analyzed by ELAP Method 198.6 (PLM) per NYSDOH. This Method does not remove vermiculite and may underestimate the level of asbestos present in a sample containing greater than 10% vermiculite.
 # denotes friable material analyzed by ELAP Method 198.6 (PLM) and 198.4 (TEM) as noted.
X denotes sample prepped only by ELAP Method 198.6.
**** Polarized-light microscopy is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Quantitative transmission electron microscopy is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos containing.**

PLM Bulk Asbestos Analysis by New York State Department of Health, ELAP Method 198.1 ,198.4 and 198.6 ("Polarized Light Microscopy and Transmission Electron Microscopy Methods for Identifying and Quantitating Asbestos in Bulk Samples and in Non-Friable Organically Bound Bulk Samples.")or EPA 600/M4-82-020 per 40 CFR 763 (NVLAP Lab Code 200530-0).

NVLAP TESTING

Lab Code 200530-0 for PLM Analysis

ELAP ID No.: 10958

Microscope: Olympus BH-2 #211874
PLM Analyst: T. Bush
Date of Analysis: 11/20/2024

Microscope: JEOL-100CX-II #EM-156094-87
TEM Analyst: F. Weinman
Date of Analysis: 11/21/2024

Laboratory Results Approved By:
Asbestos Technical Director or Designee Fernanda Weinman

Paradigm Environmental Services, Inc. is not responsible for the data supplied by an independent inspector. National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the laboratory. This PLM report relates ONLY to the items tested. This report must not be used to claim product endorsement by NVLAP or any agency of the U.S. Government. Quality control data (including 95% confidence limits and/or laboratory and analysts' precision) is available upon request. All samples that were analyzed were received in acceptable condition.

PARADIGM
ENVIRONMENTAL SERVICES

179 Lake Avenue, Rochester, NY 14608 Office: (585) 647-2530

PLM & TEM BULK ASBESTOS ANALYSIS REPORT
via NYSDOH ELAP Method 198.1,198.4 and 198.6

Client: Lu Engineers
Location: Syracuse Hancock International Airport, Former Firehouse Structure
1000 Col Eileen Boulevard, Syracuse, New York
Sample Date: 11/13/2024

Job No: 8958-24

Client ID	Lab ID	Sampling Location	Description	PLM Asbestos Fibers Type & Percentage	PLM Total Asbestos	NOB	TEM Asbestos Fibers Type & Percentage	TEM Total Asbestos	PLM Non-Asbestos Fibers Type & Percentage	Non-Fibrous Matrix Material %
34-A	78384	Mezzanine Above Metal Ceiling 3rd Layer of Main Roof Deck	Black Tar Material	Inconclusive No Asbestos Detected	0%	√	None Detected	<1.0%	None Detected	100%
34-B	78385	Mezzanine Above Metal Ceiling 3rd Layer of Main Roof Deck	Black Tar Material	Inconclusive No Asbestos Detected	0%	√	None Detected	<1.0%	None Detected	100%
35-A	78386	Mezzanine on Horizontal Air Duct Exhaust Fan 1	Tan Fibrous Cloth Fiberglass Insulation Cover	None Detected	0%		Not Required	N/A	Cellulose 99%	1%
35-B	78387	Mezzanine on Horizontal Air Duct Exhaust Fan 1	Tan Fibrous Cloth Fiberglass Insulation Cover	None Detected	0%		Not Required	N/A	Cellulose 99%	1%
36-A	78388	Mezzanine on Heating Unit "TAG AC-2"	Black Cloth Vibration Membrane	Inconclusive No Asbestos Detected	0%	√	None Detected	<1.0%	None Detected	100%
36-B	78389	Mezzanine on Heating Unit "TAG AC-2"	Black Cloth Vibration Membrane	Inconclusive No Asbestos Detected	0%	√	None Detected	<1.0%	None Detected	100%
37-A	78390	Mezzanine Office West Wall	Gray Drywall	None Detected	0%		Not Required	N/A	Cellulose 4% Fiberglass 1%	95%
37-B	78391	Mezzanine by Spiral Staircase	Gray Drywall	None Detected	0%		Not Required	N/A	Cellulose 4% Fiberglass 1%	95%
38-A	78392	Mezzanine Office North Wall	White Joint Compound	None Detected	0%		Not Required	N/A	None Detected	100%
38-B	78393	Mezzanine by Spiral Staircase	White Joint Compound	None Detected	0%		Not Required	N/A	None Detected	100%

KEY TO NOB COLUMN SYMBOLS

No Symbol in the NOB column denotes sample analyzed by ELAP Method 198.1 (PLM).
√ NOB (non-friable organically bound)denotes material analyzed by ELAP Method 198.6 (PLM) and 198.4 (TEM) as noted.
V̄ denotes material analyzed by ELAP Method 198.6 (PLM) per NYSDOH. This Method does not remove vermiculite and may underestimate the level of asbestos present in a sample containing greater than 10% vermiculite.
 # denotes friable material analyzed by ELAP Method 198.6 (PLM) and 198.4 (TEM) as noted.
X denotes sample prepped only by ELAP Method 198.6.
**** Polarized-light microscopy is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials.**
Quantitative transmission electron microscopy is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos containing.

PLM Bulk Asbestos Analysis by New York State Department of Health, ELAP Method 198.1 ,198.4 and 198.6 ("Polarized Light Microscopy and Transmission Electron Microscopy Methods for Identifying and Quantitating Asbestos in Bulk Samples and in Non-Friable Organically Bound Bulk Samples.")or EPA 600/M4-82-020 per 40 CFR 763 (NVLAP Lab Code 200530-0).

NVLAP TESTING

ELAP ID No.: 10958

Lab Code 200530-0 for PLM Analysis

Microscope: Olympus BH-2 #211874
PLM Analyst: T. Bush
Date of Analysis: 11/20/2024

Microscope: JEOL-100CX-II #EM-156094-87
TEM Analyst: F. Weinman
Date of Analysis: 11/21/2024

Laboratory Results Approved By:
Asbestos Technical Director or Designee Fernanda Weinman

Paradigm Environmental Services, Inc. is not responsible for the data supplied by an independent inspector. National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the laboratory. This PLM report relates ONLY to the items tested. This report must not be used to claim product endorsement by NVLAP or any agency of the U.S. Government. Quality control data (including 95% confidence limits and/or laboratory and analysts' precision) is available upon request. All samples that were analyzed were received in acceptable condition.

PARADIGM
ENVIRONMENTAL SERVICES

179 Lake Avenue, Rochester, NY 14608 Office: (585) 647-2530

PLM & TEM BULK ASBESTOS ANALYSIS REPORT
via NYSDOH ELAP Method 198.1,198.4 and 198.6

Client: Lu Engineers
Location: Syracuse Hancock International Airport, Former Firehouse Structure
1000 Col Eileen Boulevard, Syracuse, New York
Sample Date: 11/13/2024

Job No: 8958-24

Client ID	Lab ID	Sampling Location	Description	PLM Asbestos Fibers Type & Percentage	PLM Total Asbestos	NOB	TEM Asbestos Fibers Type & Percentage	TEM Total Asbestos	PLM Non-Asbestos Fibers Type & Percentage	Non-Fibrous Matrix Material %
39-A	78394	Mezzanine Office	Yellow Carpet Mastic	Inconclusive No Asbestos Detected	0%	√	None Detected	<1.0%	None Detected	100%
39-B	78395	Mezzanine Office	Yellow Carpet Mastic	Inconclusive No Asbestos Detected	0%	√	None Detected	<1.0%	None Detected	100%
40-A	78396	Mezzanine on Heating Unit Duct Seams Unit "TAG AC-1"	White/Green Duct Sealant	Inconclusive No Asbestos Detected	0%	√	None Detected	<1.0%	None Detected	100%
40-B	78397	Heat Unit TAG-AC-1 (Mezzanine Area)	White/Green Duct Sealant	Inconclusive No Asbestos Detected	0%	√	None Detected	<1.0%	None Detected	100%
41-A	78398	Mezzanine Office	White Fibrous 2'x4' Suspended Ceiling Tile	Inconclusive No Asbestos Detected	0%	#	None Detected	<1.0%	Mineral Wool 30%	70%
41-B	78399	Mezzanine Office	White Fibrous 2'x4' Suspended Ceiling Tile	Inconclusive No Asbestos Detected	0%	#	None Detected	<1.0%	Mineral Wool 30%	70%
42-A	78400	Observation Deck	Gray Oatmeal 12"x12" Floor Tile	Inconclusive No Asbestos Detected	0%	√	None Detected	<1.0%	None Detected	100%
42-B	78401	Observation Deck	Gray Oatmeal 12"x12" Floor Tile	Inconclusive No Asbestos Detected	0%	√	None Detected	<1.0%	None Detected	100%
43-A	78402	Observation Deck	Brown Cove Base	Inconclusive No Asbestos Detected	0%	√	None Detected	<1.0%	None Detected	100%
43-B	78403	Observation Deck	Brown Cove Base	Inconclusive No Asbestos Detected	0%	√	None Detected	<1.0%	None Detected	100%

KEY TO NOB COLUMN SYMBOLS
No Symbol in the NOB column denotes sample analyzed by ELAP Method 198.1 (PLM).
√ NOB (non-friable organically bound)denotes material analyzed by ELAP Method 198.6 (PLM) and 198.4 (TEM) as noted.
V̄ denotes material analyzed by ELAP Method 198.6 (PLM) per NYSDOH. This Method does not remove vermiculite and may underestimate the level of asbestos present in a sample containing greater than 10% vermiculite.
 # denotes friable material analyzed by ELAP Method 198.6 (PLM) and 198.4 (TEM) as noted.
X denotes sample prepped only by ELAP Method 198.6.
**** Polarized-light microscopy is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Quantitative transmission electron microscopy is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos containing.**

PLM Bulk Asbestos Analysis by New York State Department of Health, ELAP Method 198.1 ,198.4 and 198.6 ("Polarized Light Microscopy and Transmission Electron Microscopy Methods for Identifying and Quantitating Asbestos in Bulk Samples and in Non-Friable Organically Bound Bulk Samples.")or EPA 600/M4-82-020 per 40 CFR 763 (NVLAP Lab Code 200530-0).

NVLAP TESTING

ELAP ID No.: 10958

Lab Code 200530-0 for PLM Analysis

Microscope: Olympus BH-2 #211874
PLM Analyst: T. Bush
Date of Analysis: 11/20/2024

Microscope: JEOL-100CX-II #EM-156094-87
TEM Analyst: F. Weinman
Date of Analysis: 11/21/2024

Laboratory Results Approved By: Fernanda Weinman
Asbestos Technical Director or Designee

Paradigm Environmental Services, Inc. is not responsible for the data supplied by an independent inspector. National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the laboratory. This PLM report relates ONLY to the items tested. This report must not be used to claim product endorsement by NVLAP or any agency of the U.S. Government. Quality control data (including 95% confidence limits and/or laboratory and analysts' precision) is available upon request. All samples that were analyzed were received in acceptable condition.

PARADIGM
ENVIRONMENTAL SERVICES

179 Lake Avenue, Rochester, NY 14608 Office: (585) 647-2530

PLM & TEM BULK ASBESTOS ANALYSIS REPORT
via NYSDOH ELAP Method 198.1,198.4 and 198.6

Client: Lu Engineers
Location: Syracuse Hancock International Airport, Former Firehouse Structure
1000 Col Eileen Boulevard, Syracuse, New York
Sample Date: 11/13/2024

Job No: 8958-24

Client ID	Lab ID	Sampling Location	Description	PLM Asbestos Fibers Type & Percentage	PLM Total Asbestos	NOB	TEM Asbestos Fibers Type & Percentage	TEM Total Asbestos	PLM Non-Asbestos Fibers Type & Percentage	Non-Fibrous Matrix Material %
44-A	78404	Observation Deck	Brown Cove Base Mastic	Inconclusive No Asbestos Detected	0%	√	None Detected	<1.0%	None Detected	100%
44-B	78405	Observation Deck	Brown Cove Base Mastic	Inconclusive No Asbestos Detected	0%	√	None Detected	<1.0%	None Detected	100%
45-A	78406	Observation Deck on Top of HA #44	Yellow Cove Base Mastic	Inconclusive No Asbestos Detected	0%	√	None Detected	<1.0%	None Detected	100%
45-B	78407	Observation Deck on Top of HA #44	Yellow Cove Base Mastic	Inconclusive No Asbestos Detected	0%	√	None Detected	<1.0%	None Detected	100%
46-A	78408	Observation Deck on Metal Ceiling	Silver Paint	Inconclusive No Asbestos Detected	0%	√	None Detected	<1.0%	None Detected	100%
46-B	78409	Observation Deck on Metal Ceiling	Silver Paint	Inconclusive No Asbestos Detected	0%	√	None Detected	<1.0%	None Detected	100%
47-A	78410	Observation Deck on Window Frames	Black Paint	Inconclusive No Asbestos Detected	0%	√	None Detected	<1.0%	None Detected	100%
47-B	78411	Observation Deck on Window Frames	Black Paint	Inconclusive No Asbestos Detected	0%	√	None Detected	<1.0%	None Detected	100%
48-A	78412	Observation Deck Exterior Upper Corners of Structural Steel	White Caulk	Inconclusive No Asbestos Detected	0%	√	Actinolite/ Tremolite 1.2%	1.2%	None Detected	98.8%
48-B	78413	Observation Deck Exterior Upper Corners of Structural Steel	White Caulk	Inconclusive No Asbestos Detected	0%	√	Stop Positive ** No TEM	N/A	None Detected	100%

KEY TO NOB COLUMN SYMBOLS
No Symbol in the NOB column denotes sample analyzed by ELAP Method 198.1 (PLM).
√ NOB (non-friable organically bound)denotes material analyzed by ELAP Method 198.6 (PLM) and 198.4 (TEM) as noted.
V̄ denotes material analyzed by ELAP Method 198.6 (PLM) per NYSDOH. This Method does not remove vermiculite and may underestimate the level of asbestos present in a sample containing greater than 10% vermiculite.
 # denotes friable material analyzed by ELAP Method 198.6 (PLM) and 198.4 (TEM) as noted.
X denotes sample prepped only by ELAP Method 198.6.
**** Polarized-light microscopy is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Quantitative transmission electron microscopy is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos containing.**

PLM Bulk Asbestos Analysis by New York State Department of Health, ELAP Method 198.1 ,198.4 and 198.6 ("Polarized Light Microscopy and Transmission Electron Microscopy Methods for Identifying and Quantitating Asbestos in Bulk Samples and in Non-Friable Organically Bound Bulk Samples.")or EPA 600/M4-82-020 per 40 CFR 763 (NVLAP Lab Code 200530-0).

NVLAP TESTING
Lab Code 200530-0 for PLM Analysis

ELAP ID No.: 10958

Microscope: Olympus BH-2 #211874
PLM Analyst: T. Bush
Date of Analysis: 11/20/2024

Microscope: JEOL 100CX II #EM-156094-87
TEM Analyst: M. Lochner
Date of Analysis: 11/22/2024

Laboratory Results Approved By:
Asbestos Technical Director or Designee Fernanda Weinman

Paradigm Environmental Services, Inc. is not responsible for the data supplied by an independent inspector. National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the laboratory. This PLM report relates ONLY to the items tested. This report must not be used to claim product endorsement by NVLAP or any agency of the U.S. Government. Quality control data (including 95% confidence limits and/or laboratory and analysts' precision) is available upon request. All samples that were analyzed were received in acceptable condition.

PARADIGM
ENVIRONMENTAL SERVICES

179 Lake Avenue, Rochester, NY 14608 Office: (585) 647-2530

PLM & TEM BULK ASBESTOS ANALYSIS REPORT
via NYSDOH ELAP Method 198.1,198.4 and 198.6

Client: Lu Engineers
Location: Syracuse Hancock International Airport, Former Firehouse Structure
1000 Col Eileen Boulevard, Syracuse, New York
Sample Date: 11/13/2024

Job No: 8958-24

Client ID	Lab ID	Sampling Location	Description	PLM Asbestos Fibers Type & Percentage	PLM Total Asbestos	NOB	TEM Asbestos Fibers Type & Percentage	TEM Total Asbestos	PLM Non-Asbestos Fibers Type & Percentage	Non-Fibrous Matrix Material %
49-A	78414	Main Roof Deck	Silver Paint	Inconclusive No Asbestos Detected	0%	√	None Detected	<1.0%	None Detected	100%
49-B	78415	Main Roof Deck	Silver Paint	Inconclusive No Asbestos Detected	0%	√	None Detected	<1.0%	None Detected	100%
50-A	78416	South End of Main Roof Under Transmitter Antenna Support Blocks	Black Padding Material	Inconclusive No Asbestos Detected	0%	√	None Detected	<1.0%	None Detected	100%
50-B	78417	South End of Main Roof Under Transmitter Antenna Support Blocks	Black Padding Material	Inconclusive No Asbestos Detected	0%	√	None Detected	<1.0%	None Detected	100%
51-A	78418	North Side of Building Equipment Room Roof on Electric Conduit	Gray Caulk	Chrysotile 7.8%	7.8%	√	Not Required	N/A	None Detected	92.2%
51-B	78419	North Side of Building Equipment Room Roof on Electric Conduit	Gray Caulk	STOP	POSITIVE	X	SAMPLE	NOT	ANALYZED	N/A
52-A	78420	Northeast Entrance on Top of Metal Awning	White Paint	Inconclusive No Asbestos Detected	0%	√	None Detected	<1.0%	None Detected	100%
52-B	78421	Northeast Entrance on Top of Metal Awning	White Paint	Inconclusive No Asbestos Detected	0%	√	None Detected	<1.0%	None Detected	100%
53-A	78422	Equipment Room West Exterior Wall on Louver	Black Fabric Vent Flap	Inconclusive No Asbestos Detected	0%	√	None Detected	<1.0%	None Detected	100%
53-B	78423	Equipment Room West Exterior Wall on Louver	Black Fabric Vent Flap	<1.0% Residue Remaining. PLM and TEM Not Required.	N/A	X	N/A	N/A	N/A	N/A

KEY TO NOB COLUMN SYMBOLS

No Symbol in the NOB column denotes sample analyzed by ELAP Method 198.1 (PLM).
√ NOB (non-friable organically bound)denotes material analyzed by ELAP Method 198.6 (PLM) and 198.4 (TEM) as noted.
V̈ denotes material analyzed by ELAP Method 198.6 (PLM) per NYSDOH. This Method does not remove vermiculite and may underestimate the level of asbestos present in a sample containing greater than 10% vermiculite.
 # denotes friable material analyzed by ELAP Method 198.6 (PLM) and 198.4 (TEM) as noted.
X denotes sample prepped only by ELAP Method 198.6.
**** Polarized-light microscopy is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Quantitative transmission electron microscopy is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos containing.**

PLM Bulk Asbestos Analysis by New York State Department of Health, ELAP Method 198.1 ,198.4 and 198.6 ("Polarized Light Microscopy and Transmission Electron Microscopy Methods for Identifying and Quantitating Asbestos in Bulk Samples and in Non-Friable Organically Bound Bulk Samples")or EPA 600/M4-82-020 per 40 CFR 763 (NVLAP Lab Code 200530-0).

