



**CONTRACT DOCUMENTS AND
TECHNICAL SPECIFICATIONS**

For

**RECONSTRUCT RUNWAY 1-19 (BASE BID)
MILL AND OVERLAY RUNWAY 1-19 (ADD ALTERNATE NO. 1)
GROOVE RUNWAY 1-19 (ADD ALTERNATE NO. 2)**

AIP Project No. 3-25-0039-____-2020

MAY 2020



Prepared For:

**Town of Orange Airport Commission
80 Airport Street
Orange, Massachusetts 01364**

Prepared By:

**Airport Solutions Group
39 Winn Street
Burlington, MA 01803
781.491.0083**



**TOWN OF ORANGE, MASSACHUSETTS
ORANGE MUNICIPAL AIRPORT**

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Section I
Invitation For Bids

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INVITATION FOR BIDS
FOR IMPROVEMENTS TO
ORANGE MUNICIPAL (ORE)

The Town of Orange, Massachusetts, acting through the Orange Airport Commission, invites sealed bids for furnishing all labor and materials and performing all work in connection with a construction contract at the Orange Municipal Airport, Orange, Massachusetts as follows:

RECONSTRUCT RUNWAY 1-19

AIP Project No. 3-25-0039-____-2020

Procedures regarding bids and the selection of contractors shall be in conformity with the Massachusetts General Laws, Chapter 30, Section 39M, as amended to date. **Sealed Bids for the General Contract must be delivered to the office of the Airport Manager 80 Airport Road, Orange, MA 01634 prior to 10:00 a.m., Eastern Daylight Savings Time, on Wednesday June 10, 2020** at which time and place the bids will be publicly opened and read aloud. Bids received after the above time and date will be returned unopened.

The work includes, but is not limited to the reconstruction of Runway 1-19; installation of new airfield lights and signs; and runway grooving.

General Bids must be submitted on the Form for General bid included herein. The General Bids shall be filed with the Owner at the location designated above, accompanied by a bid deposit in the form of a bid bond or a certified check, in the amount not less than five percent (5%) of the bid price for the Contract work. The bid security shall be made payable to the Town of Orange Airport Commission.

The Instruction to Bidders, Bid Proposal Forms, Contract Documents, Plans and Specifications may be examined at the **Orange Municipal Airport – Office of the Airport Manager, 80 Airport Street, Orange, MA 01364, (Telephone: 978.544.8189)** on or after **May 27, 2020** between the hours of 9:00 AM and 4:00 PM Monday through Friday. Please call ahead for availability.

The Contract Plans and Specifications shall be obtained electronically by emailing cschuster@airportsolutionsgroup.com on or after **May 27, 2020**, (Monday thru Friday – 8:30 AM – 4:00 PM).

Pre-Bid Conference and Site Inspection: All bidders are highly advised to examine the site to become familiar with all site conditions. The project site will be shown to interested bidders at a pre-bid meeting to be held at **10:00 AM Eastern Daylight Saving Time, on June 3, 2020, at the Office of the Airport Manager, the City of Orange Municipal Airport, 80 Airport Street, Orange, MA 01364.** Questions regarding scope of work or of a technical nature must be presented in writing to Airport Solutions Group, LLC by 10:00 a.m. on Friday June 5, 2020, Eastern Daylight Saving Time. Questions may be submitted by email to: cschuster@airportsolutionsgroup.com or faxed to 781.491.0360.

The proposed improvements to be accomplished under this contract will be subject to the Commonwealth of Massachusetts EEO, Anti-Discrimination and Affirmative Action Program; and a Disadvantaged Business Enterprise (DBE) set aside for this work. A four and 21/100 percent (4.21%) goal for employment of DBE firms certified by the Massachusetts Unified Certification Program (UCP) has been established for this job.

Attention is called to Massachusetts Labor Standards provisions regarding conditions of employment, including requirements that minimum wage rates be paid to contractor employees in accordance with M.G.L. Chapter 149, Sections 26 to 27D and the Federal Wage Rates, whichever is higher. The Contractor must comply with the Federal Civil Rights Act of 1964, Title VI; Airport and Airways Improvement Act of 1982 General Civil Rights, Section 520; Disadvantage Business Enterprise Title 49 CFR Part 26; Lobbying and Influencing Federal Employees, Title 49 CFR Part 20; the Occupational Safety and Health Act; the Contract

Work Hours and Safety Standard Act; and Executive Order 11246. The successful contractor will be required to submit a certified payroll on a weekly basis for review by the designee of the awarding authority.

The Contractor must comply with the Buy American Preference (49 USC §50101); Foreign Trade Restriction (49 USC §50104, 49 CFR Part 30); Davis-Bacon Act (Title 29 CFR Part 5; 2 CFR §200, Appendix D); Affirmative Action Requirement (Title 41 CFR Part 60-4; Executive Order 11246); Government-wide Debarment and Suspension (2 CFR Part 180, Subpart C; 2 CFR Part 1200; DOT Order 42005); and Government-wide Requirements for Drug-free Workplace. The successful contractor will be required to submit a certified payroll on a weekly basis for review by the designee of the awarding authority.

Title VI Solicitation Notice

The Orange Airport Commission, 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) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award.

Disadvantage Business Enterprise

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 bid responsiveness, the Bidder or Offeror must submit the following information with their 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) 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.

The successful Bidder or Offeror must provide written confirmation of participation from each of the DBE firms the Bidder or Offeror lists in their commitment. This Bidder or Offeror must submit the DBE's written confirmation of participation within 5 days after bid opening.

The requirements of 49 CFR part 26 apply to this contract. It is the policy of the City of Orange Municipal Airport 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.

General Bidders and all other levels of contractors on this work will be required to sign, in accordance with the M.G.L. 62C Sections 47A through Sections 49A, a Certificate of Compliance with the Tax Laws of the Commonwealth of Massachusetts.

The Commonwealth of Massachusetts requires all out of state vendors soliciting business in the State to be registered as a Foreign Corporation in the Commonwealth of Massachusetts. Out of State businesses must file a foreign corporation form appointing an agent for services and processing within the State of Massachusetts. The form may be obtained from the state website www.state.ma.us/sec/ for completion. Proof of registration as a foreign corporation must be submitted with the bid.

Bidders shall comply with the Aviation Safety and Capacity Act of 1990 that requires preference be given to steel and manufactured products produced in the United States when funds are expended pursuant to a

grant issued under the Airport Improvement Program. The successful bidder will be required to assure that only domestic steel and manufactured products will be used by the Contractor, subcontractor, material men and suppliers in the performance of this Contract.

The successful bidder will be required to furnish a 100% Performance Bond, and a 100% Labor and Materials or Payment Bond as set forth in the specifications.

It is anticipated that work covered by this contract will commence during late summer/early fall of 2020.

The Bidder must supply all the information required by the proposal forms and specifications and must bid on all items, including the Statement of Qualifications package. The Orange Airport Commission reserves the right to waive any informalities or to reject any or all bids, or to accept any other bid than the lowest bidder should it be deemed to be in the best interest of the Commission to do so.

No bid may be withdrawn within one hundred and twenty (120) calendar days following the actual date of the bid opening.

Awarding Authority
Town of Orange Airport Commission
Julie M. Cole, Chair

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Section II
Instructions To Bidders

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INSTRUCTIONS TO BIDDERS
FOR IMPROVEMENTS TO
ORANGE MUNICIPAL AIRPORT (ORE)

RECONSTRUCT RUNWAY 1-19

AIP Project No. 3-25-0039-____-2020

General Bids will be received prior to **10:00 a.m., Eastern Daylight Savings Time, Wednesday, June 10, 2020**. Bids received after this time will be returned unopened. Bids received will be publicly opened and read aloud immediately following this time at the office of the **Airport Manager, 80 Airport Street, Orange, MA 01364**.

Hereinafter in these Instructions to Bidders and associated Specifications and Contract Documents, Owner means the **Orange Municipal Airport Commission** acting for the **Town of Orange, Massachusetts**; the Commission also means the **Orange Municipal Airport Commission**; and Engineer means Airport Solutions Group, LLC, 39 Winn Street, Burlington, MA 01803.

The Owner, in accordance with Title VI of the Civil Rights Act of 1964, 78 Stat. 252, 42 U.S.C. 2000d to 2000d-4 and Title 49, Code of Federal Regulations, Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Nondiscrimination in Federally assisted programs of the Department of Transportation issued pursuant to such Act, hereby notifies all bidders that it will affirmatively ensure that in any contract entered into pursuant to this advertisement, Disadvantaged Business Enterprises (DBE) will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of age, sex, race, color, or national origin in consideration for an award.

Prevailing Wages: By submitting a bid for this project, the bidder certifies that the bid is based on the payment of prevailing wages. State and Federal prevailing wage rates, as determined by the Secretary of Labor and included in the specifications, are applicable to this project.

Open Bidding: In order to comply with Executive Order 12818, nothing herein shall:

- a. Require bidders, offerors, contractors, or subcontractors to enter into or adhere to agreement with one or more labor organizations, on the same or other related construction project(s), or
- b. Otherwise discriminate against bidders, offerors, contractors, or subcontractors for refusing to become or remain signatories or otherwise adhere to agreements with one or more labor organizations, on the same or other related construction project(s), or
- c. Require any bidder, offeror, contractor or subcontractor to enter into, adhere to, or enforce any agreement that requires its employees, as a condition of employment, to:
 1. Become members of or affiliated with a labor organization; or
 2. Pay dues or fees to a labor organization, over an employee's objection, in excess of the employee's share of labor organization costs relating to collective bargaining, contract administration, or grievance adjustment.
- d. No contractor or subcontractor under a Federal contract shall require, as a condition of any subcontract relating to a Government construction contract that the part with which is contracts impose or enforce any of the elements specified in paragraphs 1 through 3 above in performing its subcontract. This section does not prohibit a contractor or subcontractor from voluntarily entering into an otherwise lawful agreement with a labor organization regarding its own employees.

No verbal agreements or conversations with any agent or employee of the Owner, either before or after execution of the contract, shall affect or modify any of the terms or obligations contained in any of the contract documents.

Modification of bids already submitted will be permitted, provided such modification are in writing and transmitted to the office of the **Airport Manager, 80 Airport Street, Orange, MA 01364** prior to the bid opening date and time. Such modification shall not reveal the amount of the original or revised bid.

If more than one bid is offered by one party, all such bids shall be rejected and returned unopened. If duplicate bids are not discovered until after opening, such duplication shall be cause for immediate rejection of all bids offered by the same party. A party who has quoted prices to a bidder is not thereby disqualified from quoting prices to other bidders, or from submitting a direct bid in his/her own behalf.

Bid Security: Each proposal must be accompanied by a bid security consisting of either a Certified Check, Cashier's Check or Bid Bond, made payable to the **Town of Orange, Massachusetts**, in the amount of not less than five percent (5%) of the amount of the proposal including all Base and Additive Alternate bid items identified on the Form of General Bid, as assurance that the Bidder will, upon acceptance of this bid, execute such contractual documents as may be required within the time specified.

Every General Bidder whose deposit is not returned pursuant to the provisions of the following paragraph entitled "Return of Bid Deposits" may file with the Awarding Authority at any time after five (5) days, Saturdays, Sundays, and legal holidays excluded, from the opening of the General Bids, a Bond in an amount not less than the amount of his/her Bid Deposit and in a form satisfactory to the Awarding Authority, with a surety company qualified to do business in the Commonwealth of Massachusetts. Upon the filing of a Bond, the Bid Deposit of the General Bidder filing such a Bond will be returned to the bidder.

Sales Tax Exemption Notice: Bidders are instructed to submit bids not including sales tax according to Massachusetts General Laws. The selected contractor will receive a Project Exemption Certificate and a Massachusetts Tax Exemption letter from the Owner to use in purchasing materials on a tax-free basis. It will be the contractor's responsibility to provide the documentation to any subcontractor. These documents will be used solely for purchase of materials being directly incorporated into or consumed in the construction of the work under this contract.

Proposal: All Proposals or General Bids are to be prepared on the proposal forms supplied by the Owner and included in the bid package which accompanies the contract documents. The Bidder must supply all information required by the proposal forms and specifications, and he/she must bid on all items listed on Form of General Bid. A bidder shall not stipulate in his/her proposal any conditions not contained in the proposal form included in the contract documents. Bids must be accompanied by the Massachusetts Department of Transportation (MassDOT) Aeronautics Division DBE Letter of Intent that is included in the Bid Proposal Forms.

Contract Award and Selection Criteria The selection of the contractor will be made with consideration to (1) the lowest total price for the bid and (2) the opinion of the Owner as to which contractor's qualifications are the most favorable to accomplish the proposed work. The decision to award the contract will be further conditioned upon satisfying the requirements established by the awarding authority to evaluate efforts of the bidder to meet the Disadvantaged Business Enterprise Participation contract goals included in the Bid Proposal Forms. For this project, **the DBE participation goals are at least 4.21 percent of the contract by dollar value.**

The Owner reserves the right to waive any informality in or to reject any or all portions of the various low bids from qualified contractor bid items.

The award of the contract, and contract execution, is subject to the approval of the Massachusetts Department of Transportation (MassDOT) Aeronautics Division.

Subcontractor's List: The names, address, telephone numbers, proposed work items, and amount of major subcontractors the Bidder expects to use in performing the work under this proposal shall be furnished with the bid proposal. If no subcontractors are expected to be used, a statement to that effect must accompany the bid proposal. If alternate bids are requested, any changes in the identity of the major subcontractors expected to be used for work, in the event an alternate bid is accepted, shall be shown. "Major subcontractors", as used herein, includes any subcontractor performing either ten percent (10%) of the total contract cost, or Fifty Thousand Dollars (\$50,000), whichever is less, and any other subcontractor for a particular item of work required to be identified in the bid solicitation. After the bid opening, the successful bidder may not substitute for any of the major subcontractors identified in the bid, except with the written approval of the Awarding Authority for good cause shown. The availability of another subcontractor at a lower cost to the general contractor after the bid opening shall not constitute good cause for such substitution. The successful bidder shall furnish to the Owner a complete list of all subcontractors to be used for the work within ten (10) work days of the issuance by the Owner of notice of intent to award the contract.

Right to Reject Subcontractors: If the Owner, or its designee, has reasonable objection to any proposed subcontractor, the Owner, or its designee, may, before the notice of award is given, request the apparent low bidder to submit an acceptable substitute subcontractor without an adjustment in the bid price. If the apparent low bidder declines to make such substitution, the Owner may award the contract to the next lowest bidder proposing to use acceptable subcontractors. Declining to make the requested subcontractor substitution, will not constitute grounds for any forfeiture of a bidder's bid bond.

Prohibition on Assignment or Subletting: The contractor shall not assign or subcontract any portion of the contract to any subcontractor not identified as provided in the paragraph titled "Subcontractor's List" above, without the written approval of the Owner, or its designee. No subcontractor shall subcontract any portion of its work, without the written approval of the Owner, or its designee. The Owner's written approval of subletting shall not be construed as making the Owner a party to any subcontractor, or subject the Owner to any liability to the subcontractor. No subcontract shall in any circumstances relieve the contractor, or its surety, of its liability and obligation under the contract, and all transactions shall be made through the contractor. Subcontractors will be recognized and dealt with only as workmen and representatives of the contractor.