NVLAP TESTING

ELAP ID No.: 10958

Lab Code 200530-0 for PLM Analysis

Microscope: Olympus BH-2 #211874
PLM Analyst: T. Bush
Date of Analysis: 11/20/2024

Microscope: JEOL 100CX II #EM-156094-87
TEM Analyst: M. Lochner
Date of Analysis: 11/22/2024

Laboratory Results Approved By: Fernanda Weinman
Asbestos Technical Director or Designee

Paradigm Environmental Services, Inc. is not responsible for the data supplied by an independent inspector. National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the laboratory. This PLM report relates ONLY to the items tested. This report must not be used to claim product endorsement by NVLAP or any agency of the U.S. Government. Quality control data (including 95% confidence limits and/or laboratory and analysts' precision) is available upon request. All samples that were analyzed were received in acceptable condition.

PARADIGM
ENVIRONMENTAL SERVICES

179 Lake Avenue, Rochester, NY 14608 Office: (585) 647-2530

PLM & TEM BULK ASBESTOS ANALYSIS REPORT
via NYSDOH ELAP Method 198.1,198.4 and 198.6

Client: Lu Engineers **Job No:** 8958-24
Location: Syracuse Hancock International Airport, Former Firehouse Structure **Page:** 6 of 12
1000 Col Eileen Boulevard, Syracuse, New York
Sample Date: 11/13/2024

Client ID	Lab ID	Sampling Location	Description	PLM Asbestos Fibers Type & Percentage	PLM Total Asbestos	NOB	TEM Asbestos Fibers Type & Percentage	TEM Total Asbestos	PLM Non-Asbestos Fibers Type & Percentage	Non-Fibrous Matrix Material %
54-A	78424	West Exterior Door	Gray Window Glaze	Chrysotile 2.4%	2.4%	V	Not Required	N/A	None Detected	97.6%
54-B	78425	West Exterior Door	Gray Window Glaze	STOP	POSITIVE	X	SAMPLE	NOT	ANALYZED	N/A
55-A	78426	East Exterior Between Top of Metal Window Frame and Concrete	Gray Caulk	Inconclusive No Asbestos Detected	0%	V	None Detected	<1.0%	None Detected	100%
55-B	78427	East Exterior Between Top of Metal Window Frame and Concrete	Gray Caulk	Inconclusive No Asbestos Detected	0%	V	None Detected	<1.0%	None Detected	100%
56-A	78428	Upper Roof (Observation Deck) by Roof Hatch	Black Fibrous Tar Roof Flashing	Chrysotile 16%	16%	V	Not Required	N/A	None Detected	84%
56-B	78429	Lower Roof (Main Roof)	Black Tar Roof Flashing	STOP	POSITIVE	X	SAMPLE	NOT	ANALYZED	N/A
57-A	78430	Upper Roof (Observation Deck) Core 1 (1st Layer)	Black Built-Up Roofing	Inconclusive No Asbestos Detected	0%	V	None Detected	<1.0%	None Detected	100%
57-B	78431	Lower Roof (Main Roof) Core 2 (1st Layer U	Black Built-Up Roofing	Inconclusive No Asbestos Detected	0%	V	None Detected	<1.0%	Fiberglass 5%	95%

KEY TO NOB COLUMN SYMBOLS
No Symbol in the NOB column denotes sample analyzed by ELAP Method 198.1 (PLM).
V NOB (non-friable organically bound)denotes material analyzed by ELAP Method 198.6 (PLM) and 198.4 (TEM) as noted.
Ṽ denotes material analyzed by ELAP Method 198.6 (PLM) per NYSDOH. This Method does not remove vermiculite and may underestimate the level of asbestos present in a sample containing greater than 10% vermiculite.
 # denotes friable material analyzed by ELAP Method 198.6 (PLM) and 198.4 (TEM) as noted.
X denotes sample prepped only by ELAP Method 198.6.
**** Polarized-light microscopy is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials.**
Quantitative transmission electron microscopy is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos containing.

PLM Bulk Asbestos Analysis by New York State Department of Health, ELAP Method 198.1 ,198.4 and 198.6 ("Polarized Light Microscopy and Transmission Electron Microscopy Methods for Identifying and Quantitating Asbestos in Bulk Samples and in Non-Friable Organically Bound Bulk Samples.")or EPA 600/M4-82-020 per 40 CFR 763 (NVLAP Lab Code 200530-0).

NVLAP TESTING

ELAP ID No.: 10958

Lab Code 200530-0 for PLM Analysis

Microscope: Olympus BH-2 #211874
PLM Analyst: T. Bush
Date of Analysis: 11/20/2024

Microscope: JEOL-100CX-II #EM-156094-87
TEM Analyst: M. Lochner
Date of Analysis: 11/22/2024

Laboratory Results Approved By: Fernanda Weinman
Asbestos Technical Director or Designee

Paradigm Environmental Services, Inc. is not responsible for the data supplied by an independent inspector. National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the laboratory. This PLM report relates ONLY to the items tested. This report must not be used to claim product endorsement by NVLAP or any agency of the U.S. Government. Quality control data (including 95% confidence limits and/or laboratory and analysts' precision) is available upon request. All samples that were analyzed were received in acceptable condition.

Bulk Sample Chain of Custody

Lu Engineers
ENVIRONMENTAL • TRANSPORTATION • CIVIL

Project Name: Syracuse Hancock International Airport Former Firehouse Structure	**Lu Project # 4500-03** 89158-24 1 of 6
Site Address: 1000 Col Eileen Boulevard Syracuse, New York	**Laboratory Name:** Paradigm Environmental Services 7 of 12
Results to: **Lu Engineers** **280 East Broad Street, Suite 170** **Rochester, NY 14604**	**Sample Type** ☒ NYS ELAP PLM/TEM ☐ PLM Only ☐ TEM Only
Email: msmith@luengineers.com, rdillard@luengineers.com, egonzalez@luengineers.com	**Laboratory Address:** 179 Lake Avenue Rochester, New York
Turn Around Time ☐ Immediate ☐ 12 HR ☐ 24 HR ☐ 48 HR 11.22 ☐ 72 HR ☒ 5 Day	Comments: **STOP POSITIVE**

	FIELD ID	SAMPLE LOCATION	MATERIAL	NOTES
78 375	30-A	Mezzanine Ceiling	White Paint	
376	30-B	Mezzanine Ceiling	White Paint	
377	31-A	Mezzanine, on Vertical Pipe by Stairwell	Grey Mudded Elbow	
378	31-B	Mezzanine, on Vertical Pipe by Stairwell	Grey Mudded Elbow	
379	31-C	Mezzanine, on Vertical Pipe by Stairwell	Grey Mudded Elbow	
380	32-A	Mezzanine West, on Round Vertical Air Duct	Black Tar	
381	32-B	Mezzanine West, on Round Vertical Air Duct	Black Tar	
382	33-A	Mezzanine, Above Metal Ceiling	Brown Fiberboard Insulation	2nd Layer of Main Roof Deck
383	33-B	Mezzanine, Above Metal Ceiling	Brown Fiberboard Insulation	2nd Layer of Main Roof Deck

Date Sampled: 11-13-2024

Inspector: R. Dillard / E. Gonzalez

Relinquished By _____ Date/Time 11-15-2024

Received By _____ Date/Time 11.15.24 1533

Bulk Sample Chain of Custody

Lu Engineers
ENVIRONMENTAL • TRANSPORTATION • CIVIL

Project Name: Syracuse Hancock International Airport Former Firehouse Structure	**Lu Project # 4500-03** 80958-24 2 of 6
Site Address: 1000 Col Eileen Boulevard Syracuse, New York	**Laboratory Name:** Paradigm Environmental Services 8 8125
Results to: **Lu Engineers** **280 East Broad Street, Suite 170** **Rochester, NY 14604** Email: msmith@luengineers.com, rdillard@luengineers.com, egonzalez@luengineers.com	**Sample Type** ☒ NYS ELAP PLM/TEM ☐ PLM Only ☐ TEM Only
	Laboratory Address: 179 Lake Avenue Rochester, New York
	Turn Around Time ☐ Immediate ☐ 12 HR ☐ 24 HR 11.22 ☐ 48 HR ☐ 72 HR ☒ 5 Day
	Comments: **STOP POSITIVE**

FIELD ID	SAMPLE LOCATION	MATERIAL	NOTES
78 384	34-A	Mezzanine, Above Metal Ceiling	Black Tar Material	3rd Layer of Main Roof Deck
385	34-B	Mezzanine, Above Metal Ceiling	Black Tar Material	3rd Layer of Main Roof Deck
386	35-A	Mezzanine, on Horizontal Air Duct	Tan Cloth Fiberglass Insulation Cover	Exhaust Fan 1
387	35-B	Mezzanine, on Horizontal Air Duct	Tan Cloth Fiberglass Insulation Cover	Exhaust Fan 1
388	36-A	Mezzanine, on Heating Unit	Black Cloth Vibration Membrane	Unit "TAG AC-2"
389	36-B	Mezzanine, on Heating Unit	Black Cloth Vibration Membrane	Unit "TAG AC-2"
390	37-A	Mezzanine Office, West Wall	Grey Drywall	
391	37-B	Mezzanine, by Spiral Staircase	Grey Drywall	
392	38-A	Mezzanine Office, North Wall	White Joint Compound	
393	38-B	Mezzanine, by Spiral Staircase	White Joint Compound	

Date Sampled: 11-13-2024

Inspector: R. Dillard / E. Gonzalez

Relinquished By _____ Date/Time 11-15-2024

Received By _____ Date/Time 11.15.24 1533

Bulk Sample Chain of Custody

Lu Engineers
ENVIRONMENTAL • TRANSPORTATION • CIVIL

Project Name: Syracuse Hancock International Airport Former Firehouse Structure	**Lu Project # 4500-03** 8958-24 3 of 6
Site Address: 1000 Col Eileen Boulevard Syracuse, New York	**Laboratory Name:** Paradigm Environmental Services 8 of 125
Results to: **Lu Engineers** **280 East Broad Street, Suite 170** **Rochester, NY 14604**	**Sample Type** ☒ NYS ELAP PLM/TEM ☐ PLM Only ☐ TEM Only
	Laboratory Address: 179 Lake Avenue Rochester, New York
Email: msmith@luengineers.com, rdillard@luengineers.com, egonzalez@luengineers.com	**Turn Around Time** ☐ Immediate ☐ 12 HR ☐ 24 HR 11:22 ☐ 48 HR ☐ 72 HR ☒ 5 Day
	Comments: **STOP POSITIVE**

FIELD ID	SAMPLE LOCATION	MATERIAL	NOTES
78			
394	39-A	Mezzanine Office	Yellow Carpet Mastic	
395	39-B	Mezzanine Office	Yellow Carpet Mastic	
396	40-A	Mezzanine, on Heating Unit Duct Seams	White/Green Duct Sealant	Unit "TAG AC-1"
397	40-B	Heat Unit TAG-AC-1 (Mezzanine area)	White/Green Duct Sealant	Unit "TAG AC-1"
398	41-A	Mezzanine Office	White 2'x4' Suspended Ceiling Tile	
399	41-B	Mezzanine Office	White 2'x4' Suspended Ceiling Tile	
400	42-A	Observation Deck	Grey Oatmeal 12"x12" Floor Tile	
401	42-B	Observation Deck	Grey Oatmeal 12"x12" Floor Tile	
402	43-A	Observation Deck	Brown Cove Base	
403	43-B	Observation Deck	Brown Cove Base	

Date Sampled: 11-13-2024

Inspector: R. Dillard / E. Gonzalez

Relinquished By _____ Date/Time 11-15-2024

Received By _____ Date/Time 11.15.24 1533

Bulk Sample Chain of Custody

Lu Engineers
ENVIRONMENTAL • TRANSPORTATION • CIVIL

Project Name: Syracuse Hancock International Airport Former Firehouse Structure	**Lu Project # 4500-03** 8958-24 4 of 6
Site Address: 1000 Col Eileen Boulevard Syracuse, New York	**Laboratory Name:** Paradigm Environmental Services 198129
Results to: **Lu Engineers** **280 East Broad Street, Suite 170** **Rochester, NY 14604** Email: msmith@luengineers.com, rdillard@luengineers.com, egonzalez@luengineers.com	**Sample Type** ☒ NYS ELAP PLM/TEM ☐ PLM Only ☐ TEM Only
	Laboratory Address: 179 Lake Avenue Rochester, New York
Turn Around Time ☐ Immediate ☐ 12 HR ☐ 24 HR ☐ 48 HR ☐ 72 HR 11.22 ☒ 5 Day	Comments: **STOP POSITIVE**

	FIELD ID	SAMPLE LOCATION	MATERIAL	NOTES
78 404	44-A	Observation Deck	Brown Cove Base Mastic	
405	44-B	Observation Deck	Brown Cove Base Mastic	
406	45-A	Observation Deck	Yellow Cove Base Mastic	On Top of HA#44
407	45-B	Observation Deck	Yellow Cove Base Mastic	On Top of HA#44
408	46-A	Observation Deck, on Metal Ceiling	Silver Paint	
409	46-B	Observation Deck, on Metal Ceiling	Silver Paint	
410	47-A	Observation Deck, on Window Frames	Black Paint	
411	47-B	Observation Deck, on Window Frames	Black Paint	
412	48-A	Observation Deck Exterior, Upper Corners of Structural Steel	White Caulk	
413	48-B	Observation Deck Exterior, Upper Corners of Structural Steel	White Caulk	

Date Sampled: 11-13-2024

Inspector: R. Dillard / E. Gonzalez

Relinquished By _____ Date/Time 11-15-2024

Received By _____ Date/Time 11.15.24 1533

Bulk Sample Chain of Custody

Lu Engineers
ENVIRONMENTAL • TRANSPORTATION • CIVIL

Project Name: Syracuse Hancock International Airport Former Firehouse Structure	**Lu Project # 4500-03** 8958-24 5 of 6
Site Address: 1000 Col Eileen Boulevard Syracuse, New York	**Laboratory Name:** Paradigm Environmental Services 1pd129
Results to: **Lu Engineers** **280 East Broad Street, Suite 170** **Rochester, NY 14604**	**Sample Type** ☒ NYS ELAP PLM/TEM ☐ PLM Only ☐ TEM Only
	Laboratory Address: 179 Lake Avenue Rochester, New York
Email: msmith@luengineers.com, r.dillard@luengineers.com, egonzalez@luengineers.com	**Turn Around Time** ☐ Immediate ☐ 12 HR ☐ 24 HR 11:32 ☐ 48 HR ☐ 72 HR ☒ 5 Day
	Comments: **STOP POSITIVE**

	FIELD ID	SAMPLE LOCATION	MATERIAL	NOTES
78				
414	49-A	Main Roof Deck	Silver Paint	
415	49-B	Main Roof Deck	Silver Paint	
416	50-A	South End of Main Roof, Under Transmitter Antenna Support Blocks	Black Padding Material	
417	50-B	South End of Main Roof, Under Transmitter Antenna Support Blocks	Black Padding Material	
418	51-A	North Side of Building, Equipment Room Roof, on Electric Conduit	Grey Caulk	
419	51-B	North Side of Building, Equipment Room Roof, on Electric Conduit	Grey Caulk	
420	52-A	Northeast Entrance, On Top of Metal Awning	White Paint	
421	52-B	Northeast Entrance, On Top of Metal Awning	White Paint	
422	53-A	Equipment Room, West Exterior Wall, on Louver	Black Fabric Vent Flap	
423	53-B	Equipment Room, West Exterior Wall, on Louver	Black Fabric Vent Flap	

Date Sampled: 11-13-2024

Inspector: R. Dillard / E. Gonzalez

Relinquished By _____ Date/Time 11-15-2024

Received By _____ Date/Time 11.15.24 1533

Bulk Sample Chain of Custody

Lu Engineers
ENVIRONMENTAL • TRANSPORTATION • CIVIL

Project Name: Syracuse Hancock International Airport Former Firehouse Structure	**Lu Project # 4500-03** 8958-24 6 of 6
Site Address: 1000 Col Eileen Boulevard Syracuse, New York	**Laboratory Name:** Paradigm Environmental Services 12/12s
Results to: **Lu Engineers** **280 East Broad Street, Suite 170** **Rochester, NY 14604**	**Sample Type** ☒ NYS ELAP PLM/TEM ☐ PLM Only ☐ TEM Only
	Laboratory Address: 179 Lake Avenue Rochester, New York
Email: msmith@luengineers.com, rdillard@luengineers.com, egonzalez@luengineers.com	**Turn Around Time** ☐ Immediate ☐ 12 HR ☐ 24 HR 11:37 ☐ 48 HR ☐ 72 HR ☒ 5 Day
	Comments: **STOP POSITIVE**

FIELD ID	SAMPLE LOCATION	MATERIAL	NOTES
78 424	54-A West Exterior Door	Grey Window Glaze	
425	54-B West Exterior Door	Grey Window Glaze	
426	55-A East Exterior, Between Top of Metal Window Frame and Concrete	Grey Caulk	
427	55-B East Exterior, Between Top of Metal Window Frame and Concrete	Grey Caulk	
428	56-A Upper Roof (Observation Deck) by Roof Hatch	Black Tar Roof Flashing	
429	56-B Lower Roof (Main Roof)	Black Tar Roof Flashing	
430	57-A Upper Roof (Observation Deck)	Black Built up Roofing Material	Core 1 (1st Layer)
431	57-B Lower Roof (Main Roof)	Black Built up Roofing Material	Core 2 (1st Layer, Under Ballast Stone)

Date Sampled: 11-13-2024

Inspector: R. Dillard / E. Gonzalez

Relinquished By _____ Date/Time 11-15-2024

Received By _____ Date/Time 11.15.24 1533

PARADIGM

Analytical Report For

Lu Engineers, Inc.