Statement of Qualifications: Each proposal must be accompanied by a statement of the bidder's qualifications to perform the work contemplated. The Statement of Qualifications shall be prepared on the form attached hereto.

Contract Documents: The Contract Documents consist of all the specification sections listed in this specification document bound together labeled **Reconstruct Runway 1-19, AIP No. 3-25-0039-____-2020, Orange** or included herein by reference, together with Plans dated **May 2020** are all a part of the contract.

Permits: The Contractor shall refer to, fully understand, and provide acknowledgement of the permits found in the appendices of these specifications.

Copies of this permit are attached to this specification in the Appendix. The Contractor shall assume all responsibility for compliance to these permits.

Contract Performance Period: Upon execution of the contract, the Owner will issue a written "Notice to Proceed" which will specify an effective date for the Contractor to begin work at the site. All work under this Contract must be completed within **one hundred and thirty one (131)** calendar days of the date

specified in the "Notice to Proceed" for the award of the bid. Generally work is only permitted on weekdays (Monday through Friday) from 7:00 am to 5:00 pm. No work on Saturday or Sundays, or holidays is allowed. See the construction phasing plans for actual times available to work. Failure to complete the project within the time period specified will result in the assessment of liquidated damages as listed below, or termination of contract.

Liquidated Damages: In the event that a successful bidder should fail or refuse to execute and deliver the Contract and Bonds required within five (5) calendar days from the date of the Notice of Award, he/she shall forfeit to the Owner as liquidated damages his/her bid deposit.

Refer to the project special provisions and Technical Specification Item M-001 for additional information regarding liquidated damages for the entire project and per specific work areas.

Pre-award Compliance Review: Upon the request of the U.S. Department of Labor, the sponsor will not enter into contracts or approve the entry into contracts or subcontracts with any bidder, prospective prime contractor, or proposed subcontractor named by the Department of Labor until a pre-award compliance review has been conducted and approved with a determination that the bidder, prospective prime contractor or proposed subcontractor will be able to comply with the provisions of the Equal Opportunity Clause.

Non-procurement List: The "Non-procurement List" is that portion of the "List of Parties Excluded from Federal Procurement and Non-procurement Programs" compiled, maintained, and distributed by GSA which contains the names and other information about persons or companies who have been debarred, suspended, or voluntarily excluded from participation in Federal programs. An individual or company named in the "Non-procurement List" may not be awarded a grant, a contract, or a subcontract except as provided in 49 CFR Part 29.

Performance Bond and Payment Bond: Simultaneously with his/her delivery of the executed Contract, the Contractor shall furnish surety bonds as security for faithful performance of this Contract and for the payment of all persons performing labor on the project under this Contract and furnishing materials in connection with this Contract. The surety shall be a duly authorized surety company satisfactory to the Owner, listed on the current United States Department of the Treasury "Department of Treasury's listing of approved sureties (Department Circular 570)", and licensed to do business in the Commonwealth of Massachusetts as a condition of acceptability.

| | |
|------------------------|-----------------------|
| Surety Bonds Required: | 100% Performance Bond |
| | 100% Payment Bond |

Power of Attorney: Attorneys-in-fact who sign Bid Bonds or Contract Bonds must file with each bond a certified and effectively dated copy of their power of attorney.

Notice of Special Conditions: Attention is particularly called to the General Provisions, Supplemental General Provisions, and the Technical Specifications that deal with the following:

- a. Inspection and Testing of Materials
- b. Insurance Requirements
- c. Legal Relations and Responsibility to Public
- d. Control of Work
- e. Summary of Work
- f. Work Schedule
- g. Miscellaneous items (Engineer's Field Office, Environmental Requirements, etc.)

Addenda and Interpretations: No interpretation of the meaning of the plans, specifications or other pre-bid documents will be made to any bidder verbally.

Every request for such interpretations should be in writing to the Engineer and mailed to, Airport Solutions Group, LLC, 39 Winn Street, Burlington, MA 01803, by facsimile to 781.491.0360, or by email at cschuster@airportsolutionsgroup.com and to be given consideration must be received by 12:00 noon Eastern Daylight Savings Time on Friday, June 5, 2020. Any and all such interpretations and any supplemental instructions will be in the form of a written addenda to the specifications which, if issued, will be mailed by certified mail with return receipt requested, by Federal Express, or by email, or by facsimile with a form to be returned by the Bidder acknowledging receipt, to all prospective Bidders at the respective addresses or facsimile numbers furnished for such purposes. Failure of any Bidder to receive any such addendum or interpretation shall not relieve such Bidder from any obligation under his/her bid as submitted. All addenda so issued shall become part of the Contract Documents and so acknowledged by the bidder.

Estimated Quantities and Bid Form: Estimated quantities for unit price items are approximate only, being given as a basis for the uniform comparison of bids, and the Owner does not expressly, nor by implication, agree that the actual amount of work will correspond therewith.

The Owner reserves the right, as a condition for awarding the Contract, to increase or diminish the amount of any classes, or portion of the work, or to omit construction in certain locations, as may be determined by the Owner.

The Bid Proposal Form, in Section III, consists of items of work for which bid unit prices are requested and/or items of work for which bid lump sum prices are requested. Each bid shall state a unit price for each unit price item and a lump sum price for each lump sum item (if applicable). Each unit price shall be multiplied by the quantity of the particular item and the result stated as the total amount for the item. All such total amounts shall be added together with the sum of all lump sum prices and the grand total of the bid when correctly calculated will be used in the comparison of bids received.

The bid form must not be changed and must be submitted under the name of and with the correct business address of the bidder.

Compliance Reports: Executive Order 11246 as amended. Within 30 calendar days after award of this contract, the Contractor/Subcontractor shall file a compliance report (Standard Form 100) if she/he has not submitted a complete compliance report within 12 months preceding the date of award. This report is required if the Contractor/Subcontractor meets all of the following conditions:

- a. Contractors/Subcontractors are not exempt based on 41 CFR 60-1.5.
- b. Has 50 or more employees.
- c. Is a prime contractor or first tier subcontractor.
- d. There is a contract, subcontract, or purchase order amounting to \$50,000 or more.

Procedure for General Bids: Submission of General Bids

The General Bids shall be submitted on the Forms that are provided within a sealed envelope containing the General Bid and the accompanying Bid Security. The envelope shall be clearly marked on the outside as follows:

General Bid for:

RECONSTRUCT RUNWAY 1-19**AIP Project No. 3-25-0039-____-2020****at the ORANGE MUNICIPAL AIRPORT, ORANGE, MASSACHUSETTS*****Name of Bidder******Address of Bidder***

- a. ALL GENERAL BIDS SHALL BE SUBMITTED IN DUPLICATE.
- b. The General Base Bid shall be for the complete project as called for in the Specifications
- c. The Bid Deposit specified in the Invitation for Bids shall be included in the envelope with the Bid Form.
- d. General Bids sent by mail are forwarded at the risk of the bidder and will not be accepted if received after the time for the opening of the bids.
- e. The award of every such contract in connection with which approval by an officer, board or agency of the Commonwealth or of the Federal government, is required shall be made within **one hundred twenty (120) calendar days**, Saturdays, Sundays and legal holidays included, after such approval; and the award of every contract for which approval by an officer, board or agency of the Commonwealth or of the Federal government is not required shall be made within **one hundred twenty (120) calendar days** Saturdays, Sundays and legal holidays included, after the opening of the bids. No Bidder may withdraw his/her bid for at least **one hundred twenty (120) calendar days** after the day and date set for the receipt of General Bids, Saturdays, Sundays, and legal holidays included.
- f. If the General Bidder is a Corporation a Vote of Corporate Authorization must be submitted with the Bid.
- g. When a conflict exists between the amount shown in figures and the amount shown in words, it shall be understood that the amount shown in words shall govern.
- h. Modification of bids already submitted will be permitted, provided such modification be in writing and transmitted to the Director of Purchasing of the Airport Manager, Orange Municipal Airport, 80 Airport Street, Orange, MA 01364.