For Lab Project ID

245414

Referencing

4500-03 Syracuse Hancock International Airport

Prepared

Thursday, November 21, 2024

Any noncompliant QC parameters or other notes impacting data interpretation are flagged or documented on the final report or are noted below:

Reduced sample size used for Lead analysis due to limited sample volume. Kindly refer to Chain of Custody Supplement for the affected samples.

Certifies that this report has been approved by the Technical Director or Designee

179 Lake Avenue • Rochester, NY 14608 • (585) 647-2530 • Fax (585) 647-3311 • ELAP ID# 10958

This report is part of a multipage document and should only be evaluated in its entirety. The Chain of Custody provides additional sample information, including compliance with the sample condition requirements upon receipt.

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 245414

Client: **Lu Engineers, Inc.**

Project Reference: 4500-03 Syracuse Hancock International Airport

Sample Identifier: Area 1, On Column, LP-13, Grey/Yell/Wht Paint

Lab Sample ID: 245414-01 **Date Sampled:** 10/16/2024 9:00

Matrix: Paint **Date Received** 11/15/2024

Lead

Analyte	Result	Units	Qualifier	Date Analyzed
Lead	**0.00514**	%		11/19/2024 10:05

Method Reference(s): EPA 6010C
EPA 3050B
Preparation Date: 11/18/2024
Data File: 241119A

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 245414

Client: **Lu Engineers, Inc.**

Project Reference: 4500-03 Syracuse Hancock International Airport

Sample Identifier:	Area 2, Truck Bay, LP-14, Red Paint		
Lab Sample ID:	245414-02	**Date Sampled:**	10/16/2024 9:30
Matrix:	Paint	**Date Received**	11/15/2024

Lead

Analyte	Result	Units	Qualifier	Date Analyzed
Lead	**0.0548**	%		11/19/2024 10:08

Method Reference(s): EPA 6010C
EPA 3050B
Preparation Date: 11/18/2024
Data File: 241119A

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 245414

Client: **Lu Engineers, Inc.**

Project Reference: 4500-03 Syracuse Hancock International Airport

Sample Identifier:	Area 3, Locker Room, LP-24, White Paint		
Lab Sample ID:	245414-03	**Date Sampled:**	10/16/2024 10:00
Matrix:	Paint	**Date Received**	11/15/2024

Lead

Analyte	Result	Units	Qualifier	Date Analyzed
Lead	**0.0272**	%		11/19/2024 10:11

Method Reference(s): EPA 6010C
EPA 3050B
Preparation Date: 11/18/2024
Data File: 241119A

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 245414

Client: **Lu Engineers, Inc.**

Project Reference: 4500-03 Syracuse Hancock International Airport

Sample Identifier:	Area 4, On Boiler, LP-29, Silver Paint		
Lab Sample ID:	245414-04	**Date Sampled:**	10/16/2024 11:00
Matrix:	Paint	**Date Received**	11/15/2024

Lead

Analyte	Result	Units	Qualifier	Date Analyzed
Lead	**0.00672**	%		11/19/2024 10:15

Method Reference(s): EPA 6010C
EPA 3050B
Preparation Date: 11/18/2024
Data File: 241119A

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 245414

Client: **Lu Engineers, Inc.**

Project Reference: 4500-03 Syracuse Hancock International Airport

Sample Identifier:	Mezzanine Ceiling, LP-30, White Paint		
Lab Sample ID:	245414-05	**Date Sampled:**	11/13/2024 9:00
Matrix:	Paint	**Date Received**	11/15/2024

Lead

Analyte	Result	Units	Qualifier	Date Analyzed
Lead	< 0.00484	%		11/19/2024 10:18

Method Reference(s): EPA 6010C
EPA 3050B
Preparation Date: 11/18/2024
Data File: 241119A

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 245414

Client: **Lu Engineers, Inc.**

Project Reference: 4500-03 Syracuse Hancock International Airport

Sample Identifier:	Observation Deck, LP-46, Silver Paint		
Lab Sample ID:	245414-06	**Date Sampled:**	11/13/2024 9:30
Matrix:	Paint	**Date Received**	11/15/2024

Lead

Analyte	Result	Units	Qualifier	Date Analyzed
Lead	**0.00514**	%		11/19/2024 10:22

Method Reference(s): EPA 6010C
EPA 3050B
Preparation Date: 11/18/2024
Data File: 241119A

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 245414

Client: **Lu Engineers, Inc.**

Project Reference: 4500-03 Syracuse Hancock International Airport

Sample Identifier:	Observation Deck, LP-47, Black Paint		
Lab Sample ID:	245414-07	**Date Sampled:**	11/13/2024 10:00
Matrix:	Paint	**Date Received**	11/15/2024

Lead

Analyte	Result	Units	Qualifier	Date Analyzed
Lead	< 0.00484	%		11/19/2024 10:32

Method Reference(s): EPA 6010C
EPA 3050B
Preparation Date: 11/18/2024
Data File: 241119A

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 245414

Client: **Lu Engineers, Inc.**

Project Reference: 4500-03 Syracuse Hancock International Airport

Sample Identifier:	Main Roof Deck, LP-49, Silver Paint		
Lab Sample ID:	245414-08	**Date Sampled:**	11/13/2024 10:30
Matrix:	Paint	**Date Received**	11/15/2024

Lead

Analyte	Result	Units	Qualifier	Date Analyzed
Lead	**0.0147**	%		11/19/2024 10:35

Method Reference(s): EPA 6010C
EPA 3050B
Preparation Date: 11/18/2024
Data File: 241119A

PARADIGM ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 245414

Client: **Lu Engineers, Inc.**

Project Reference: 4500-03 Syracuse Hancock International Airport

Sample Identifier:	NE Entrance, LP-52, White Paint		
Lab Sample ID:	245414-09	**Date Sampled:**	11/13/2024 11:00
Matrix:	Paint	**Date Received**	11/15/2024

Lead

Analyte	Result	Units	Qualifier	Date Analyzed
Lead	**0.332**	%		11/19/2024 10:38

Method Reference(s): EPA 6010C
EPA 3050B
Preparation Date: 11/18/2024
Data File: 241119A

Analytical Report Appendix

The reported results relate only to the samples as they have been received by the laboratory.

Each page of this document is part of a multipage report. This document may not be reproduced except in its entirety, without the prior consent of Paradigm Environmental Services, Inc.

All soil/sludge samples have been reported on a dry weight basis, unless qualified "reported as received". Other solids are reported as received.

Low level Volatiles blank reports for soil/solid matrix are based on a nominal 5 gram weight. Sample results and reporting limits are based on actual weight, which may be more or less than 5 grams.

The Chain of Custody provides additional information, including compliance with sample condition requirements upon receipt. Sample condition requirements are defined under the 2003 NELAC Standard, sections 5.5.8.3.1 and 5.5.8.3.2.

NYSDOH ELAP does not certify for all parameters. Paradigm Environmental Services or the indicated subcontracted laboratory does hold certification for all analytes where certification is offered by ELAP unless otherwise specified. Aliquots separated for certain tests, such as TCLP, are indicated on the Chain of Custody and final reports with an "A" suffix.

Data qualifiers are used, when necessary, to provide additional information about the data. This information may be communicated as a flag or as text at the bottom of the report. Please refer to the following list of analyte-specific, frequently used data flags and their meaning:

"<" = Analyzed for but not detected at or above the quantitation limit.
"E" = Result has been estimated, calibration limit exceeded.
"H" = Denotes a parameter analyzed outside of holding time.
"Z" = See case narrative.
"D" = Sample, Laboratory Control Sample, or Matrix Spike Duplicate results above Relative Percent Difference limit.
"M" = Matrix spike recoveries outside QC limits. Matrix bias indicated.
"B" = Method blank contained trace levels of analyte. Refer to included method blank report.
"J" = Result estimated between the quantitation limit and half the quantitation limit.
"L" = Laboratory Control Sample recovery outside accepted QC limits.
"P" = Concentration differs by more than 40% between the primary and secondary analytical columns.
"NC" = Not calculable. Applicable to RPD if sample or duplicate result is non-detect or estimated (see primary report for data flags). Applicable to MS if sample is greater or equal to ten times the spike added. Applicable to sample surrogates or MS if sample dilution is 10x or higher.
"" = Indicates any recoveries outside associated acceptance windows. Surrogate outliers in samples are presumed matrix effects. LCS demonstrates method compliance unless otherwise noted.*
"(1)" = Indicates data from primary column used for QC calculation.
"A" = denotes a parameter for which ELAP does not offer approval as part of their laboratory certification program.
"F" = denotes a parameter for which Paradigm does not carry certification, the results for which should therefore only be used where ELAP certification is not required, such as personal exposure assessment.

GENERAL TERMS AND CONDITIONS
LABORATORY SERVICES

These Terms and Conditions embody the whole agreement of the parties in the absence of a signed and executed contract between the Laboratory (LAB) and Client. They shall supersede all previous communications, representations, or agreements, either verbal or written, between the parties. The LAB specifically rejects all additional, inconsistent, or conflicting terms, whether printed or otherwise set forth in any purchase order or other communication from the Client to the LAB. The invalidity or unenforceability in whole or in part of any provision, term or condition hereof shall not affect in any way the validity or enforceability of the remainder of the Terms and Conditions. No waiver by LAB of any provision, term, or condition hereof or of any breach by or obligation of the Client hereunder shall constitute a waiver of such provision, term, or condition on any other occasion or a waiver of any other breach by or obligation of the Client. This agreement shall be administered and interpreted under the laws of the state which services are procured.

Warranty. Recognizing that the nature of many samples is unknown and that some may contain potentially hazardous components, LAB warrants only that it will perform testing services, obtain findings, and prepare reports in accordance with generally accepted analytical laboratory principles and practices at the time of performance of services. LAB makes no other warranty, express or implied.

Scope and Compensation. LAB agrees to perform the services described in the chain of custody to which these terms and conditions are attached. Unless the parties agree in writing to the contrary, the duties of LAB shall not be construed to exceed the services specifically described. LAB wi use LAB default method for all tests unless specified otherwise on the Work Order.
Payment terms are net 30 days from the date of invoice. All overdue payments are subject to an interest charge of one and one-half percent (1-1/2%) per month or a portion thereof. Client shall also be responsible for costs of collection, including payment of reasonable attorney fees if such expense is incurred. The prices, unless stated, do not include any sale, use or other taxes. Such taxes will be added to invoice prices when required.

Prices. Compensation for services performed will be based on the current Lab Analytical Fee Schedule or on quotations agreed to in writing by the parties. Turnaround time based charges are determined from the time of resolution of all work order questions. Testimony, court appearances or data compilation for legal action will be charged separately. Evaluation and reporting of initial screening runs may incur additional fees.

Limitations of Liability. In the event of any error, omission, or other professional negligence, the sole and exclusive responsibility of LAB shall be to re-perform the deficient work at its own expense and LAB shall have no other liability whatsoever. All claims shall be deemed waived unless made in writing and received by LAB within ninety (90) days following completion of services.
LAB shall have no liability, obligation, or responsibility of any kind for losses, costs, expenses, or other damages (including but not limited to any special, direct, incidental or consequential damages) with respect to LAB's services or results.
All results provided by LAB are strictly for the use of its clients and LAB is in no way responsible for the use of such results by clients or third parties. All reports should be considered in their entirety, and LAB is not responsible for the separation, detachment, or other use of any portion of these reports. Client may not assign the lab report without the written consent of the LAB.
Client covenants and agrees, at its/his/her sole expense, to indemnify, protect, defend, and save harmless the LAB from and against any and all damages, losses, liabilities, obligations, penalties, claims, litigation, demands, defenses, judgments, suits, actions, proceedings, costs, disbursements and/or expenses (including, without limitation attorneys' and experts' fees and disbursements) of any kind whatsoever which may at any time be imposed upon, incurred by or asserted or awarded against client relating to, resulting from or arising out of (a) the breach of this agreement by this client, (b) the negligence of the client in handling, delivering or disclosing any hazardous substance, (c) the violation of the Client of any applicable law, (d) non-compliance by the Client with any environmental permit or (e) a material misrepresentation in disclosing the materials to be tested.

Hazard Disclosure. Client represents and warrants that any sample delivered to LAB will be preceded or accompanied by complete written disclosure of the presence of any hazardous substances known or suspected by Client. Client further warrants that any sample containing any hazardous substance that is to be delivered to LAB will be packaged, labeled, transported, and delivered properly and in accordance with applicable laws.

Sample Handling. Prior to LAB's acceptance of any sample (or after any revocation of acceptance), the entire risk of loss or of damage to such sample remains with Client. Samples are accepted when receipt is acknowledged on chain of custody documentation. In no event will LAB have any responsibility for the action or inaction of any carrier shipping or delivering any sample to or from LAB premises.
Client authorizes LAB to proceed with the analysis of samples as received by the laboratory, recognizing that any samples not in compliance with all current DOH-ELAP-NELAP requirements for containers, preservation or holding time will be noted as such on th final report.
Disposal of hazardous waste samples is the responsibility of the Client. If the Client does not wish such samples returned, LAB may add storage and disposal fees to the final invoice. Maximum storage time for samples is 30 days after completion of analysis unless modified by applicable state or federal laws. Client will be required to give the LAB written instructions concerning disposal of these samples.
LAB reserves the absolute right, exercisable at any time, to refuse to receive delivery of, refuse to accept, or revoke acceptance of any sample, which, in the sole judgment of LAB (a) is of unsuitable volume, (b) may be or become unsuitable for or may pose a risk in handling, transport, or processing for any health, safety, environmental or other reason whether or not due to the presence in the sample of any hazardous substance, and whether or not such presence has been disclosed to LAB by Client or (c) if the condition or sample date make the sample unsuitable for analysis.

Legal Responsibility. LAB is solely responsible for performance of this contract, and no affiliated company, director, officer, employee, or agent shall have any legal responsibility hereunder, whether in contract or tort including negligence.

Assignment. LAB may assign its performance obligations under this contract to other parties, as it deems necessary. LAB shall disclose to Client any assignee (subcontractor) by ELAP ID # on the submitted final report.

Force Majeure. LAB shall have no responsibility or liability to the Client for any failure or delay in performance by LAB, which results in whole or in part from any cause or circumstance beyond the reasonable control of LAB. Such causes and circumstances shall include, but not limited to, acts of God, acts or orders of any government authority, strikes or other labor disputes, natural disasters, accidents, wars, civil disturbances, difficulties or delays in transportation, mail or delivery services, inability to obtain sufficient services or supplies from LAB's usual suppliers, or any other cause beyond LAB's reasonable control.

Law. This contract shall be continued under the laws of the State of New York without regard to its conflicts of laws provision.

179 Lake Avenue, Rochester, NY 14608 Office (585) 647-2530 Fax (585) 647-3311

PARADIGM ENVIRONMENTAL SERVICES, INC

CHAIN OF CUSTODY

REPORT TO:	INVOICE TO:		
COMPANY: LU ENGINEERS	COMPANY: Same	LAB PROJECT #: 245414	CLIENT PROJECT #: 4500-03
ADDRESS: 280 East Broad Street, Suite 170	ADDRESS:		
CITY: ROCHESTER STATE: NY ZIP: 14604	CITY: STATE: ZIP:	TURNAROUND TIME: (WORKING DAYS)	
PHONE: 385-7417 FAX: 546-1634	PHONE: FAX:		
ATTN: Mitch Smith	ATTN:	STD [ ] 1 [ ] 2 [ ] 3 [X] 5	OTHER [ ]
COMMENTS: msmith@luengineers.com, rdillard@luengineers.com, egonzalez@luengineers.com		Quotation #	

PROJECT NAME/SITE NAME: Syracuse Hancock International Airport - Former Firehouse

REQUESTED ANALYSIS

	DATE	TIME	COMPOSITE	GRAB	SAMPLE LOCATION/FIELD ID	MATRIX	NUMBER CONTAINERS	TOTAL LEAD	REMARKS	PARADIGM LAB SAMPLE NUMBER
1	10-16-24	0900		X	Area 1, on Column, LP-13	PAINT	1	X	LP-13, Grey/yell/wht paint	-01
2	10-16-24	0930		X	Area 2, Truck Bay, LP-14			X	LP-14, Red Paint	-02
3	10-16-24	1000		X	Area 3, Locker Room, LP-24			X	LP-24, White Paint	-03
4	10-16-24	1100		X	Area 4, on Boiler, LP-29			X	LP-29, Silver Paint	-04
5	11-13-24	0900		X	Mezzanine Ceiling, LP-30			X	LP-30, White Paint	-05
6	11-13-24	0930		X	Observation Deck, LP-46			X	LP-46, Silver Paint	-06
7	11-13-24	1000		X	Observation Deck, LP-47			X	LP-47, Black Paint	-07
8	11-13-24	1030		X	Main Roof Deck, LP-49			X	LP-49, Silver Paint	-08
9	11-13-24	1100		X	NE Entrance, LP-52			X	LP-52, White Paint	-09
10										

Per visual QM 11/15/24

LAB USE ONLY BELOW THIS LINE

Sample Condition: Per NELAC/ELAP 210/241/242/243/244

Receipt Parameter	NELAC Compliance	
Container Type:	Y [ ]	N [ ]
Comments:		
Preservation:	Y [ ]	N [ ]
Comments:		
Holding Time:	Y [ ]	N [ ]
Comments:		
Temperature:	Y [ ]	N [ ]
Comments:		

R. Dillard / E. Gonzalez — 10/16/24 + 11/13/24
Sampled By — Date/Time

[signature] — 11/15/24 @1420
Relinquished By — Date/Time

Received By — Date/Time

[signature] — 11/15/24 14:58
Received @ Lab By — Date/Time

Total Cost:

P.I.F.