Qualification of Bidder: It shall be the responsibility of the Owner to determine if bidders are “responsible” and “eligible” in accordance with Massachusetts General Law and these plans and specifications.

The Owner may make other such investigations including those outlined in the General Provisions Section 20 paragraph 20-02 to determine if the bidder is “responsible” and “eligible.” It is the responsibility of the bidder to promptly furnish all such information and data for this purpose as listed herein or as requested by the Owner.

The Owner reserves the right to reject any bid if the evidence submitted by, or investigation of, such bidder fails to indicate that such bidder is responsible and eligible. If the Owner determines that the low bidder is not responsible and eligible, the Owner shall reject the bidder and evaluate the next low bidder in accordance with this section.

Obligation of Bidder: At the time of the opening of bids each Bidder will be presumed to have inspected the site, and to have read and to be thoroughly familiar with the Plans and Contract Documents (including all addenda and permits) as well as all statutes, by-laws and regulations affecting this bid. The failure or omission of any Bidder to examine the site, any form, instrument or document applicable to its bid shall in no way relieve any Bidder from any obligation in respect to its bid.

Rejection of General Bids: Every General Bid which is not accompanied by a Bid Deposit or which otherwise does not conform to the requirements of Chapter 30, Section 39 inclusive of the Massachusetts General Laws, or which is on a form not completely filled in, or which is incomplete, conditional or obscure, or which contains any additional information not called for, shall be invalid, and the Owner will reject every such bid.

Bid Forms must be completely and correctly filled in; giving all of the information that is requested. Bids must not be qualified in any manner. Such qualification may be cause for the rejection of the bid.

More than one Bid Proposal from an individual, firm, or partnership, a corporation or an association under the same or different names will not be considered. Reasonable grounds for believing that any Bidder is interested in submitting more than one Bid Proposal for the work will cause rejection of all Bid Proposals in which the bidder is interested. Any or all Bid Proposals will be rejected if there is reason for believing that collusion exists among the bidders, and no participants in such collusion will be considered in future Bid Proposals for the same work. Bid Proposals in which prices are obviously unbalanced may be rejected.

The Owner reserves the right to waive any informalities in the bidding procedure; to reject any or all bids, if it is deemed to be in the best interest of the Owner, and further, the Contract for the work may be awarded to any other than the low bidder if the low bidder does not possess the necessary skill, ability, or integrity for faithful performance or cannot certify ability to furnish labor that works in harmony with all other elements of labor.

Return of Bid Deposits: All Certified Checks, Certificates of Deposit or Bid Deposits of General Bidders, except those of the three (3) lowest responsible and eligible General Bidders, will be returned within ten (10) calendar days, Saturdays, Sundays, and legal holidays included, after the opening of the General Bids. Bid Bonds will be retained by the Owner unless accompanied by a self-addressed stamped envelope. The Bid Deposit of the three (3) lowest responsible and eligible General Bidders will be returned upon the execution and delivery of the general contract, or if no award is made, upon the expiration of the **one hundred and twenty (120) calendar day time limit**, Saturdays, Sundays and legal holidays included.

If any General Bidder fails to execute a Contract and to furnish a Performance Bond, Labor and Materials Payment Bond, and Maintenance Bond, his/her Bid Deposit shall become the property of the Owner as Liquidated Damages for noncompliance of this requirement; provided that the amount of the Bid Deposit shall not, in any event, exceed the difference between his/her price and the bid price of the next lowest responsible and eligible Bidder.

The General Bid Deposit will be returned in case of death, disability, bona fide clerical or mechanical error of a substantial nature, or other unforeseen circumstances affecting the General Bidder.

Registered to do Business: All bidders shall be registered to do business within the Commonwealth of Massachusetts. Registration can be obtained through the Corporation Division of the Office of the Secretary, Commonwealth of Massachusetts. Proof of registration as a foreign corporation must be submitted with the bid.

Nondiscrimination in Employment: Contracts for work under this proposal will obligate the Contractors and subcontractors not to discriminate in employment practices.

Bidders must, if requested or required herein, submit a compliance report concerning their employment practices and policies in order to maintain their eligibility to receive the award of the Contract. Successful Bidders must, if requested or required herein, submit a list of all subcontractors who will perform work on the project and written signed statements from authorized agents of the labor pools with which they will, or may, deal for employees on the work together with supporting information that said labor pools will affirmatively cooperate in, or offer no hindrance to, the recruitment, employment and equal treatment of

employees seeking employment and performing work under the Contract, or a certification as to what efforts have been made to secure such statements when such agents or labor pools have failed or refused to furnish same prior to the award of the Contract. Successful Bidders must be prepared to comply in all respects with the Contract Provisions regarding non-discrimination.

END OF SECTION II - INSTRUCTIONS TO BIDDERS

Section III
Forms for Proposals

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GENERAL BIDDER'S SUBMISSION CHECKLIST

- FORM FOR GENERAL BID
- GENERAL BID SCHEDULE OF PRICES
- VOTE OF CORPORATION AUTHORIZING EXECUTION OF CONTRACT
- NON COLLUSION AND TAX COMPLIANCE FORM
- REQUIRED EQUAL OPPORTUNITY STATEMENTS
- INTERNAL REVENUE SERVICE EMPLOYER IDENTIFICATION NUMBER
- FORM OF PROPOSAL GUARANTY (BID BOND)
- BUY AMERICAN CERTIFICATION
- STATEMENT OF QUALIFICATIONS
- ANTICIPATED SUBCONTRACTS
- TOWN OF ORANGE MASSACHUSETTS AFFIRMATIVE ACTION
- TOWN OF ORANGE AFFIRMATIVE ACTION BID SUBMISSION
 - BIDDERS CERTIFICATE OF UNDERSTANDING
 - SCHEDULE OF PARTICIPATION DISADVANTAGE/MINORITY/WOMAN BUSINESS ENTERPRISES
 - LETTER OF INTENT
 - MINORITY/WOMAN BUSINESS ENTERPRISE PROGRAM CONTRACTOR IDENTIFICATION STATEMENT
 - BIDDERS CERTIFICATION
 - MINORITY/WOMAN/DISADVANTAGED BUSINESS ENTERPRISES UNAVAILABILITY CERTIFICATION (IF APPLICABLE)
 - MINORITY/WOMAN/DISADVANTAGED BUSINESS ENTERPRISES REQUEST FOR WAIVER (IF APPLICABLE)
- REQUEST FOR VERIFICATION OF TAXATION REPORTING INFORMATION
- OSHA CERTIFICATION REQUIREMENTS
- FORM A: MASS COMPLIANCE WITH MINORITY RATIOS AND AFFIRMATIVE ACTION
- FORM B: MASS CERTIFICATION FOR CORPORATE, FIRM OR INDIVIDUAL-OWNED BUSINESS COMPLIANCE WITH MASSACHUSETTS TAX RETURNS AND TAX PAYMENTS
- FORM C: MASS CERTIFICATION FOR NOT PAYING A RETAINAGE FEE TO OTHERS FOR SECURING THIS WORK
- MASSDOT LETTER OF INTENT / SCHEDULE OF PARTICIPATION
- CONTRACTORS CERTIFICATION
- FOSTERING SMALL BUSINESS PARTICIPATION – CFR PART 26.39
- CONTRACTOR'S CERTIFICATION (EEO)
- SUBCONTRACTOR'S CERTIFICATION (EEO)
- BIDDER'S CERTIFICATION
- CERTIFICATION OF OFFERER/BIDDER REGARDING TAX DELINQUENCY AND FELONY CONVICTIONS
- FAA DBE LETTER OF INTENT

- FAA DISADVANTAGE BUSINESS ENTERPRISE (DBE) UTILIZATION
- DUPLICATE COMPLETE PROPOSAL FORMS***

**FORM FOR GENERAL BID
(BID PROPOSAL FORM)**

**ORANGE MUNICIPAL AIRPORT
RECONSTRUCT RUNWAY 1-19**

AIP Project No. 3-25-0039-___-2020

DATE: _____

TO: **THE AWARDING AUTHORITY
ORANGE AIRPORT COMMISSION (OWNER)
MS. JULIE M. COLE, CHAIR**

A) The undersigned proposes to furnish all labor and materials required for the project titled, **RECONSTRUCT RUNWAY 1-19** located at the Orange Municipal Airport in accordance with the accompanying plans and specifications prepared by Airport Solutions Group, LLC (Engineer), for the contract price specified below, subject to additions and deductions according to the terms of the Specifications. It shall be understood that the Owner is the sole judge as to acceptance of the bids and award of the Contract.