PARADIGM
ENVIRONMENTAL SERVICES

Chain of Custody Supplement

Client: Ln Engineers **Completed by:**

Lab Project ID: 245414 **Date:** 11/15/2024

Sample Condition Requirements

Per NELAC/ELAP 210/241/242/243/244

Condition	*NELAC compliance with the sample condition requirements upon receipt* Yes	No	N/A
Container Type	☑	☐	☐
Comments			
Transferred to method-compliant container	☐	☐	☑
Headspace (<1 mL)	☐	☐	☑
Comments			
Preservation	☐	☐	☑
Comments			
Chlorine Absent (<0.10 ppm per test strip)	☐	☐	☑
Comments			
Holding Time	☑	☐	☐
Comments			
Temperature	☐	☐	☑
Comments			
Compliant Sample Quantity/Type	☒ -01, -04, -06	☒ -02, -03, -05, ~~-07~~	☐
Comments		limited volume MB 11/19/24	

EMSL Analytical, Inc.

200 Route 130, Cinnaminson, NJ, 08077
Telephone: 856-858-4800 Fax:856-786-5974
EMSL-CIN-01

EMSL Order ID: 012437511
LIMS Reference ID: AC37511
EMSL Customer ID: LUEN50

December 04, 2024

Mitch Smith
LU Engineers [LUEN50]
280 East Broad St., Suite 170
Rochester, NY 14604

The following analytical report covers the analysis performed on samples submitted to EMSL Analytical, Inc. on 11/19/2024. The results are tabulated on the attached pages for the following client designated project:

Syracuse Hancock International Airport - Former Firehouse Structure

The reference number for these samples is EMSL Order #: AC37511 . Please use this reference when calling about these samples. If you have any questions, please do not hesitate to contact the lab at 856-858-4800.



Owen McKenna Laboratory Manager or other approved signatory

Table of Contents

Cover Letter	1
Sample Condition on Receipt	3
Samples in Report	4
Positive Hits Summary	5
Sample Results	6
Quality Assurance Results	13
Certified Analyses	14
Certifications	14
Qualifiers, Definitions and Disclaimer	15
Chain of Custody PDF	16

EMSL Analytical, Inc.

200 Route 130, Cinnaminson, NJ, 08077
Telephone: 856-858-4800 Fax:856-786-5974
EMSL-CIN-01

EMSL Order ID: 012437511
LIMS Reference ID: AC37511
EMSL Customer ID: LUEN50

Attention: Mitch Smith
LU Engineers [LUEN50]
280 East Broad St., Suite 170
Rochester, NY 14604
(585) 385-7417
msmith@luengineers.com

Project Name: Syracuse Hancock International Airport - Former Firehouse Structure

Customer PO:
EMSL Sales Rep: Gillian Egiazarov
Received: 11/19/2024 09:30
Reported: 12/04/2024 14:17

Sample Condition on Receipt

Cooler ID: Default Cooler **Temperature:** **°C**

Custody Seals	Y
Containers Intact	Y
COC/Labels Agree	Y
Preservation Confirmed	Y

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted.

EMSL Analytical, Inc.

200 Route 130, Cinnaminson, NJ, 08077
Telephone: 856-858-4800 Fax:856-786-5974
EMSL-CIN-01

EMSL Order ID: 012437511
LIMS Reference ID: AC37511
EMSL Customer ID: LUEN50

Attention: Mitch Smith
LU Engineers [LUEN50]
280 East Broad St., Suite 170
Rochester, NY 14604
(585) 385-7417
msmith@luengineers.com

Project Name: Syracuse Hancock International Airport - Former Firehouse Structure

Customer PO:
EMSL Sales Rep: Gillian Egiazarov
Received: 11/19/2024 09:30
Reported: 12/04/2024 14:17

Samples in this Report

Lab ID	Sample	Matrix	Date Sampled	Date Received
AC37511-01	PCB-16	Solid	10/16/24 12:00 am	11/19/2024
AC37511-02	PCB-25	Solid	10/16/24 12:00 am	11/19/2024
AC37511-03	PCB-26	Solid	10/16/24 12:00 am	11/19/2024
AC37511-04	PCB-48	Solid	10/16/24 12:00 am	11/19/2024
AC37511-05	PCB-51	Solid	10/16/24 12:00 am	11/19/2024
AC37511-06	PCB-54	Solid	10/16/24 12:00 am	11/19/2024
AC37511-07	PCB-55	Solid	10/16/24 12:00 am	11/19/2024

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted.

EMSL Analytical, Inc.

200 Route 130, Cinnaminson, NJ, 08077
Telephone: 856-858-4800 Fax:856-786-5974
EMSL-CIN-01

EMSL Order ID: 012437511
LIMS Reference ID: AC37511
EMSL Customer ID: LUEN50

Attention: Mitch Smith
LU Engineers [LUEN50]
280 East Broad St., Suite 170
Rochester, NY 14604
(585) 385-7417
msmith@luengineers.com

Project Name: Syracuse Hancock International Airport - Former Firehouse Structure

Customer PO:
EMSL Sales Rep: Gillian Egiazarov
Received: 11/19/2024 09:30
Reported: 12/04/2024 14:17

Positive Hits Summary

No positive results reported

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted.

EMSL Analytical, Inc.

200 Route 130, Cinnaminson, NJ, 08077
Telephone: 856-858-4800 Fax:856-786-5974
EMSL-CIN-01

EMSL Order ID: 012437511
LIMS Reference ID: AC37511
EMSL Customer ID: LUEN50

Attention: Mitch Smith
LU Engineers [LUEN50]
280 East Broad St., Suite 170
Rochester, NY 14604
(585) 385-7417
msmith@luengineers.com

Project Name: Syracuse Hancock International Airport - Former Firehouse Structure

Customer PO:
EMSL Sales Rep: Gillian Egiazarov
Received: 11/19/2024 09:30
Reported: 12/04/2024 14:17

Sample Results

Sample: PCB-16/Black Window Glaze
AC37511-01 (Solid)

Analyte	Result	Q	DF	RL	Units	Prepared Date/Time	Analyzed Date/Time	Prep/Analyst Initials	Prep Method	Analytical Method
GC-SVOA										
Aroclor-1016	ND		1	1.2	mg/kg	11/29/24 09:37	11/29/24 15:43	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1221	ND		1	1.2	mg/kg	11/29/24 09:37	11/29/24 15:43	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1232	ND		1	1.2	mg/kg	11/29/24 09:37	11/29/24 15:43	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1242	ND		1	1.2	mg/kg	11/29/24 09:37	11/29/24 15:43	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1248	ND		1	1.2	mg/kg	11/29/24 09:37	11/29/24 15:43	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1254	ND		1	1.2	mg/kg	11/29/24 09:37	11/29/24 15:43	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1260	ND		1	1.2	mg/kg	11/29/24 09:37	11/29/24 15:43	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1262	ND		1	1.2	mg/kg	11/29/24 09:37	11/29/24 15:43	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1268	ND		1	1.2	mg/kg	11/29/24 09:37	11/29/24 15:43	CWA/AxJ	SW846 3546	SW846-8082A
Surrogate(s)	**Recovery**	**Q**		**Limits**						
Surrogate: Tetrachloro-m-xylene	*57%*			*10-112*		11/29/24 09:37	11/29/24 15:43	CWA/AxJ	SW846 3546	*SW846-8082A*
Surrogate: Decachlorobiphenyl	*48%*			*10-123*		11/29/24 09:37	11/29/24 15:43	CWA/AxJ	SW846 3546	*SW846-8082A*

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted.

EMSL Analytical, Inc.

200 Route 130, Cinnaminson, NJ, 08077
Telephone: 856-858-4800 Fax:856-786-5974
EMSL-CIN-01

EMSL Order ID: 012437511
LIMS Reference ID: AC37511
EMSL Customer ID: LUEN50

Attention: Mitch Smith
LU Engineers [LUEN50]
280 East Broad St., Suite 170
Rochester, NY 14604
(585) 385-7417
msmith@luengineers.com

Project Name: Syracuse Hancock International Airport - Former Firehouse Structure

Customer PO:
EMSL Sales Rep: Gillian Egiazarov
Received: 11/19/2024 09:30
Reported: 12/04/2024 14:17

Sample Results
(Continued)

Sample: PCB-25/Black Firestop Caulk
AC37511-02 (Solid)

GC-SVOA

Analyte	Result	Q	DF	RL	Units	Prepared Date/Time	Analyzed Date/Time	Prep/Analyst Initials	Prep Method	Analytical Method
Aroclor-1016	ND		1	1.2	mg/kg	11/29/24 09:37	11/29/24 16:05	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1221	ND		1	1.2	mg/kg	11/29/24 09:37	11/29/24 16:05	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1232	ND		1	1.2	mg/kg	11/29/24 09:37	11/29/24 16:05	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1242	ND		1	1.2	mg/kg	11/29/24 09:37	11/29/24 16:05	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1248	ND		1	1.2	mg/kg	11/29/24 09:37	11/29/24 16:05	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1254	ND		1	1.2	mg/kg	11/29/24 09:37	11/29/24 16:05	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1260	ND		1	1.2	mg/kg	11/29/24 09:37	11/29/24 16:05	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1262	ND		1	1.2	mg/kg	11/29/24 09:37	11/29/24 16:05	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1268	ND		1	1.2	mg/kg	11/29/24 09:37	11/29/24 16:05	CWA/AxJ	SW846 3546	SW846-8082A

Surrogate(s)	Recovery	Q	Limits					
Surrogate: Tetrachloro-m-xylene	*53%*		*10-112*	11/29/24 09:37	11/29/24 16:05	CWA/AxJ	SW846 3546	*SW846-8082A*
Surrogate: Decachlorobiphenyl	*53%*		*10-123*	11/29/24 09:37	11/29/24 16:05	CWA/AxJ	SW846 3546	*SW846-8082A*

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted.

EMSL Analytical, Inc.

200 Route 130, Cinnaminson, NJ, 08077
Telephone: 856-858-4800 Fax:856-786-5974
EMSL-CIN-01

EMSL Order ID: 012437511
LIMS Reference ID: AC37511
EMSL Customer ID: LUEN50

Attention: Mitch Smith
LU Engineers [LUEN50]
280 East Broad St., Suite 170
Rochester, NY 14604
(585) 385-7417
msmith@luengineers.com

Project Name: Syracuse Hancock International Airport - Former Firehouse Structure

Customer PO:
EMSL Sales Rep: Gillian Egiazarov
Received: 11/19/2024 09:30
Reported: 12/04/2024 14:17

Sample Results
(Continued)

Sample: PCB-26/Gray Window Glaze
AC37511-03 (Solid)

Analyte	Result	Q	DF	RL	Units	Prepared Date/Time	Analyzed Date/Time	Prep/Analyst Initials	Prep Method	Analytical Method
GC-SVOA										
Aroclor-1016	ND		1	0.88	mg/kg	11/29/24 09:37	11/29/24 16:27	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1221	ND		1	0.88	mg/kg	11/29/24 09:37	11/29/24 16:27	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1232	ND		1	0.88	mg/kg	11/29/24 09:37	11/29/24 16:27	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1242	ND		1	0.88	mg/kg	11/29/24 09:37	11/29/24 16:27	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1248	ND		1	0.88	mg/kg	11/29/24 09:37	11/29/24 16:27	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1254	ND		1	0.88	mg/kg	11/29/24 09:37	11/29/24 16:27	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1260	ND		1	0.88	mg/kg	11/29/24 09:37	11/29/24 16:27	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1262	ND		1	0.88	mg/kg	11/29/24 09:37	11/29/24 16:27	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1268	ND		1	0.88	mg/kg	11/29/24 09:37	11/29/24 16:27	CWA/AxJ	SW846 3546	SW846-8082A
Surrogate(s)	**Recovery**	**Q**		**Limits**						
Surrogate: Tetrachloro-m-xylene	*60%*			*10-112*		11/29/24 09:37	11/29/24 16:27	CWA/AxJ	SW846 3546	*SW846-8082A*
Surrogate: Decachlorobiphenyl	*58%*			*10-123*		11/29/24 09:37	11/29/24 16:27	CWA/AxJ	SW846 3546	*SW846-8082A*

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted.

EMSL Analytical, Inc.

200 Route 130, Cinnaminson, NJ, 08077
Telephone: 856-858-4800 Fax:856-786-5974
EMSL-CIN-01

EMSL Order ID: 012437511
LIMS Reference ID: AC37511
EMSL Customer ID: LUEN50

Attention: Mitch Smith
LU Engineers [LUEN50]
280 East Broad St., Suite 170
Rochester, NY 14604
(585) 385-7417
msmith@luengineers.com

Project Name: Syracuse Hancock International Airport - Former Firehouse Structure

Customer PO:
EMSL Sales Rep: Gillian Egiazarov
Received: 11/19/2024 09:30
Reported: 12/04/2024 14:17

Sample Results
(Continued)

Sample: PCB-48/White Caulk
AC37511-04 (Solid)

Analyte	Result	Q	DF	RL	Units	Prepared Date/Time	Analyzed Date/Time	Prep/Analyst Initials	Prep Method	Analytical Method
GC-SVOA										
Aroclor-1016	ND		1	0.82	mg/kg	11/29/24 09:37	11/29/24 16:49	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1221	ND		1	0.82	mg/kg	11/29/24 09:37	11/29/24 16:49	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1232	ND		1	0.82	mg/kg	11/29/24 09:37	11/29/24 16:49	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1242	ND		1	0.82	mg/kg	11/29/24 09:37	11/29/24 16:49	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1248	ND		1	0.82	mg/kg	11/29/24 09:37	11/29/24 16:49	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1254	ND		1	0.82	mg/kg	11/29/24 09:37	11/29/24 16:49	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1260	ND		1	0.82	mg/kg	11/29/24 09:37	11/29/24 16:49	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1262	ND		1	0.82	mg/kg	11/29/24 09:37	11/29/24 16:49	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1268	ND		1	0.82	mg/kg	11/29/24 09:37	11/29/24 16:49	CWA/AxJ	SW846 3546	SW846-8082A
Surrogate(s)	**Recovery**	**Q**		**Limits**						
Surrogate: Tetrachloro-m-xylene	*63%*			*10-112*		11/29/24 09:37	11/29/24 16:49	CWA/AxJ	SW846 3546	*SW846-8082A*
Surrogate: Decachlorobiphenyl	*60%*			*10-123*		11/29/24 09:37	11/29/24 16:49	CWA/AxJ	SW846 3546	*SW846-8082A*

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted.

EMSL Analytical, Inc.

200 Route 130, Cinnaminson, NJ, 08077
Telephone: 856-858-4800 Fax:856-786-5974
EMSL-CIN-01

EMSL Order ID: 012437511
LIMS Reference ID: AC37511
EMSL Customer ID: LUEN50

Attention: Mitch Smith
LU Engineers [LUEN50]
280 East Broad St., Suite 170
Rochester, NY 14604
(585) 385-7417
msmith@luengineers.com

Project Name: Syracuse Hancock International Airport - Former Firehouse Structure

Customer PO:
EMSL Sales Rep: Gillian Egiazarov
Received: 11/19/2024 09:30
Reported: 12/04/2024 14:17

Sample Results
(Continued)

Sample: PCB-51/Gray Caulk
AC37511-05 (Solid)

Analyte	Result	Q	DF	RL	Units	Prepared Date/Time	Analyzed Date/Time	Prep/Analyst Initials	Prep Method	Analytical Method
GC-SVOA										
Aroclor-1016	ND		1	0.91	mg/kg	11/29/24 09:37	11/29/24 17:11	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1221	ND		1	0.91	mg/kg	11/29/24 09:37	11/29/24 17:11	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1232	ND		1	0.91	mg/kg	11/29/24 09:37	11/29/24 17:11	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1242	ND		1	0.91	mg/kg	11/29/24 09:37	11/29/24 17:11	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1248	ND		1	0.91	mg/kg	11/29/24 09:37	11/29/24 17:11	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1254	ND		1	0.91	mg/kg	11/29/24 09:37	11/29/24 17:11	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1260	ND		1	0.91	mg/kg	11/29/24 09:37	11/29/24 17:11	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1262	ND		1	0.91	mg/kg	11/29/24 09:37	11/29/24 17:11	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1268	ND		1	0.91	mg/kg	11/29/24 09:37	11/29/24 17:11	CWA/AxJ	SW846 3546	SW846-8082A
Surrogate(s)	**Recovery**	**Q**		**Limits**						
Surrogate: Tetrachloro-m-xylene	*61%*			*10-112*		11/29/24 09:37	11/29/24 17:11	CWA/AxJ	SW846 3546	*SW846-8082A*
Surrogate: Decachlorobiphenyl	*55%*			*10-123*		11/29/24 09:37	11/29/24 17:11	CWA/AxJ	SW846 3546	*SW846-8082A*

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted.

EMSL Analytical, Inc.