B) This bid includes Addenda numbered: _____
(*contractor must acknowledge receipt of all addenda that are issued. *)

C) The proposed cumulative **Contract Price for the Base Bid, Add Alternate No. 1, and Add Alternate No. 2 is as follows** (spelled out and in numbers). In the event of a discrepancy between the written and numeric prices, the written prices shall prevail.

1). Base Bid Price: _____
_____ Dollars (\$ _____)

2). Add Alternate No. 1 Price: _____
_____ Dollars (\$ _____)

3). Add Alternate No. 2 Price: _____
_____ Dollars (\$ _____)

4). Total Bid Price: _____
_____ Dollars (\$ _____)

D) The undersigned agrees that, if he/she is selected as General Contractor, he/she will, within five (5) consecutive calendar days, after presentation thereof by the awarding authority, execute a contract in accordance with the terms of this Bid, and furnish a Performance Bond, and also a Labor and Materials Payment Bond, each of a surety company qualified to do business under the laws of the Commonwealth of Massachusetts and satisfactory to the Awarding Authority, and each in the sum of the contract price, the premiums for which are to be paid by the General Contractor and are included in the Contract Price.

The undersigned hereby certifies that he/she is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the project and will comply fully with all laws and regulations applicable to awards made subject to Massachusetts General Laws Chapter 30 Section 39M.

The undersigned further certifies under the penalties of perjury that this bid is in all respects is bona fide, fair and made without collusion or fraud with any other person or entity. As used in this subsection the word "person" shall mean any natural person, joint venture, partnership, corporation or other business or legal entity.

The undersigned further certifies under penalty of perjury that the said undersigned is not presently debarred from doing public construction work in the Commonwealth of Massachusetts under the provisions of M.G.L. Section 29F of Chapter 29, or any other applicable debarment provisions of any other chapter of the General Laws or any rule or regulation promulgated thereunder.

The undersigned hereby certifies, under penalty of perjury, that the said undersigned has paid all State Taxes (Income Taxes, Unemployment Taxes, Excise Taxes, Real Estate Taxes, etc., etc.) due in compliance with the Tax Laws of the Commonwealth of Massachusetts M.G.L. Chapter 62C Sections 47A thru 49A.

- E) **Time of Completion:** The undersigned agrees that the construction contract performance period shall extend from the Notice to Proceed through **one hundred and thirty one (131)** consecutive calendar days. The Contractor is further advised to review the General Provisions, Technical Specifications and all other references in the specifications and the contract plans for additional requirements regarding completion of specific phases of construction.

Since time is of the essence of this contract, the undersigned further agrees the work embraced in this contract shall be completed within the specified contract time as defined in paragraphs 80-07, and 80-08 of the General Provisions (Section VI) or as amended herein.

The undersigned agrees that this Bid Proposal may not be withdrawn for a period of **one hundred and twenty (120) calendar days** from the opening thereof.

Note:

If funding is available to construct the Add Alternate No. 1 work then the Bid award will be based on the total combined pricing of the Base Bid price plus the Add Alternate No. 1 price.

If funding is available to construct the Add Alternate No. 1 and Add Alternate No. 2 work then the Bid award will be based on the total combined pricing of the Base Bid price plus the Add Alternate No. 1 plus Add Alternate No. 2 price.

If funding is not available for the Add Alternate No. 1, or Add Alternate No. 1 plus Add Alternate No.2 work then the Bid award will be based on the total price for the Base Bid work.

Add Alternate No. 2 cannot be awarded without first awarding Add Alternate No. 1

Availability of funds will be determined after bids have been opened.

In submitting this Bid Proposal, it is understood that the right is reserved by the Owner to waive any informality in, or to reject any or all bids.

Date: _____

Name of General Bidder: _____

By: _____

(Authorized Signature)

(Title)

Business Address of Bidder: _____

Town/State/Zip: _____ Telephone #: _____

Note: If the bidder is a corporation, indicate the State of Incorporation under the signature and affix the Corporate seal; if a partnership, give full names and residential address if different from the business address.

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**ORANGE MUNICIPAL AIRPORT
RECONSTRUCT RUNWAY 1-19**

AIP Project No. 3-25-0039-____-2020

GENERAL BID SCHEDULE OF PRICES

BASE BID

| ITEM NO. | ESTIMATED QUANTITY | ITEM DESCRIPTION WITH UNIT BID PRICE WRITTEN IN WORDS | UNIT PRICE | | AMOUNT | |
|----------|--------------------|--|------------|-------|---------|-------|
| | | | Dollars | Cents | Dollars | Cents |
| M-002-1 | 1 LS | <u>Development and Implementation of S.W.P.P.P.</u> for the unit price per Lump Sum of: _____dollars and _____ cents. | | | | |
| M-003-1 | 4 EA | <u>Furnish and Install Lighted X's</u> for the unit price per Each of: _____dollars and _____ cents. | | | | |
| M-003-2 | 4 EA | <u>Runway Closed Surface Marker</u> for the unit price per Each of: _____dollars and _____ cents. | | | | |
| M-004-1 | 50 EA | <u>Low Profile Barricade</u> for the unit price per Each of: _____dollars and _____ cents. | | | | |
| M-004-2 | 9,400 LF | <u>Snow Fence</u> for the unit price per Linear Foot of: _____dollars and _____ cents. | | | | |

| ITEM NO. | ESTIMATED QUANTITY | ITEM DESCRIPTION WITH UNIT BID PRICE WRITTEN IN WORDS | UNIT PRICE | | AMOUNT | |
|----------|--------------------|---|------------|-------|---------|-------|
| | | | Dollars | Cents | Dollars | Cents |
| M-005-2 | 115 LF | <u>Sawing Asphalt Pavement</u> for the unit price per Linear Foot of: _____dollars and _____ cents. | | | | |
| M-005-3 | 115 LF | <u>Saw and Seal</u> for the unit price per Linear Foot of: _____dollars and _____ cents. | | | | |
| M-007-1 | 285 EA | <u>Drum Barricades</u> for the unit price each of: _____dollars and _____ cents. | | | | |
| M-007-2 | 120 SF | <u>Temporary Lane Closure Signs</u> for the unit price per Square Foot of: _____dollars and _____ cents. | | | | |
| M-007-3 | 1 ALL | <u>Police Detail</u> for the unit price per Allowance of: Eight thousand dollars and zero cents. | 10000 | 00 | 10000 | 00 |
| M-008-1 | 1 LS | <u>Replace Existing Culvert</u> for the unit price Lump Sum of: _____dollars and _____ cents. | | | | |
| M-009-1 | 37 EA | <u>Abandon Catch Basin</u> for the unit price per Each of: _____dollars and _____ cents. | | | | |