200 Route 130, Cinnaminson, NJ, 08077
Telephone: 856-858-4800 Fax:856-786-5974
EMSL-CIN-01

EMSL Order ID: 012437511
LIMS Reference ID: AC37511
EMSL Customer ID: LUEN50

Attention: Mitch Smith
LU Engineers [LUEN50]
280 East Broad St., Suite 170
Rochester, NY 14604
(585) 385-7417
msmith@luengineers.com

Project Name: Syracuse Hancock International Airport - Former Firehouse Structure

Customer PO:
EMSL Sales Rep: Gillian Egiazarov
Received: 11/19/2024 09:30
Reported: 12/04/2024 14:17

Sample Results
(Continued)

Sample: PCB-54/Gray Window Glaze
AC37511-06 (Solid)

Analyte	Result	Q	DF	RL	Units	Prepared Date/Time	Analyzed Date/Time	Prep/Analyst Initials	Prep Method	Analytical Method
GC-SVOA										
Aroclor-1016	ND		1	1.2	mg/kg	11/29/24 09:37	11/29/24 17:33	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1221	ND		1	1.2	mg/kg	11/29/24 09:37	11/29/24 17:33	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1232	ND		1	1.2	mg/kg	11/29/24 09:37	11/29/24 17:33	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1242	ND		1	1.2	mg/kg	11/29/24 09:37	11/29/24 17:33	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1248	ND		1	1.2	mg/kg	11/29/24 09:37	11/29/24 17:33	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1254	ND		1	1.2	mg/kg	11/29/24 09:37	11/29/24 17:33	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1260	ND		1	1.2	mg/kg	11/29/24 09:37	11/29/24 17:33	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1262	ND		1	1.2	mg/kg	11/29/24 09:37	11/29/24 17:33	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1268	ND		1	1.2	mg/kg	11/29/24 09:37	11/29/24 17:33	CWA/AxJ	SW846 3546	SW846-8082A
Surrogate(s)	**Recovery**	**Q**		**Limits**						
Surrogate: Tetrachloro-m-xylene	*65%*			*10-112*		11/29/24 09:37	11/29/24 17:33	CWA/AxJ	SW846 3546	*SW846-8082A*
Surrogate: Decachlorobiphenyl	*60%*			*10-123*		11/29/24 09:37	11/29/24 17:33	CWA/AxJ	SW846 3546	*SW846-8082A*

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted.

EMSL Analytical, Inc.

200 Route 130, Cinnaminson, NJ, 08077
Telephone: 856-858-4800 Fax:856-786-5974
EMSL-CIN-01

EMSL Order ID: 012437511
LIMS Reference ID: AC37511
EMSL Customer ID: LUEN50

Attention: Mitch Smith
LU Engineers [LUEN50]
280 East Broad St., Suite 170
Rochester, NY 14604
(585) 385-7417
msmith@luengineers.com

Project Name: Syracuse Hancock International Airport - Former Firehouse Structure

Customer PO:
EMSL Sales Rep: Gillian Egiazarov
Received: 11/19/2024 09:30
Reported: 12/04/2024 14:17

Sample Results
(Continued)

Sample: PCB-55/Gray Caulk
AC37511-07 (Solid)

Analyte	Result	Q	DF	RL	Units	Prepared Date/Time	Analyzed Date/Time	Prep/Analyst Initials	Prep Method	Analytical Method
GC-SVOA										
Aroclor-1016	ND		1	0.91	mg/kg	11/29/24 09:37	11/29/24 17:55	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1221	ND		1	0.91	mg/kg	11/29/24 09:37	11/29/24 17:55	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1232	ND		1	0.91	mg/kg	11/29/24 09:37	11/29/24 17:55	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1242	ND		1	0.91	mg/kg	11/29/24 09:37	11/29/24 17:55	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1248	ND		1	0.91	mg/kg	11/29/24 09:37	11/29/24 17:55	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1254	ND		1	0.91	mg/kg	11/29/24 09:37	11/29/24 17:55	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1260	ND		1	0.91	mg/kg	11/29/24 09:37	11/29/24 17:55	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1262	ND		1	0.91	mg/kg	11/29/24 09:37	11/29/24 17:55	CWA/AxJ	SW846 3546	SW846-8082A
Aroclor-1268	ND		1	0.91	mg/kg	11/29/24 09:37	11/29/24 17:55	CWA/AxJ	SW846 3546	SW846-8082A
Surrogate(s)	**Recovery**	**Q**		**Limits**						
Surrogate: Tetrachloro-m-xylene	*51%*			*10-112*		11/29/24 09:37	11/29/24 17:55	CWA/AxJ	SW846 3546	*SW846-8082A*
Surrogate: Decachlorobiphenyl	*49%*			*10-123*		11/29/24 09:37	11/29/24 17:55	CWA/AxJ	SW846 3546	*SW846-8082A*

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted.

EMSL Analytical, Inc.

200 Route 130, Cinnaminson, NJ, 08077
Telephone: 856-858-4800 Fax:856-786-5974
EMSL-CIN-01

EMSL Order ID: 012437511
LIMS Reference ID: AC37511
EMSL Customer ID: LUEN50

Attention: Mitch Smith
LU Engineers [LUEN50]
280 East Broad St., Suite 170
Rochester, NY 14604
(585) 385-7417
msmith@luengineers.com

Project Name: Syracuse Hancock International Airport - Former Firehouse Structure

Customer PO:
EMSL Sales Rep: Gillian Egiazarov
Received: 11/19/2024 09:30
Reported: 12/04/2024 14:17

Quality Control

GC-SVOA

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BCK2989 - SW846 3546										
Blank (BCK2989-BLK1)					Prepared & Analyzed: 11/29/2024					
Aroclor-1016	ND		0.25	mg/kg						
Aroclor-1221	ND		0.25	mg/kg						
Aroclor-1232	ND		0.25	mg/kg						
Aroclor-1242	ND		0.25	mg/kg						
Aroclor-1248	ND		0.25	mg/kg						
Aroclor-1254	ND		0.25	mg/kg						
Aroclor-1260	ND		0.25	mg/kg						
Aroclor-1262	ND		0.25	mg/kg						
Aroclor-1268	ND		0.25	mg/kg						
Surrogate(s)										
Surrogate: Tetrachloro-m-xylene					*0.5000*		*74*	*10-112*		
Surrogate: Decachlorobiphenyl					*0.5000*		*65*	*10-123*		
LCS (BCK2989-BS1)					Prepared & Analyzed: 11/29/2024					
Aroclor-1016	3.45		0.25	mg/kg	5.000		69	23-111		
Aroclor-1260	3.46		0.25	mg/kg	5.000		69	29-119		
Surrogate(s)										
Surrogate: Tetrachloro-m-xylene					*0.5000*		*65*	*10-112*		
Surrogate: Decachlorobiphenyl					*0.5000*		*62*	*10-123*		
LCS Dup (BCK2989-BSD1)					Prepared & Analyzed: 11/29/2024					
Aroclor-1016	3.91		0.25	mg/kg	5.000		78	23-111	13	25
Aroclor-1260	3.88		0.25	mg/kg	5.000		78	29-119	12	25
Surrogate(s)										
Surrogate: Tetrachloro-m-xylene					*0.5000*		*72*	*10-112*		
Surrogate: Decachlorobiphenyl					*0.5000*		*68*	*10-123*		

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted.

EMSL Analytical, Inc.

200 Route 130, Cinnaminson, NJ, 08077
Telephone: 856-858-4800 Fax:856-786-5974
EMSL-CIN-01

EMSL Order ID: 012437511
LIMS Reference ID: AC37511
EMSL Customer ID: LUEN50

Attention: Mitch Smith
LU Engineers [LUEN50]
280 East Broad St., Suite 170
Rochester, NY 14604
(585) 385-7417
msmith@luengineers.com

Project Name: Syracuse Hancock International Airport - Former Firehouse Structure

Customer PO:
EMSL Sales Rep: Gillian Egiazarov
Received: 11/19/2024 09:30
Reported: 12/04/2024 14:17

Certified Analyses included in this Report

Analyte	CAS #	Certifications
SW846-8082A in Solid		
Aroclor-1016	12674-11-2	NJDEP,NYSDOH,PADEP,California ELAP
Aroclor-1221	11104-28-2	NJDEP,NYSDOH,PADEP,California ELAP
Aroclor-1232	11141-16-5	NJDEP,NYSDOH,PADEP,California ELAP
Aroclor-1242	53469-21-9	NJDEP,NYSDOH,PADEP,California ELAP
Aroclor-1248	12672-29-6	NJDEP,NYSDOH,PADEP,California ELAP
Aroclor-1254	11097-69-1	NJDEP,NYSDOH,PADEP,California ELAP
Aroclor-1254 [2C]	11097-69-1	NJDEP,NYSDOH,PADEP,California ELAP
Aroclor-1260	11096-82-5	NJDEP,NYSDOH,PADEP,California ELAP
Aroclor-1262	37324-23-5	NJDEP,NYSDOH,PADEP
Aroclor-1268	11100-14-4	NJDEP,NYSDOH,PADEP

List of Certifications

Code	Description	Number	Expires
PADEP	Pennsylvania Department of Environmental Protection	68-00367	11/30/2025
NYSDOH	New York State Department of Health	10872	04/01/2025
NJDEP	New Jersey Department of Environmental Protection	03036	06/30/2025
MADEP	Massachusetts Department of Environmental Protection	M-NJ337	06/30/2025
CTDPH	Connecticut Department of Public Health	PH-0270	06/23/2026
California ELAP	California Water Boards	1877	06/30/2025
AIHA LAP	EMSL Analytical, Inc. Cinnaminson, NJ AIHA-LAP, LLC-ELLAP Accredited	100194	01/01/2025
A2LA	A2LA Environmental Certificate	2845.01	07/31/2026

Please see the specific Field of Testing (FOT) on www.emsl.com <http://www.emsl.com> for a complete listing of parameters for which EMSL is certified.

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted.

EMSL Analytical, Inc.

200 Route 130, Cinnaminson, NJ, 08077
Telephone: 856-858-4800 Fax:856-786-5974
EMSL-CIN-01

EMSL Order ID: 012437511
LIMS Reference ID: AC37511
EMSL Customer ID: LUEN50

Attention: Mitch Smith
LU Engineers [LUEN50]
280 East Broad St., Suite 170
Rochester, NY 14604
(585) 385-7417
msmith@luengineers.com

Project Name: Syracuse Hancock International Airport - Former Firehouse Structure

Customer PO:
EMSL Sales Rep: Gillian Egiazarov
Received: 11/19/2024 09:30
Reported: 12/04/2024 14:17

Notes and Definitions

Item	Definition
(Dig)	For metals analysis, sample was digested.
[2C]	Reported from the second channel in dual column analysis.
DF	Dilution Factor
MDL	Method Detection Limit.
ND	Analyte was NOT DETECTED at or above the detection limit.
NR	Spike/Surrogate showed no recovery.
Q	Qualifier
RL	Reporting Limit
Wet	Sample is not dry weight corrected.
%REC	Percent Recovery
RPD	Relative Percent Difference
Source	Sample that was matrix spiked or duplicated

Measurement of uncertainty and any applicable definitions of method modifications are available upon request. Per EPA NLLAP policy, sample results are not blank corrected.

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted.

Environmental Chemistry Chain of Custody

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

EMSL Order Number / Lab Use Only: AC37511

200 Route 130 North
Cinnaminson, NJ 08077
PHONE: 1-800-220-3675
EMAIL: c@emsl.com

Customer Information

Customer ID:	
Company Name:	LU Engineers
Contact Name:	Mitch Smith
Street Address:	280 East Broad St., Suite 170
City, State, Zip:	Rochester NY 14604
Country:	US
Phone:	585-385-7417
Email(s) for Report:	msmith@luengineers.com, rdillard@luengineers.com

Billing Information

Billing ID:	
Company Name:	LU Engineers
Billing Contact:	Mitch Smith
Street Address:	280 East Broad St., Suite 170
City, State, Zip:	Rochester NY 14604
Country:	US
Phone:	585-385-7417
Email(s) for Invoice:	msmith@luengineers.com

Project Name/No: Syracuse Hancock International Airport-Former Firehouse Structure 4500-03

Purchase Order:

EMSL LIMS Project ID: (If applicable, EMSL will provide)

US State where samples collected: NY

State of Connecticut (CT) must select project location: ☐ Commercial (Taxable) ☐ Residential (Non-Taxable)

Samples for Compliance? ☐ Yes ☑ No

If Yes, for NPDES? ☐ Yes ☑ No

Other (Specify)

PWS ID:

State Reporting Required? ☐ Yes ☑ No

Samples Collected by (Check One): ☐ EMSL ☑ CLIENT

Samples Received Chilled? ☐ Yes ☑ No

Sample(s) Temperature Upon Receipt (LAB ONLY)

Sampled By Name: R.Dillard / E.Gonzalez

Sampled By Signature:

No. of Samples in Shipment:

Turn-Around-Time (TAT) Standard Turn-Around-Time: ☑ 2 Weeks

The following TAT's are subject to Lab approval. Call lab to confirm TAT before submittal: ☐ 1 Week ☐ 4 Days ☐ 3 Days ☐ 2 Days ☐ 1 Day

Client Sample ID	Comp	Grab	Date / Time Collected	Matrix (W=Water S=Soil A=Air SL=Sludge O=Other)	Preservative (1 HCL 2 HNO3 3 H2SO4 4 ICE 5 Other – Describe below in Special Instructions)	Test 1: PCB Caulk	Test 2:	Test 3:	Test 4:	Test 5:	Test 6:	Test 7:	Test 8:	Comments
PCB-16	☐	☑	10-16-24	O		☑	☐	☐	☐	☐	☐	☐	☐	Black Window Glaze
PCB-25	☐	☑	10-16-24	O		☑	☐	☐	☐	☐	☐	☐	☐	Black Fire Stop Caulk
PCB-26	☐	☑	10-16-24	O		☑	☐	☐	☐	☐	☐	☐	☐	Grey Window Glaze
PCB-48	☐	☑	11-13-24	O		☑	☐	☐	☐	☐	☐	☐	☐	White Caulk

Special Instructions and/or Regulatory Requirements (Sample Specifications, Processing Methods, Limits of Detection, etc.)

21.2°C Recd in Plastic

Reporting Requirements: ☑ Results Only ☐ Results and QC ☐ Reduced Deliverables ☐ Hzresults EDD ☐ Excel ☐ Other (Describe Above)

Method of Shipment: Fed Ex

Sample Condition Upon Receipt:

Relinquished by: R.Dillard	Date/Time: 11-18-2024	Received by:	Date/Time: 11/19/24 0930
Relinquished by:	Date/Time:	Received by:	Date/Time

☐ **AGREE TO ELECTRONIC SIGNATURE** (By checking, I consent to signing this Chain of Custody document by electronic signature.)

ATTACHMENT D

Asbestos Location Plans

Lu Engineers
ENVIRONMENTAL • TRANSPORTATION • CIVIL

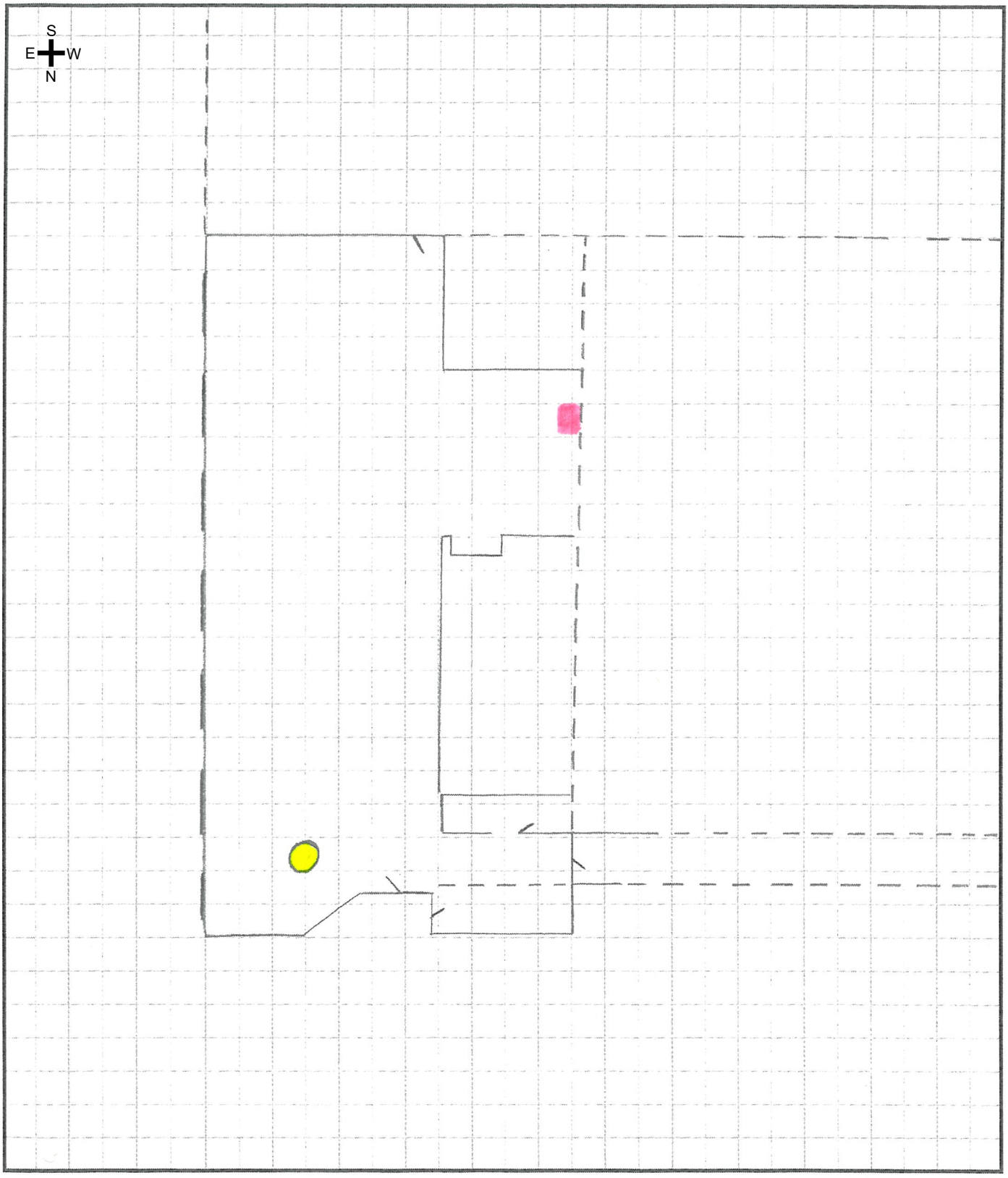
ASBESTOS, LEAD PAINT, and PCB CAULK SURVEY