| ITEM NO. | ESTIMATED QUANTITY | ITEM DESCRIPTION WITH UNIT BID PRICE WRITTEN IN WORDS | UNIT PRICE | | AMOUNT | |
|----------|--------------------|--|------------|-------|---------|-------|
| | | | Dollars | Cents | Dollars | Cents |
| M-009-2 | 2 EA | <u>Remove and Dispose of Existing Catch Basin</u> for the unit price per Each of: _____dollars and _____ cents. | | | | |
| M-009-3 | 80 LF | <u>Remove and Dispose of Existing Drain Pipe</u> for the unit price per Linear Foot of: _____dollars and _____ cents. | | | | |
| M-009-4 | 86 EA | <u>Remove and Dispose of Existing Runway/Taxiway Edge Light Fixture</u> for the unit price per Each of: _____dollars and _____ cents. | | | | |
| M-009-5 | 11,500 LF | <u>Remove and Dispose of Existing Electrical Cables</u> for the unit price per Linear Foot of: _____dollars and _____ cents. | | | | |
| M-009-6 | 6 EA | <u>Remove and Dispose of Existing Airfield Sign</u> for the unit price per Each of: _____dollars and _____ cents. | | | | |
| M-009-7 | 100 LF | <u>Remove and Dispose of Existing Fence</u> for the unit price per Linear Foot of: _____dollars and _____ cents. | | | | |

| ITEM NO. | ESTIMATED QUANTITY | ITEM DESCRIPTION WITH UNIT BID PRICE WRITTEN IN WORDS | UNIT PRICE | | AMOUNT | |
|----------|--------------------|---|------------|-------|---------|-------|
| | | | Dollars | Cents | Dollars | Cents |
| M-009-8 | 50 CY | <u>Pavement Removal</u> for the unit price per Cubic Yard of: _____dollars and _____ cents. | | | | |
| M-009-9 | 2,200 SF | <u>Pavement Marking Removal</u> for the unit price per Square Foot of: _____dollars and _____ cents. | | | | |
| M-010-1 | 1 LS | <u>Verification of Existing Circuitry</u> for the unit price per Lump Sum of: _____dollars and _____ cents. | | | | |
| M-010-2 | 1 LS | <u>Temporary Electrical Connections</u> for the unit price per Lump Sum Foot of: _____dollars and _____ cents. | | | | |
| M-011-1 | 72 EA | <u>Inlet Protection</u> for the unit price per Each of: _____dollars and _____ cents. | | | | |
| M-012-1 | 6 AC | <u>Mechanized Equipment Clearing</u> for the unit price per Acre of: _____dollars and _____ cents | | | | |
| M-012-2 | 29,000 SY | <u>Northeast Showy Seed Mix</u> for the unit price per Square Yard of: _____dollars and _____ cents | | | | |

| ITEM NO. | ESTIMATED QUANTITY | ITEM DESCRIPTION WITH UNIT BID PRICE WRITTEN IN WORDS | UNIT PRICE | | AMOUNT | |
|----------|--------------------|--|------------|-------|---------|-------|
| | | | Dollars | Cents | Dollars | Cents |
| M-012-3 | 29,000 SY | <u>Compost Top Dressing</u> for the unit price per Square Yard of: _____dollars and _____ cents | | | | |
| M-012-4 | 700 EA | <u>Restoration Planting</u> for the unit price per Each of: _____dollars and _____ cents | | | | |
| C-100-1 | 1 LS | <u>Contractor Quality Control Program (CQCP)</u> for the unit price per Lump Sum of: _____dollars and _____ cents | | | | |
| P-152-1 | 8,200 CY | <u>Unclassified Excavation</u> for the unit price per Cubic Yard of: _____dollars and _____ cents. | | | | |
| P-152-2 | 4,800 CY | <u>Embankment In-Place</u> for the unit price per Cubic Yard of: _____dollars and _____ cents. | | | | |
| P-207-1 | 36,500 SY | <u>Recycled Asphalt Aggregate Material</u> for the unit price per Cubic Yard of: _____dollars and _____ cents. | | | | |
| P-209-1 | 6,300 CY | <u>Crushed Aggregate Base Course</u> for the unit price per Cubic Yard of: _____dollars and _____ cents. | | | | |

| ITEM NO. | ESTIMATED QUANTITY | ITEM DESCRIPTION WITH UNIT BID PRICE WRITTEN IN WORDS | UNIT PRICE | | AMOUNT | |
|----------|--------------------|---|------------|-------|---------|-------|
| | | | Dollars | Cents | Dollars | Cents |
| P-401-1 | 9,600 TON | <u>Asphalt Surface Course</u> for the unit price per Ton of: _____dollars and _____ cents. | | | | |
| P-603-1 | 2,600 GAL | <u>Emulsified Asphalt Tack Coat</u> for the unit price per Gallon of: _____dollars and _____ cents. | | | | |
| P-620-1 | 14,500 SF | <u>Pavement Marking</u> for the unit price per Square Foot of: _____dollars and _____ cents. | | | | |
| P-620-2 | 800 LB | <u>Reflective Media</u> for the unit price per Pound of: _____dollars and _____ cents. | | | | |
| D-701-1 | 80 LF | <u>12 Inch RCP Drain Pipe</u> for the unit price per Linear Foot of: _____dollars and _____ cents. | | | | |
| D-751-1 | 1 EA | <u>Catch Basin</u> for the unit price per Each of: _____dollars and _____ cents. | | | | |
| F-162-1 | 100 LF | <u>8 Foot High Chain Link Fence</u> for the unit price per Linear Foot of: _____dollars and _____ cents. | | | | |

| ITEM NO. | ESTIMATED QUANTITY | ITEM DESCRIPTION WITH UNIT BID PRICE WRITTEN IN WORDS | UNIT PRICE | | AMOUNT | |
|----------|--------------------|---|------------|-------|---------|-------|
| | | | Dollars | Cents | Dollars | Cents |
| T-901-1 | 58,700 SY | Seeding for the unit price per Square Yard of: _____dollars and _____ cents. | | | | |
| T-901-2 | 58,700 SY | Stabilization Seeding for the unit price per Square Yard of: _____dollars and _____ cents. | | | | |
| T-905-1 | 58,700 SY | Topsoil for the unit price per Square Yard of: _____dollars and _____ cents. | | | | |
| L-108-1 | 12,700 LF | Cable Trench for the unit price per Linear Foot of: _____dollars and _____ cents. | | | | |
| L-108-2 | 16,200 LF | No. 8 AWG 5 kV, L-824, Type C Cable for the unit price per Linear Foot of: _____dollars and _____ cents. | | | | |
| L-108-3 | 12,300 LF | No. 6 AWG, Solid, Bare Copper Counterpoise Wire for the unit price per Linear Foot of: _____dollars and _____ cents. | | | | |
| L-108-4 | 13,800 LF | No. 6 AWG, Bare, Ground Wire for the unit price per Linear Foot of: _____dollars and _____ cents. | | | | |