SYRACUSE HANCOCK INTERNATIONAL AIRPORT
FORMER FIREHOUSE STRUCTURE
1000 COL EILEEN BOULEVARD
SYRACUSE, NEW YORK

Lu Engineers
ENVIRONMENTAL • TRANSPORTATION • CIVIL

ABESTOS LOCATION PLAN

"Area 1" Front Room Entrance



LEGEND:

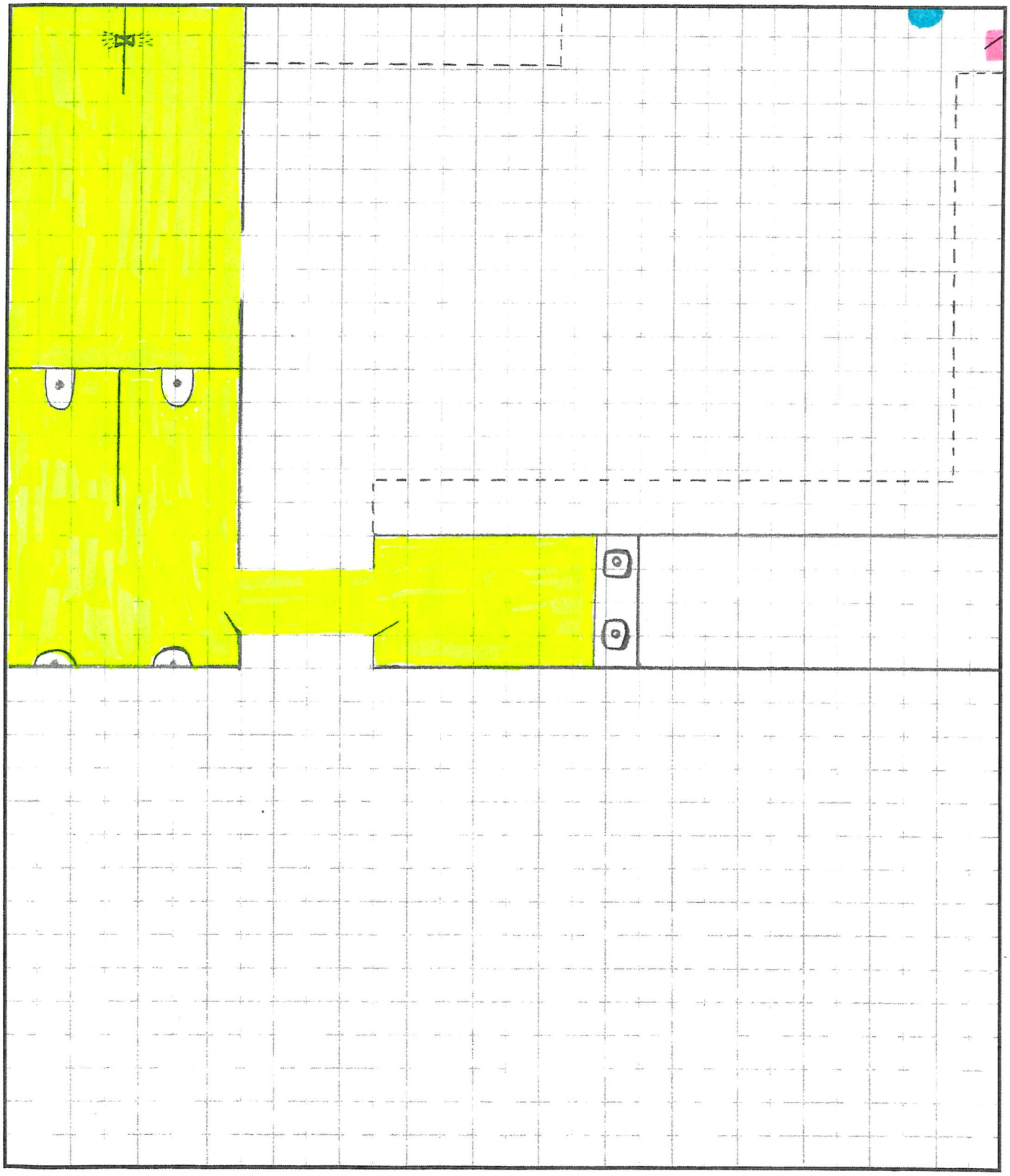
= Approximate location of Asbestos Containing Grey/Yellow/White Paint

= Approximate location of Asbestos Containing Pink Sink Undercoating

Lu Engineers
ENVIRONMENTAL • TRANSPORTATION • CIVIL

ASBESTOS LOCATION PLAN

"Area 3" Locker Room



LEGEND:

= Approximate location of Asbestos Containing Grey Floor/Wall Tile Adhesive

= Approximate location of Asbestos Containing Black Fire Stop Caulk

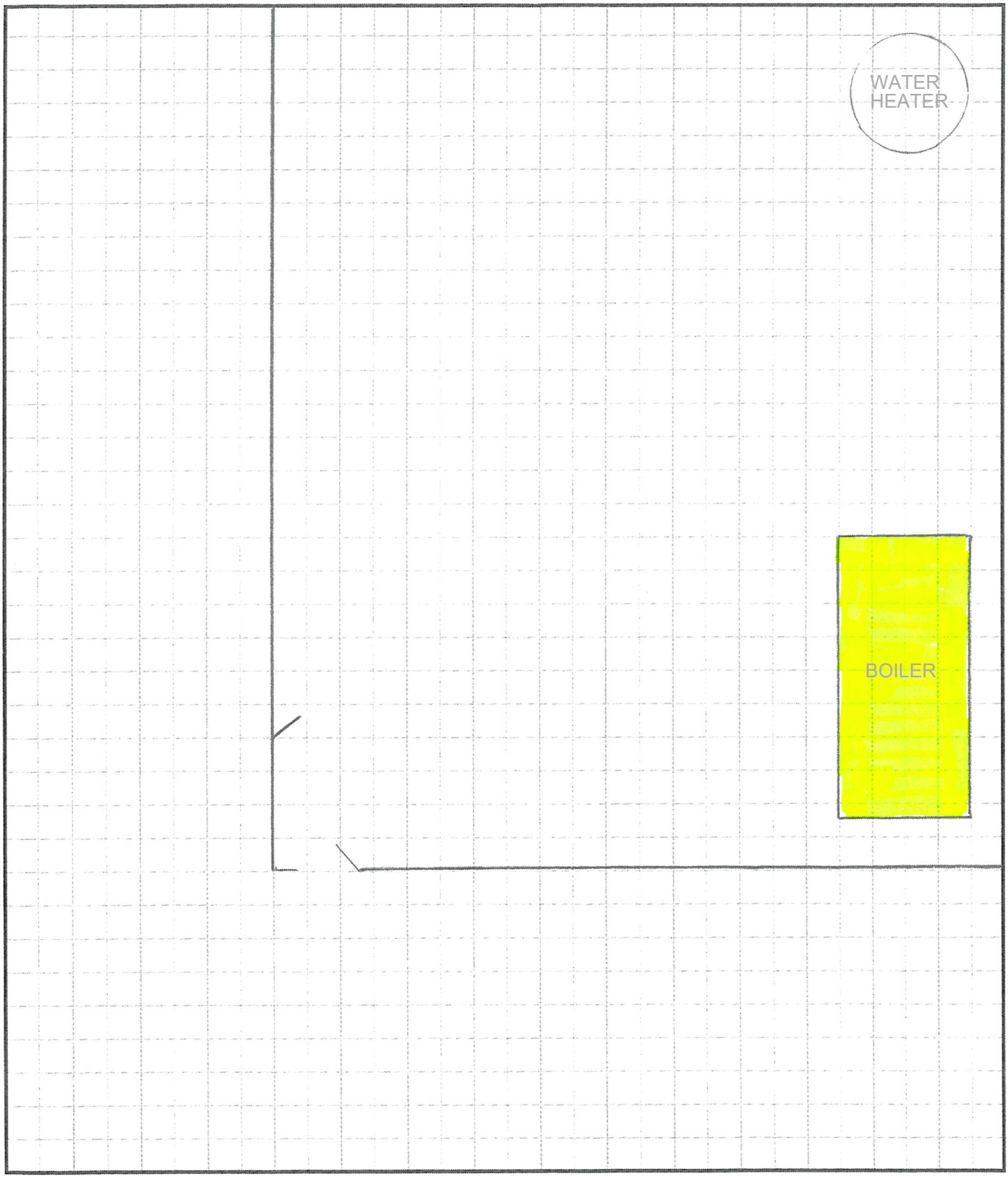
= Approximate location of Asbestos Containing Grey Window Glaze

N
W E
S

Lu Engineers
ENVIRONMENTAL • TRANSPORTATION • CIVIL

ASBESTOS LOCATION PLAN

"Area 4" Boiler Room



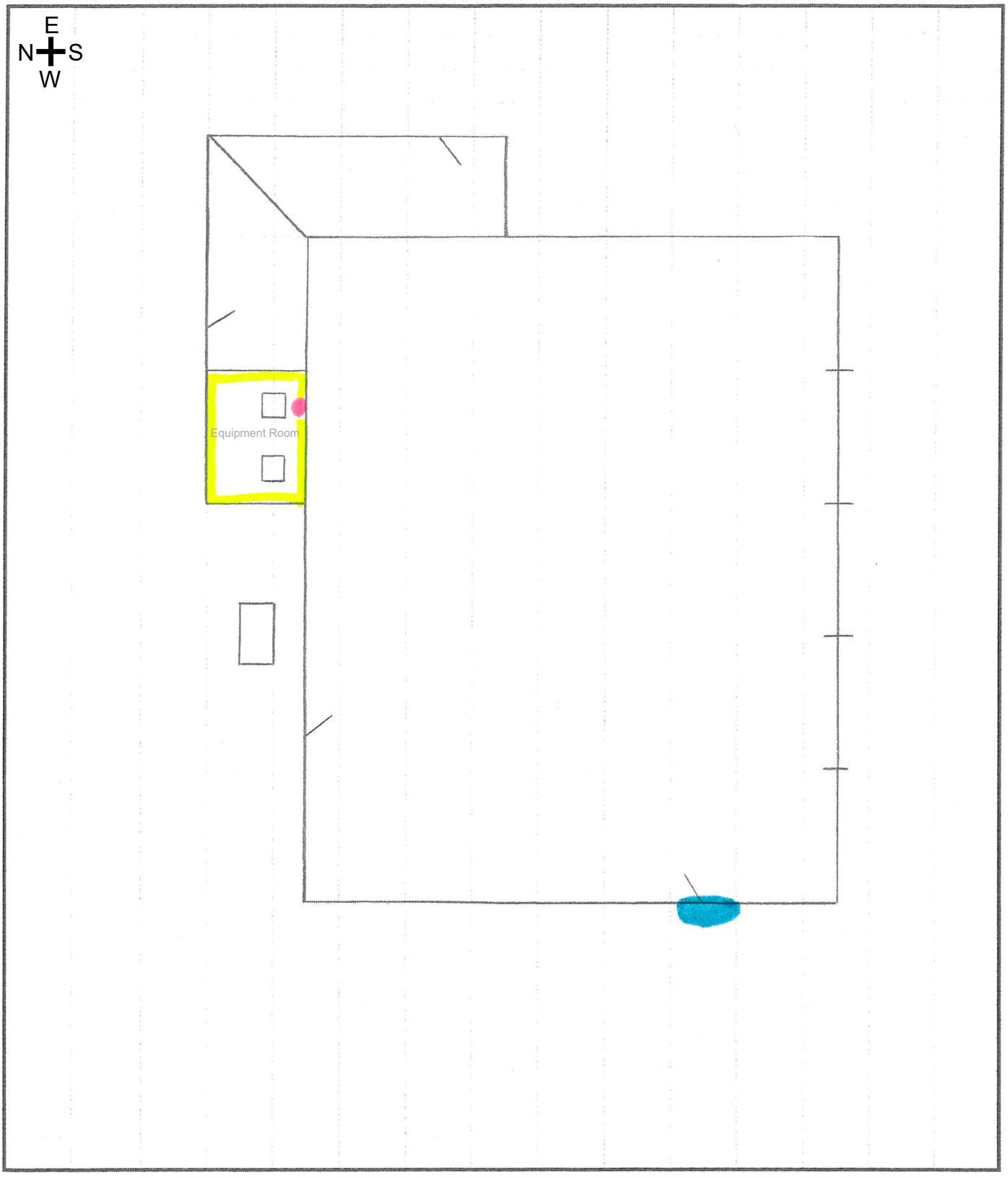
LEGEND: = Approximate location of Asbestos Containing Tan Refractory Cement

E
N S
W

Lu Engineers
ENVIRONMENTAL • TRANSPORTATION • CIVIL

ASBESTOS LOCATION PLAN

Exterior



= Approximate location of Asbestos Containing Black Tar Roof Flashing

= Approximate Location of Asbestos Containing Grey Caulk

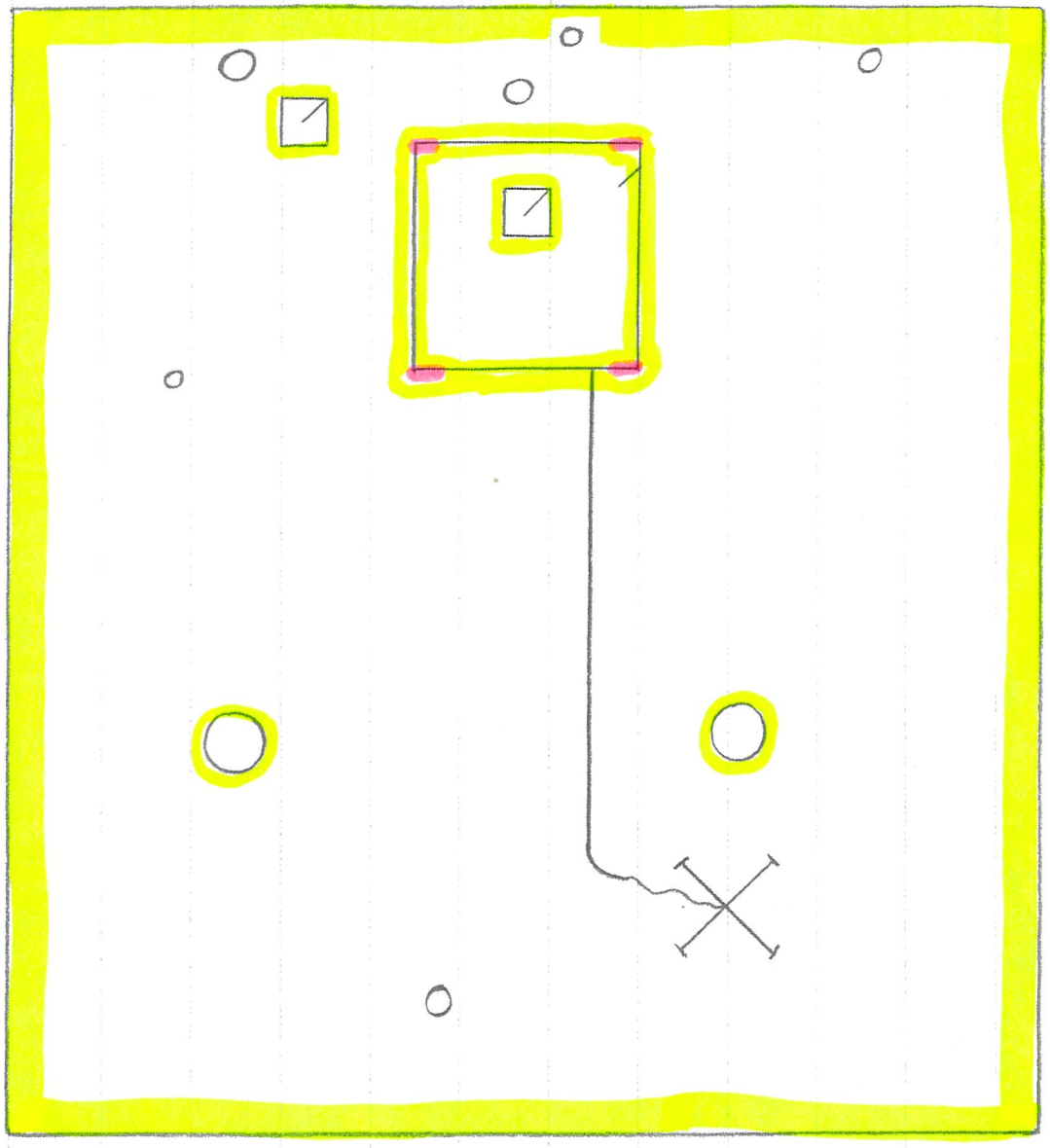
= Approximate location of Asbestos Containing Grey Window Glaze

Lu Engineers
ENVIRONMENTAL • TRANSPORTATION • CIVIL

ASBESTOS LOCATION PLAN

Roof

N
W E
S



LEGEND:

= Approximate location of Asbestos Containing Black Tar Roof Flashing

= Approximate location of Asbestos Containing White Caulk

ATTACHMENT E

Site Photographs

Lu Engineers
ENVIRONMENTAL • TRANSPORTATION • CIVIL

ASBESTOS, LEAD PAINT, and PCB CAULK SURVEY

SYRACUSE HANCOCK INTERNATIONAL AIRPORT
FORMER FIREHOUSE STRUCTURE
1000 COL EILEEN BOULEVARD
SYRACUSE, NEW YORK

1



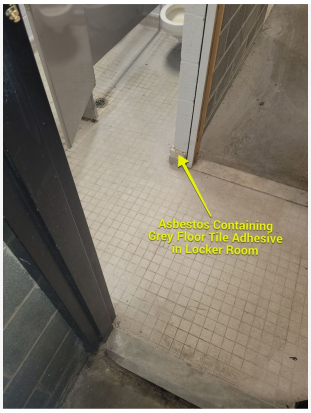
Project: Syracuse Airport Firehouse (4500-03)
Date: 10/16/2024, 9:02am
Creator: Ryan Dillard

2



Project: Syracuse Airport Firehouse (4500-03)
Date: 10/16/2024, 9:18am
Creator: Ryan Dillard

3



Project: Syracuse Airport Firehouse (4500-03)
Date: 10/16/2024, 9:25am
Creator: Ryan Dillard

4



Project: Syracuse Airport Firehouse (4500-03)
Date: 10/16/2024, 9:26am
Creator: Ryan Dillard

5



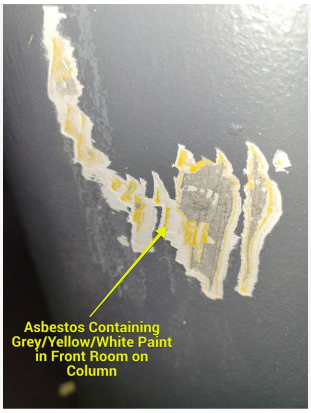
Project: Syracuse Airport Firehouse (4500-03)
Date: 10/16/2024, 9:28am
Creator: Ryan Dillard

6



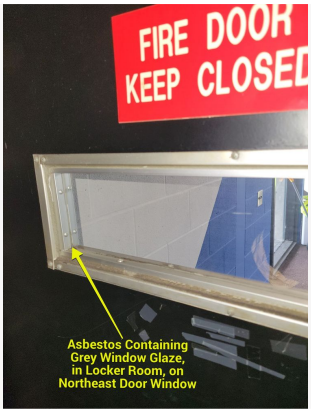
Project: Syracuse Airport Firehouse (4500-03)
Date: 10/16/2024, 10:35am
Creator: Ryan Dillard

7



Project: Syracuse Airport Firehouse (4500-03)
Date: 10/16/2024, 10:37am
Creator: Ryan Dillard

8



Project: Syracuse Airport Firehouse (4500-03)
Date: 10/16/2024, 12:53pm
Creator: Ryan Dillard

9



Project: Syracuse Airport Firehouse (4500-03)
Date: 11/13/2024, 11:41am
Creator: Ryan Dillard

10



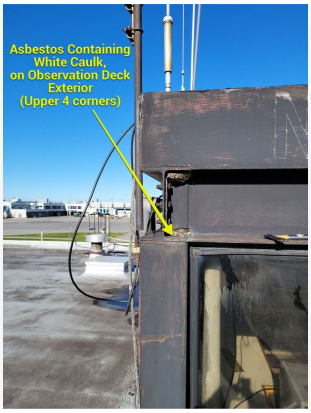
Project: Syracuse Airport Firehouse (4500-03)
Date: 11/13/2024, 11:41am
Creator: Ryan Dillard

11



Project: Syracuse Airport Firehouse (4500-03)
Date: 11/13/2024, 12:00pm
Creator: Ryan Dillard

12



Project: Syracuse Airport Firehouse (4500-03)
Date: 11/13/2024, 12:10pm
Creator: Ryan Dillard

13



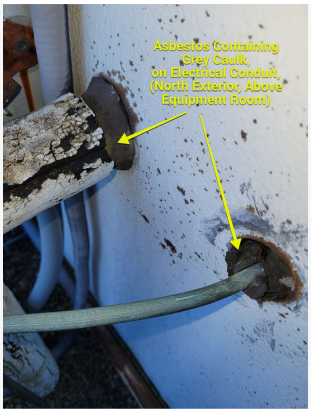
Project: Syracuse Airport Firehouse (4500-03)
Date: 11/13/2024, 12:10pm
Creator: Ryan Dillard

14



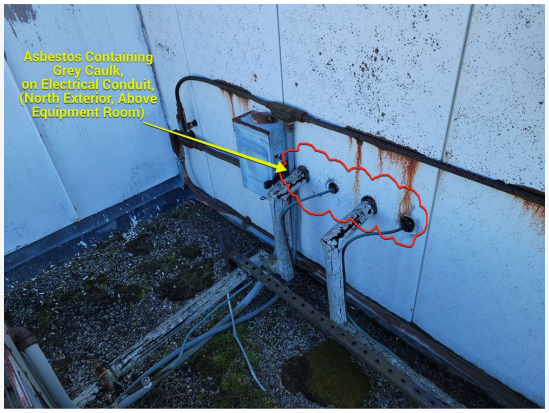
Project: Syracuse Airport Firehouse (4500-03)
Date: 11/13/2024, 12:49pm
Creator: Ryan Dillard

15



Project: Syracuse Airport Firehouse (4500-03)
Date: 11/13/2024, 12:53pm
Creator: Ryan Dillard

16



Project: Syracuse Airport Firehouse (4500-03)
Date: 11/13/2024, 12:54pm
Creator: Ryan Dillard

17



Project: Syracuse Airport Firehouse (4500-03)
Date: 11/13/2024, 1:08pm
Creator: Ryan Dillard

18



Project: Syracuse Airport Firehouse (4500-03)
Date: 11/13/2024, 1:08pm
Creator: Ryan Dillard

SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK
CENTRALIZED DEICING FACILITY (CDF) PROJECT
BASE BID

ITEM NO.	SPEC NO.	QUANTITY	ITEM LIST ITEM DESCRIPTION (PRICE WRITTEN IN WORDS)	UNIT PRICE IN FIGURES DOLLARS	 CENTS	TOTAL AMOUNT DOLLARS	 CENTS
1	C-100-1	1 LS	CONTRACTOR QUALITY CONTROL PROGRAM (CQCP) AT PER LUMP SUM				
2	C-102-1	1 LS	COMPLIANCE WITH TEMPORARY AIR AND WATER POLLUTION, SOIL EROSION AND SILTATION CONTROL AT PER LUMP SUM				
3	C-102-2	9 EACH	INSTALLATION AND REMOVAL OF STORM DRAIN INLET PROTECTION AT PER EACH				
4	C-102-3	4,800 LF	INSTALLATION AND REMOVAL OF COMPOST FILTER SOCK AT PER LINEAR FOOT				
5	C-102-4	3 EACH	INSTALLATION AND REMOVAL OF PREFORMED CHECK DAM AT PER EACH				
6	C-102-5	50 CY	INSTALLATION OF STONE CHECK DAM AT PER CUBIC YARD				
7	C-102-6	360 LF	INSTALLATION OF DRY SWALE AT PER LINEAR FOOT				
8	C-105-1	1 LS	MOBILIZATION (4% MAX.) AT PER LUMP SUM				

SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK
CENTRALIZED DEICING FACILITY (CDF) PROJECT
BASE BID

ITEM NO.	SPEC NO.	QUANTITY	ITEM LIST ITEM DESCRIPTION (PRICE WRITTEN IN WORDS)	UNIT PRICE IN FIGURES DOLLARS	 CENTS	TOTAL AMOUNT DOLLARS	 CENTS
9	C-105-2	1 LS	FIELD OFFICE AT PER LUMP SUM				
10	C-105-3	1 LS	FIELD OFFICE EQUIPMENT AT PER LUMP SUM				
11	C-106-1	1 LS	SAFETY, SECURITY AND MAINTENANCE OF TRAFFIC AT PER LUMP SUM				
12	C-107-1	1 LS	PROJECT SURVEY AND STAKEOUT AT PER LUMP SUM				
13	P-101-1	47,650 SY	ASPHALT PAVEMENT REMOVAL, 15" AVERAGE THICKNESS AT PER SQUARE YARD				
14	P-101-3	7,700 SY	PROFILE MILLING ASPHALT PAVEMENT AT PER SQUARE YARD				
15	P-152-1	63,250 CY	UNCLASSIFIED EXCAVATION AT PER CUBIC YARD				
16	P-153-1	400 CY	CONTROLLED LOW STRENGTH MATERIAL (CLSM) AT PER CUBIC YARD				

SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK
CENTRALIZED DEICING FACILITY (CDF) PROJECT
BASE BID

ITEM NO.	SPEC NO.	QUANTITY	ITEM LIST ITEM DESCRIPTION (PRICE WRITTEN IN WORDS)	UNIT PRICE IN FIGURES DOLLARS	 CENTS	TOTAL AMOUNT DOLLARS	 CENTS
17	P-156-1	94,000 SY	CEMENT TREATED SUBGRADE, 12" THICK AT PER SQUARE YARD				
18	P-160-1	1,000 CY	CRUSHED STONE FOR UNDERCUT REPLACEMENT AT PER CUBIC YARD				
19	P-209-1	31,500 CY	CRUSHED AGGREGATE BASE COURSE AT PER CUBIC YARD				
20	P-209-2	400 SY	SEPARATION GEOTEXTILE AT PER SQUARE YARD				
21	P-401-1	25,500 TON	ASPHALT SURFACE COURSE, GRADATION 2 AT PER TON				
22	P-401-2	34,000 TON	ASPHALT BASE COURSE, GRADATION 1 AT PER TON				
23	P-407-1	34,000 TON	ASPHALT TREATED PERMEABLE BASE COURSE (ATPB) AT PER TON				
24	P-603-1	24,250 GAL	EMULSIFIED ASPHALT TACK COAT AT PER GALLON				

ITEM NO.	SPEC NO.	QUANTITY	ITEM LIST ITEM DESCRIPTION (PRICE WRITTEN IN WORDS)	UNIT PRICE IN FIGURES DOLLARS	 CENTS	TOTAL AMOUNT DOLLARS	 CENTS
25	P-605-1	8,400 LF	JOINT SEALING FILLER AT PER LINEAR FOOT				
26	P-620-1	1 LS	SURFACE PREPARATION AT PER LUMP SUM				
27	P-620-2	29,500 SF	PERMANENT PAVEMENT MARKINGS AT PER SQUARE FOOT				
28	P-620-3	3,800 SF	TEMPORARY PAVEMENT MARKINGS AT PER SQUARE FOOT				
29	P-620-4	3,750 SF	PREFORMED THERMOPLASTIC PAVEMENT MARKINGS AT PER SQUARE FOOT				
30	P-620-5	8,000 SF	PAVEMENT MARKING REMOVAL AT PER SQUARE FOOT				
31	P-621-1	35,800 SY	SAW-CUT PAVEMENT GROOVING AT PER SQUARE YARD				
32	P-640-1	1 LS	ABANDONED ARFF BUILDING DEMOLITION AT PER LUMP SUM				

ITEM NO.	SPEC NO.	QUANTITY	ITEM LIST ITEM DESCRIPTION (PRICE WRITTEN IN WORDS)	UNIT PRICE IN FIGURES DOLLARS	 CENTS	TOTAL AMOUNT DOLLARS	 CENTS
33	P-640-2	1 LS	MITIGATION AND REMOVAL OF HAZARDOUS BUILDING MATERIALS AT PER LUMP SUM				
34	F-170-2	21 EACH	VEHICLE COLLISION PROTECTION BOLLARDS AT PER EACH				
35	D-701-2	150 LF	18-INCH DIA. REINFORCED CONCRETE PIPE (RCP), CLASS V AT PER LINEAR FOOT				
36	D-701-3	360 LF	24-INCH DIA. REINFORCED CONCRETE PIPE (RCP), CLASS V AT PER LINEAR FOOT				
37	D-701-4	775 LF	36-INCH DIA. REINFORCED CONCRETE PIPE (RCP), CLASS V AT PER LINEAR FOOT				
38	D-701-5	350 LF	30-INCH ELLIPTICAL REINFORCED CONCRETE PIPE (RCP), CLASS V AT PER LINEAR FOOT				
39	D-701-6	200 LF	36-INCH ELLIPTICAL REINFORCED CONCRETE PIPE (RCP), CLASS V AT PER LINEAR FOOT				
40	D-701-7	1,550 LF	12-INCH DIA. HDPE GLYCOL FORCE MAIN PIPE AT PER LINEAR FOOT				

ITEM NO.	SPEC NO.	QUANTITY	ITEM LIST ITEM DESCRIPTION (PRICE WRITTEN IN WORDS)	UNIT PRICE IN FIGURES DOLLARS	 CENTS	TOTAL AMOUNT DOLLARS	 CENTS
41	D-701-8	475 LF	14-INCH DIA. HDPE GLYCOL FORCE MAIN PIPE AT PER LINEAR FOOT				
42	D-701-9	1,800 LF	12-INCH DIA. SMOOTH INTERIOR CORRUGATED POLYETHYLENE PIPE (SICPP) AT PER LINEAR FOOT				
43	D-701-10	250 LF	15-INCH DIA. SMOOTH INTERIOR CORRUGATED POLYETHYLENE PIPE (SICPP) AT PER LINEAR FOOT				
44	D-701-11	1,375 LF	18-INCH DIA. SMOOTH INTERIOR CORRUGATED POLYETHYLENE PIPE (SICPP) AT PER LINEAR FOOT				
45	D-701-12	1,050 LF	24-INCH DIA. SMOOTH INTERIOR CORRUGATED POLYETHYLENE PIPE (SICPP) AT PER LINEAR FOOT				
46	D-701-13	1,400 LF	36-INCH DIA. SMOOTH INTERIOR CORRUGATED POLYETHYLENE PIPE (SICPP) AT PER LINEAR FOOT				
47	D-701-14	75 LF	18-INCH DIA. DUCTILE IRON PIPE (DIP) AT PER LINEAR FOOT				
48	D-701-15	55 LF	24-INCH DIA. DUCTILE IRON PIPE (DIP) AT PER LINEAR FOOT				

ITEM NO.	SPEC NO.	QUANTITY	ITEM LIST ITEM DESCRIPTION (PRICE WRITTEN IN WORDS)	UNIT PRICE IN FIGURES DOLLARS	 CENTS	TOTAL AMOUNT DOLLARS	 CENTS
49	D-701-16	1 LS	SUBSURFACE STORMWATER MANAGEMENT SYSTEM UG SWD #1 AT PER LUMP SUM				
50	D-701-17	1 LS	SUBSURFACE STORMWATER MANAGEMENT SYSTEM UG SWD #1A AT PER LUMP SUM				
51	D-701-18	1 LS	SUBSURFACE STORMWATER MANAGEMENT SYSTEM UG SWD #2 AT PER LUMP SUM				
52	D-701-19	1 LS	SUBSURFACE STORMWATER MANAGEMENT SYSTEM UG SWD #3 AT PER LUMP SUM				
53	D-705-1	3,700 LF	6-INCH PERFORATED CORRUGATED POLYETHYLENE DRAINAGE PIPE UNDERDRAIN, SMOOTH INTERIOR, UNDER PAVEMENT AT PER LINEAR FOOT				
54	D-705-4	5 EACH	REMOVAL OF UNDERDRAIN CLEANOUT OR HEADWALL AT PER EACH				
55	D-707-1	200 LF	8-INCH DIA. DUCTILE IRON WATER PIPE OR FORCE MAIN, CLASS 52 AT PER LINEAR FOOT				
56	D-707-3	5 EACH	4 OR 8-INCH DIA. DUCTILE IRON GATE VALVE AT PER EACH				

ITEM NO.	SPEC NO.	QUANTITY	ITEM LIST ITEM DESCRIPTION (PRICE WRITTEN IN WORDS)	UNIT PRICE IN FIGURES DOLLARS	 CENTS	TOTAL AMOUNT DOLLARS	 CENTS
57	D-707-4	1 EACH	FIRE HYDRANT AT PER EACH				
58	D-751-1	47 EACH	STORMWATER CATCH BASIN OR MANHOLE AT PER EACH				
59	D-751-2	2 EACH	STORMWATER VALVE PIT STRUCTURE, VALVES AND ALL APPURTENANCES AT PER EACH				
60	D-751-3	2 EACH	STORMWATER PUMP STATION STRUCTURE, PUMPS, CONTROLS AND ALL APPURTENANCES AT PER EACH				
61	D-751-4	1 EACH	DRAINAGE MANHOLE WITH GLYCOL PIPE AIR RELEASE VALVE, CHECK VALVE AND ALL APPURTENANCES AT PER EACH				
62	D-751-5	1 EACH	DRAINAGE MANHOLE WITH TWO (2) CHECK VALVES AND ALL APPURTENANCES AT PER EACH				
63	D-751-6	2,100 LF	STORMWATER CHANNEL DRAIN AT PER LINEAR FOOT				
64	D-751-7	6 EACH	MODIFICATION OF STORMWATER DRAINAGE STRUCTURE AT PER EACH				

ITEM NO.	SPEC NO.	QUANTITY	ITEM LIST ITEM DESCRIPTION (PRICE WRITTEN IN WORDS)	UNIT PRICE IN FIGURES DOLLARS	 CENTS	TOTAL AMOUNT DOLLARS	 CENTS
65	D-751-8	1 EACH	REMOVAL OF SANITARY SEWER SEPTIC TANK, LEACH FIELD AND ALL APPURTENANCES AT PER EACH				
66	D-751-9	15 EACH	REMOVAL OF EXISTING DRAINAGE STRUCTURE, ALL TYPES AND SIZES AT PER EACH				
67	T-901-1	38,100 SY	SEEDING, WET APPLIED AT PER SQUARE YARD				
68	T-905-1	5,250 CY	TOPSOIL (FURNISHED FROM ON SITE STRIPPING OPERATIONS) AT PER CUBIC YARD				
69	T-908-1	38,100 SY	MULCHING AT PER SQUARE YARD				
70	L-100-1	2 EACH	35-FOOT HIGH APRON AREA FLOOD LIGHT, POLE AND FOUNDATION AT PER EACH				
71	L-100-3	5 EACH	REMOVAL OF LIGHT POLE AND FOUNDATION AT PER EACH				
72	L-108-1	24,700 LF	NO. 8 AWG, 5 KV, L-824, TYPE C AIRFIELD LIGHTING CABLE AT PER LINEAR FOOT				