| ITEM NO. | ESTIMATED QUANTITY | ITEM DESCRIPTION WITH UNIT BID PRICE WRITTEN IN WORDS | UNIT PRICE | | AMOUNT | |
|----------|--------------------|---|------------|-------|---------|-------|
| | | | Dollars | Cents | Dollars | Cents |
| L-110-1 | 85 LF | <u>4 Way – 4 Inch Concrete Encased Duct Bank</u> for the unit price per Linear Foot of: _____dollars and _____ cents. | | | | |
| L-110-2 | 65 LF | <u>4 Way – 4 Inch Direct Buried Duct Bank</u> for the unit price per Linear Foot of: _____dollars and _____ cents. | | | | |
| L-115-1 | 2 EA | <u>Electric Handhole</u> for the unit price per Each of: _____dollars and _____ cents. | | | | |
| L-125-1 | 11 EA | <u>Base Mounted Elevated Runway Edge Light</u> for the unit price per Each of: _____dollars and _____ cents. | | | | |
| L-125-2 | 36 EA | <u>Stake Mounted Elevated Runway Edge Light</u> for the unit price per Each of: _____dollars and _____ cents. | | | | |
| L-125-3 | 12 EA | <u>Stake Mounted Elevated Runway Threshold End Light</u> for the unit price per Each of: _____dollars and _____ cents. | | | | |
| L-125-4 | 6 EA | <u>Stake Mounted Elevated Runway Displaced Threshold Light</u> for the unit price per Each of: _____dollars and _____ cents. | | | | |

| ITEM NO. | ESTIMATED QUANTITY | ITEM DESCRIPTION WITH UNIT BID PRICE WRITTEN IN WORDS | UNIT PRICE | | AMOUNT | |
|----------|--------------------|---|------------|-------|---------|-------|
| | | | Dollars | Cents | Dollars | Cents |
| L-125-5 | 7 EA | <u>Stake Mounted Elevated Taxiway Edge Light</u> for the unit price per Each of: _____dollars and _____ cents. | | | | |
| L-125-6 | 2 EA | <u>Base Mounted Elevated Taxiway Edge Light</u> for the unit price per Each of: _____dollars and _____ cents. | | | | |
| L-125-7 | 7 EA | <u>Airfield Sign</u> for the unit price per Each of: _____dollars and _____ cents. | | | | |

Total Base Bid Price Written in Figures:

Total Base Bid Price Written in Words:

The Owner reserves the right to delete any item of work in whole or in part, in order to meet the available funding.

Amounts are to be shown in both words and figures. In case of Discrepancy, the amount shown in words will govern.

The above unit prices shall include all labor, materials, overhead, profit, insurance, etc., to cover the finished work of the several kinds called for.

This Proposal includes Addenda numbers*** _____
 ***To be filled in by Bidder if Addenda are issued

GENERAL BIDDER:

NAME

TITLE

**ORANGE MUNICIPAL AIRPORT
RECONSTRUCT RUNWAY 1-19**

AIP Project No. 3-25-0039-____-2020

GENERAL BID SCHEDULE OF PRICES

ADD ALTERNATE NO. 1

| ITEM NO. | ESTIMATED QUANTITY | ITEM DESCRIPTION WITH UNIT BID PRICE WRITTEN IN WORDS | UNIT PRICE | | AMOUNT | |
|----------|--------------------|--|------------|-------|---------|-------|
| | | | Dollars | Cents | Dollars | Cents |
| M-005-1 | 3,200 SY | <u>Asphalt Pavement Milling, 0" to 4"</u> for the unit price per Square Yard of: _____ dollars and _____ cents. | | | | |
| M-005-2 | 190 LF | <u>Sawing Asphalt Pavement</u> for the unit price per Linear Foot of: _____ dollars and _____ cents. | | | | |
| M-005-3 | 190 LF | <u>Saw and Seal</u> for the unit price per Linear Foot of: _____ dollars and _____ cents. | | | | |
| M-006-1 | 2,000 LF | <u>Crack Repair – Type 1A</u> for the unit price per Linear Foot of: _____ dollars and _____ cents. | | | | |
| M-006-2 | 3,000 LF | <u>Crack Repair – Type 1B</u> for the unit price per Linear Foot of: _____ dollars and _____ cents. | | | | |

| ITEM NO. | ESTIMATED QUANTITY | ITEM DESCRIPTION WITH UNIT BID PRICE WRITTEN IN WORDS | UNIT PRICE | | AMOUNT | |
|----------|--------------------|---|------------|-------|---------|-------|
| | | | Dollars | Cents | Dollars | Cents |
| M-006-3 | 500 LF | Crack Repair – Type 1C for the unit price per Linear Foot of: _____dollars and _____ cents. | | | | |
| M-009-1 | 4 EA | Abandon Catch Basin for the unit price per Each of: _____dollars and _____ cents. | | | | |
| M-009-3 | 30 LF | Remove and Dispose of Existing Drain Pipe for the unit price per Linear Foot of: _____dollars and _____ cents. | | | | |
| M-010-3 | 3 EA | Remove and Reset Existing Runway Edge Light for the unit price Each of: _____dollars and _____ cents. | | | | |
| M-011-1 | 7 EA | Inlet Protection for the unit price per Each of: _____dollars and _____ cents. | | | | |
| P-152-1 | 400 CY | Unclassified Excavation for the unit price per Cubic Yard of: _____dollars and _____ cents. | | | | |
| P-152-2 | 430 CY | Embankment In-place for the unit price per Cubic Yard of: _____dollars and _____ cents. | | | | |

| ITEM NO. | ESTIMATED QUANTITY | ITEM DESCRIPTION WITH UNIT BID PRICE WRITTEN IN WORDS | UNIT PRICE | | AMOUNT | |
|----------|--------------------|--|------------|-------|---------|-------|
| | | | Dollars | Cents | Dollars | Cents |
| P-401-1 | 1,600 TON | <u>Asphalt Surface Course</u> for the unit price per Ton of: _____dollars and _____ cents. | | | | |
| P-401-2 | 650 TON | <u>Asphalt Leveling Course</u> for the unit price per Ton of: _____dollars and _____ cents. | | | | |
| P-603-1 | 750 GAL | <u>Emulsified Asphalt Tack Coat</u> for the unit price per Gallon of: _____dollars and _____ cents. | | | | |
| D-701-2 | 160 LF | <u>8 Inch PVC Drain Pipe</u> for the unit price per Linear Foot of: _____dollars and _____ cents. | | | | |
| D-751-1 | 2 EA | <u>Catch Basin</u> for the unit price per Each of: _____dollars and _____ cents. | | | | |
| T-901-1 | 12,000 SY | <u>Seeding</u> for the unit price per Square Yard of: _____dollars and _____ cents. | | | | |
| T-901-2 | 12,000 SY | <u>Stabilization Seeding</u> for the unit price per Square Yard of: _____dollars and _____ cents. | | | | |

| ITEM NO. | ESTIMATED QUANTITY | ITEM DESCRIPTION WITH UNIT BID PRICE WRITTEN IN WORDS | UNIT PRICE | | AMOUNT | |
|----------|--------------------|--|------------|-------|---------|-------|
| | | | Dollars | Cents | Dollars | Cents |
| T-905-1 | 12,000 SY | <u>Topsoil</u> for the unit price per Square Yard of: _____dollars and _____ cents. | | | | |

Total Add Alternate No. 1 Price Written in Figures:

Total Add Alternate No. 1 Price Written in Words:

The Owner reserves the right to delete any item of work in whole or in part, in order to meet the available funding.

Amounts are to be shown in both words and figures. In case of Discrepancy, the amount shown in words will govern.

The above unit prices shall include all labor, materials, overhead, profit, insurance, etc., to cover the finished work of the several kinds called for.

This Proposal includes Addenda numbers*** _____
 ***To be filled in by Bidder if Addenda are issued

GENERAL BIDDER:

 NAME

 TITLE

**ORANGE MUNICIPAL AIRPORT
RECONSTRUCT RUNWAY 1-19**

AIP Project No. 3-25-0039-___-2020

GENERAL BID SCHEDULE OF PRICES

ADD ALTERNATE NO. 2

| ITEM NO. | ESTIMATED QUANTITY | ITEM DESCRIPTION WITH UNIT BID PRICE WRITTEN IN WORDS | UNIT PRICE | | AMOUNT | |
|----------|--------------------|--|------------|-------|---------|-------|
| | | | Dollars | Cents | Dollars | Cents |
| P-620-3 | 14,500 SF | <u>Pavement Marking (50% Application no reflective media)</u> for the unit price per Square Feet of: _____ dollars and _____ cents. | | | | |
| P-621-1 | 30,440 SY | <u>Grooving</u> for the unit price per Square Foot of: _____ dollars and _____ cents. | | | | |

Total Add Alternate No. 2 Price Written in Figures:

Total Add Alternate No. 2 Price Written in Words:

The Owner reserves the right to delete any item of work in whole or in part, in order to meet the available funding.