ITEM NO.	SPEC NO.	QUANTITY	ITEM LIST ITEM DESCRIPTION (PRICE WRITTEN IN WORDS)	UNIT PRICE IN FIGURES DOLLARS	 CENTS	TOTAL AMOUNT DOLLARS	 CENTS
73	L-108-2	2,200 LF	NO. 6 AWG, 5 KV, L-824, TYPE C AIRFIELD LIGHTING CABLE AT PER LINEAR FOOT				
74	L-108-3	11,000 LF	NO. 6 AWG, SOLID, BARE COPPER COUNTERPOISE WIRE AT PER LINEAR FOOT				
75	L-108-4	4,050 LF	NO. 12 AWG, 600V, 1/C, TYPE XLP USE-2, 1/C CABLE AT PER LINEAR FOOT				
76	L-108-5	1,275 LF	NO. 10 AWG, 600V, 1/C, TYPE XLP USE-2, 1/C CABLE AT PER LINEAR FOOT				
77	L-108-6	250 LF	NO. 8 AWG, 600V, 1/C, TYPE XLP USE-2, 1/C CABLE AT PER LINEAR FOOT				
78	L-108-7	50 LF	NO. 6 AWG, 600V, 1/C, TYPE XLP USE-2, 1/C CABLE AT PER LINEAR FOOT				
79	L-108-9	4,500 LF	NO. 3 AWG, 600V, 1/C, TYPE XLP USE-2, 1/C CABLE AT PER LINEAR FOOT				
80	L-108-10	3,000 LF	NO. 1 AWG, 600V, 1/C, TYPE XLP USE-2, 1/C CABLE AT PER LINEAR FOOT				

ITEM NO.	SPEC NO.	QUANTITY	ITEM LIST ITEM DESCRIPTION (PRICE WRITTEN IN WORDS)	UNIT PRICE IN FIGURES DOLLARS	 CENTS	TOTAL AMOUNT DOLLARS	 CENTS
81	L-108-11	750 LF	NO. 2/0 AWG, 600V, 1/C, TYPE XLP USE-2, 1/C CABLE AT PER LINEAR FOOT				
82	L-108-12	250 LF	NO. 3/0 AWG, 600V, 1/C, TYPE XLP USE-2, 1/C CABLE AT PER LINEAR FOOT				
83	L-108-13	4,500 LF	NO. 300 KCMIL AWG, 600V, 1/C, TYPE XLP USE-2, 1/C CABLE AT PER LINEAR FOOT				
84	L-108-15	2,750 LF	12 STRAND SINGLE MODE ARMORED JACKET DUCT RATED FIBER OPTIC CABLE WITH INNERDUCT AT PER LINEAR FOOT				
85	L-109-1	1 LS	10' X 16' POWER AND CONTROL EQUIPMENT SHELTER AT PER LUMP SUM				
86	L-109-2	1 LS	4 KW CONSTANT CURRENT REGULATOR WITH SERIES CUTOUT AT PER LUMP SUM				
87	L-109-3	1 LS	TRANSFORMER WITHIN EQUIPMENT SHELTER AT PER LUMP SUM				
88	L-109-4	1 LS	AIRFIELD LIGHTING CONTROL AND MONITORING SYSTEM (ALCMS) AT PER LUMP SUM				

ITEM NO.	SPEC NO.	QUANTITY	ITEM LIST ITEM DESCRIPTION (PRICE WRITTEN IN WORDS)	UNIT PRICE IN FIGURES DOLLARS	 CENTS	TOTAL AMOUNT DOLLARS	 CENTS
89	L-109-6	1 LS	PUMP STATION #1 POWER AND CONTROL EQUIPMENT, LOCAL CONDUITS AND CABLE AT PER LUMP SUM				
90	L-109-7	1 LS	PUMP STATION #2 POWER AND CONTROL EQUIPMENT, LOCAL CONDUITS AND CABLE AT PER LUMP SUM				
91	L-109-8	1 LS	MAIN FEED PAD MOUNTED TRANSFORMER AND SWITCHGEAR ASSEMBLY, SHELTER SITE POWER AND CONTROL EQUIPMENT AT PER LUMP SUM				
92	L-110-1	1,400 LF	2-WAY, 4-INCH CONCRETE ENCASED DUCT BANK AT PER LINEAR FOOT				
93	L-110-2	3,000 LF	4-WAY, 4-INCH CONCRETE ENCASED DUCT BANK AT PER LINEAR FOOT				
94	L-110-3	6,000 LF	2-INCH DIA. SCH. 80 PVC CONDUIT IN TURF AT PER LINEAR FOOT				
95	L-110-4	1,000 LF	4-INCH DIA. SCH. 80 PVC CONDUIT IN TURF AT PER LINEAR FOOT				
96	L-110-5	5,000 LF	2-INCH DIA. CONCRETE ENCASED SCH. 40 PVC CONDUIT IN PAVEMENT AT PER LINEAR FOOT				

ITEM NO.	SPEC NO.	QUANTITY	ITEM LIST ITEM DESCRIPTION (PRICE WRITTEN IN WORDS)	UNIT PRICE IN FIGURES DOLLARS	 CENTS	TOTAL AMOUNT DOLLARS	 CENTS
97	L-110-6	1,600 LF	4-INCH DIA. CONCRETE ENCASED SCH. 40 PVC CONDUIT IN PAVEMENT AT PER LINEAR FOOT				
98	L-110-7	15,400 LF	CABLE REMOVAL IN EXISTING DUCT BANK OR CONDUIT AT PER LINEAR FOOT				
99	L-110-8	1,050 LF	2-INCH DIA. SCH. 80 PVC ELECTRICAL DRAIN PIPE AT PER LINEAR FOOT				
100	L-115-1	19 EACH	PRECAST ELECTRICAL / COMMUNICATIONS PULL BOX AT PER EACH				
101	L-115-2	1 EACH	ELECTRICAL JUNCTION CAN AT PER EACH				
102	L-115-3	21 EACH	REMOVAL OF ELECTRICAL / COMMUNICATIONS PULL BOX OR MANHOLE AT PER EACH				
103	L-115-4	2 EACH	REMOVAL OF ELECTRICAL JUNCTION CAN AT PER EACH				
104	L-125-1	29 EACH	MEDIUM INTENSITY TAXIWAY EDGE LIGHT FIXTURE, ELEVATED, LED AT PER EACH				

ITEM NO.	SPEC NO.	QUANTITY	ITEM LIST ITEM DESCRIPTION (PRICE WRITTEN IN WORDS)	UNIT PRICE IN FIGURES DOLLARS	 CENTS	TOTAL AMOUNT DOLLARS	 CENTS
105	L-125-2	72 EACH	MEDIUM INTENSITY TAXIWAY LIGHT FIXTURE, SEMI-FLUSH, LED AT PER EACH				
106	L-125-3	10 EACH	SALVAGE AND REINSTALL EXISTING MEDIUM INTENSITY TAXIWAY EDGE LIGHT FIXTURE, BASE MOUNTED AT PER EACH				
107	L-125-4	72 EACH	L-868B LOAD BEARING LIGHT BASE, IN PAVEMENT AT PER EACH				
108	L-125-5	39 EACH	L-867B NON LOAD BEARING LIGHT BASE, IN TURF AT PER EACH				
109	L-125-6	3 EACH	RETROREFLECTIVE STOP AND INTERNATIONAL NO AIRCRAFT ENTRY SIGN AT PER EACH				
110	L-125-7	5 EACH	AIRFIELD GUIDANCE SIGN AND FOUNDATION, LED, SIZE 3, 2 MODULE AT PER EACH				
111	L-125-8	1 EACH	AIRFIELD GUIDANCE SIGN AND FOUNDATION, LED, SIZE 3, 3 MODULES AT PER EACH				
112	L-125-9	1 EACH	AIRFIELD GUIDANCE SIGN AND FOUNDATION, LED, SIZE 3, 4 MODULES AT PER EACH				

ITEM NO.	SPEC NO.	QUANTITY	ITEM LIST ITEM DESCRIPTION (PRICE WRITTEN IN WORDS)	UNIT PRICE IN FIGURES DOLLARS	 CENTS	TOTAL AMOUNT DOLLARS	 CENTS
113	L-125-10	7 EACH	REMOVAL OF GUIDANCE SIGN AND FOUNDATION AT PER EACH				
114	L-125-11	69 EACH	REMOVAL OF LIGHT FIXTURE AND APPURTENANCES AT PER EACH				
115	L-125-12	69 EACH	REMOVAL OF LIGHT BASE AT PER EACH				
116	L-125-13	1 LS	SPARE PARTS (NOT TO EXCEED $10,000 OR 10% TOTAL COST) AT PER LUMP SUM				
117	PQ-102-1	226,000 SF	SPOIL AREA MATERIAL LINER SYSTEM, ALL SIDES ENCAPSULATED AT PER SQUARE FOOT				
TOTAL PRICE (WRITTEN IN WORDS)					DOLLARS		CENTS

SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK
CENTRALIZED DEICING FACILITY (CDF) PROJECT
ADD ON #1 (GLYCOL TANK STORAGE FACILITY)

ITEM NO.	SPEC NO.	QUANTITY	ITEM LIST ITEM DESCRIPTION (PRICE WRITTEN IN WORDS)	UNIT PRICE IN FIGURES DOLLARS	 CENTS	TOTAL AMOUNT DOLLARS	 CENTS
1	C-100-1	1 LS	CONTRACTOR QUALITY CONTROL PROGRAM (CQCP) AT PER LUMP SUM				
2	C-102-1	1 LS	COMPLIANCE WITH TEMPORARY AIR AND WATER POLLUTION, SOIL EROSION AND SILTATION CONTROL AT PER LUMP SUM				
3	C-102-2	2 EACH	INSTALLATION AND REMOVAL OF STORM DRAIN INLET PROTECTION AT PER EACH				
4	C-102-3	750 LF	INSTALLATION AND REMOVAL OF COMPOST FILTER SOCK AT PER LINEAR FOOT				
5	C-102-4	1 EACH	INSTALLATION AND REMOVAL OF PREFORMED CHECK DAM AT PER EACH				
6	C-102-5	36 CY	INSTALLATION OF STONE CHECK DAM AT PER CUBIC YARD				
7	C-102-6	220 LF	INSTALLATION OF DRY SWALE AT PER LINEAR FOOT				
8	C-105-1	1 LS	MOBILIZATION (4% MAX.) AT PER LUMP SUM				

SYRACUSE HANCOCK INTERNATIONAL AIRPORT
SYRACUSE, NEW YORK
CENTRALIZED DEICING FACILITY (CDF) PROJECT
ADD ON #1 (GLYCOL TANK STORAGE FACILITY)

ITEM NO.	SPEC NO.	QUANTITY	ITEM LIST ITEM DESCRIPTION (PRICE WRITTEN IN WORDS)	UNIT PRICE IN FIGURES DOLLARS	 CENTS	TOTAL AMOUNT DOLLARS	 CENTS
9	C-107-1	1 LS	PROJECT SURVEY AND STAKEOUT AT PER LUMP SUM				
10	P-101-2	100 SY	ASPHALT PAVEMENT REMOVAL, 6" AVERAGE THICKNESS AT PER SQUARE YARD				
11	P-152-1	3,620 CY	UNCLASSIFIED EXCAVATION AT PER CUBIC YARD				
12	P-160-1	330 CY	CRUSHED STONE FOR UNDERCUT REPLACEMENT AT PER CUBIC YARD				
13	P-209-1	2,560 CY	CRUSHED AGGREGATE BASE COURSE AT PER CUBIC YARD				
14	P-209-2	6,120 SY	SEPARATION GEOTEXTILE AT PER SQUARE YARD				
15	P-401-1	1,130 TON	ASPHALT SURFACE COURSE, GRADATION 2 AT PER TON				
16	P-401-2	1,660 TON	ASPHALT BASE COURSE, GRADATION 1 AT PER TON				

ITEM NO.	SPEC NO.	QUANTITY	ITEM LIST ITEM DESCRIPTION (PRICE WRITTEN IN WORDS)	UNIT PRICE IN FIGURES DOLLARS	 CENTS	TOTAL AMOUNT DOLLARS	 CENTS
17	P-603-1	960 GAL	EMULSIFIED ASPHALT TACK COAT AT PER GALLON				
18	P-605-1	1,230 LF	JOINT SEALING FILLER AT PER LINEAR FOOT				
19	P-610-1	270 CY	PORTLAND CEMENT CONCRETE PAVEMENT AT PER CUBIC YARD				
20	F-170-1	190 LF	BOX BEAM GUIDE RAILING AT PER LINEAR FOOT				
21	F-170-2	22 EACH	VEHICLE COLLISION PROTECTION BOLLARDS AT PER EACH				
22	D-701-1	140 LF	12-INCH DIA. REINFORCED CONCRETE PIPE (RCP), CLASS V AT PER LINEAR FOOT				
23	D-705-2	620 LF	6-INCH PERFORATED CORRUGATED POLYETHYLENE DRAINAGE PIPE UNDERDRAIN, SMOOTH INTERIOR, IN TURF AT PER LINEAR FOOT				
24	D-705-3	3 EACH	UNDERDRAIN CLEANOUT OR HEADWALL AT PER EACH				

ITEM NO.	SPEC NO.	QUANTITY	ITEM LIST ITEM DESCRIPTION (PRICE WRITTEN IN WORDS)	UNIT PRICE IN FIGURES DOLLARS	 CENTS	TOTAL AMOUNT DOLLARS	 CENTS
25	D-707-2	360 LF	4-INCH DIA. DUCTILE IRON WATER PIPE, CLASS 52 AT PER LINEAR FOOT				
26	D-707-3	4 EACH	4 OR 8-INCH DIA. DUCTILE IRON GATE VALVE AT PER EACH				
27	D-707-5	1 EACH	WATER PIPE RPZ AND METER IN HEATED ENCLOSURE AT PER EACH				
28	D-751-1	2 EACH	STORMWATER CATCH BASIN OR MANHOLE AT PER EACH				
29	T-901-1	2,800 SY	SEEDING, WET APPLIED AT PER SQUARE YARD				
30	T-905-1	390 CY	TOPSOIL (FURNISHED FROM ON SITE STRIPPING OPERATIONS) AT PER CUBIC YARD				
31	T-908-1	2,800 SY	MULCHING AT PER SQUARE YARD				
32	L-100-2	4 EACH	22-FOOT HIGH AREA FLOOD LIGHT, POLE AND FOUNDATION AT PER EACH				

ITEM NO.	SPEC NO.	QUANTITY	ITEM LIST ITEM DESCRIPTION (PRICE WRITTEN IN WORDS)	UNIT PRICE IN FIGURES DOLLARS	 CENTS	TOTAL AMOUNT DOLLARS	 CENTS
33	L-108-8	1,500 LF	NO. 4 AWG, 600V, 1/C, TYPE XLP USE-2, 1/C CABLE AT PER LINEAR FOOT				
34	L-108-10	750 LF	NO. 1 AWG, 600V, 1/C, TYPE XLP USE-2, 1/C CABLE AT PER LINEAR FOOT				
35	L-108-14	3,000 LF	NO. 350 KCMIL AWG, 600V, 1/C, TYPE XLP USE-2, 1/C CABLE AT PER LINEAR FOOT				
36	L-108-15	780 LF	12 STRAND SINGLE MODE ARMORED JACKET DUCT RATED FIBER OPTIC CABLE WITH INNERDUCT AT PER LINEAR FOOT				
37	L-109-5	1 LS	DEICING FLUID STORAGE FACILITY POWER AND CONTROL EQUIPMENT, LOCAL CONDUITS AND CABLE AT PER LUMP SUM				
38	L-110-3	180 LF	2-INCH DIA. SCH. 80 PVC CONDUIT IN TURF AT PER LINEAR FOOT				
39	L-110-4	130 LF	4-INCH DIA. SCH. 80 PVC CONDUIT IN TURF AT PER LINEAR FOOT				
40	L-110-5	640 LF	2-INCH DIA. CONCRETE ENCASED SCH. 40 PVC CONDUIT IN PAVEMENT AT PER LINEAR FOOT				

ITEM NO.	SPEC NO.	QUANTITY	ITEM LIST ITEM DESCRIPTION (PRICE WRITTEN IN WORDS)	UNIT PRICE IN FIGURES DOLLARS	 CENTS	TOTAL AMOUNT DOLLARS	 CENTS
41	L-110-6	220 LF	4-INCH DIA. CONCRETE ENCASED SCH. 40 PVC CONDUIT IN PAVEMENT AT PER LINEAR FOOT				
42	PQ-101-1	3 EACH	20,000 GALLON HORIZONTAL CYLINDRICAL DOUBLE WALL ABOVE GROUND STEEL TANK WITH ALL APPURTENANCES INCLUDING CATWALK AND STAIRWAY AT PER EACH				
43	PQ-101-2	2 EACH	8-FOOT DIA., 5,600 GALLON VERTICAL CYLINDRICAL POLYETHYLENE TANK WITH ALL APPURTENANCES AT PER EACH				
44	PQ-101-3	1 LS	DEICING FLUID STORAGE FACILITY EQUIPMENT AT PER LUMP SUM				
45	PQ-101-4	1 LS	DEICING FLUID STORAGE FACILITY EQUIPMENT INSTALLATION, SITE WORK, PLUMBING SYSTEM, PADS AND SUPPORTS AT PER LUMP SUM				
TOTAL PRICE (WRITTEN IN WORDS)					DOLLARS		CENTS