Amounts are to be shown in both words and figures. In case of Discrepancy, the amount shown in words will govern.

The above unit prices shall include all labor, materials, overhead, profit, insurance, etc., to cover the finished work of the several kinds called for.

This Proposal includes Addenda numbers*** _____
***To be filled in by Bidder if Addenda are issued

GENERAL BIDDER:

| NAME | TITLE |
|------|-------|
|------|-------|

VOTE OF CORPORATION AUTHORIZING EXECUTION OF CONTRACT

At a meeting of the Board of Directors of _____ duly called and held on _____ 20____, at which a quorum was present and acting throughout, the following vote was duly adopted.

VOTED: That _____, the _____ of the Corporation, be and hereby is authorized to affix the corporate Seal, sign the contract and deliver in the name and behalf of the corporation a contract with:

The Town of Orange, MA

For supplying _____

(), _____ and also to seal and executive

as bonds above surety company bonds to secure the performance of said contract and payment for labor and materials, all in such form and on such terms and conditions as he/she, by the execution thereof, shall deem proper.

A true copy;

ATTEST:

If the vendor accepts this contract and then fails to supply the commodity as ordered by the Owner, if the Owner decides to legally pursue this non-supply, then the vendor agrees to the jurisdiction of the appropriate court in the state of Massachusetts.

(Affix the corporate seal)

Clerk of the Corporation _____

NON-COLLUSION AND TAX COMPLIANCE FORM

CERTIFICATE OF NON-COLLUSION

The undersigned certifies under penalties of perjury that this bid or proposal has been made and submitted in good faith and without collusion or fraud with any other person. As used in this certification, the word "person" shall mean any natural person, business, partnership, corporation, union, committee, club, or other organization, entity, or group of individuals.

Signature of individual submitting bid

Name of Business / Organization

TAX COMPLIANCE CERTIFICATE

Pursuant to M.G.L. Ch. 62C, sec. 49A, I certify under the penalties of perjury that, to the best of my knowledge and belief, the undersigned organization is in compliance with all laws of the Commonwealth relating to taxes, reporting of employees and contractors, and withholding and remitting child support.

Signature of individual submitting bid

Name of Business / Organization

REQUIRED EQUAL OPPORTUNITY STATEMENTS

1. Section 60-1.7(b) of the Regulations of the Secretary of Labor requires each bidder or prospective prime contractor and proposed subcontractor, where appropriate, to state in the bid whether it has participated in any previous contract or subcontract subject to the equal opportunity clause; and if so, whether it has filed with the Joint Reporting Committee, the Director, an agency, or the former President's Committee on Equal Employment Opportunity all reports due under the applicable filing requirements. In any case in which a bidder or prospective prime contractor or proposed subcontractor has participated in a previous contract subject to Executive Orders 10925, 11114, or 11246 and has not filed a report due under the applicable filing requirements, no contract or subcontract shall be awarded unless such contractor submits a report covering the delinquent period or such other period specified by the FAA or the Director, OFCC.
2. To effectuate these requirements, the Bidder shall complete and sign 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 10925, or Executive Order 11246, or Executive Order 11114.

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" prior to the award of contract.

Dated: _____
_____ Legal name of Person, Firm, or Corporation

By: _____

Title: _____

INTERNAL REVENUE SERVICE EMPLOYER IDENTIFICATION NUMBER

Name and Title of Signer

Signature

Date

Note: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

FORM OF PROPOSAL GUARANTY (BID BOND)

KNOWN ALL MEN/WOMEN BY THESE PRESENTS, that we, the undersigned, _____

_____ as Principal

and _____

as Surety, are hereby held and firmly bound unto the Town of Orange, Massachusetts, hereinafter called the "Owner" in the sum of _____ dollars (\$_____) for payment of which sum, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors, and assigns.

The condition of the above obligation is such that whereas the Principal has submitted to the Owner a certain Proposal, attached hereto and hereby made a part hereof, to enter into a contract in writing for improvements Orange Municipal Airport, AIP No. 3-25-0039-__-2020, **RECONSTRUCT RUNWAY 1-19 (BASE BID); MILL AND OVERLAY RUNWAY 1-19 (ADD ALTERNATE NO. 1); GROOVE RUNWAY 1-19 (ADD ALTERNATE NO. 2)**

NOW, THEREFORE,

- (a) If said Proposal shall be rejected, or in the alternate,
- (b) If said Proposal shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract Agreement attached hereto and shall execute and deliver Performance Bond and Payment Bond in the Forms attached hereto, all properly completed in accordance with said Proposal,

Then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all default of the Principal hereunder shall be the amount of this obligation as herein stated.

The Surety, for value received stipulates and agrees that the obligation of said Surety and its bond shall be in no way impaired or affected by any extension of the time within which the Board may accept such Proposal; and said Surety does hereby waive notice of any extension.

IN WITNESS WHEREOF, the above-bound parties have executed this instrument under their several seals this _____ day of _____, 20__, the name and corporate seal of each incorporated party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Principal

By _____ SEAL

Surety

Attest:

By _____ SEAL
Attorney-In-Fact

Attest:

Attest:

(Accompany this bond with Attorney-In-Fact's authority from the Surety to execute bond, certified to include the date of the bond.)

BUY AMERICAN PREFERENCE

The Contractor agrees to comply with 49 USC § 50101, which provides that Federal funds may not be obligated unless all 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.

A bidder or offeror must complete and submit the Buy America certification included herein with their bid or offer. The Owner will reject as nonresponsive any bid or offer that does not include a completed Certificate of Buy American Compliance.

Certificate of Buy American Compliance for Manufactured Products

As a matter of bid responsiveness, the bidder or offeror must complete, sign, date, and submit this certification statement with their proposal. The bidder or offeror must indicate how they intend to comply with 49 USC § 50101 by selecting one on the following certification statements. These statements are mutually exclusive. Bidder must select one or the other (not both) by inserting a checkmark (✓) or the letter "X".

- Bidder or offeror hereby certifies that it will comply with 49 USC § 50101 by:
- a) Only installing steel and manufactured products produced in the United States;
 - b) 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
 - c) 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:

1. To provide to the Owner evidence that documents the source and origin of the steel and manufactured product.
 2. To faithfully comply with providing U.S. domestic product.
 3. To furnish U.S. domestic product for any waiver request that the FAA rejects
 4. To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.
- The bidder or offeror hereby certifies it cannot comply with the 100 percent Buy American Preferences of 49 USC § 50101(a) but may qualify for either 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:
1. To submit to the Owner within 15 calendar days of the bid opening, a formal waiver request and required documentation that supports the type of waiver being requested.
 2. That failure to submit the required documentation within the specified timeframe is cause for a non-responsive determination may result in rejection of the proposal.

- 3. To faithfully comply with providing U.S. domestic products at or above the approved U.S. domestic content percentage as approved by the FAA.
- 4. To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.

Required Documentation

Type 3 Waiver – The cost of the item components and subcomponents produced in the United States is more that 60 percent of the cost of all components and subcomponents of the “item”. The required documentation for a Type 3 waiver is:

- a) Listing of all product components and subcomponents 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).
- b) Cost of non-domestic components and subcomponents, excluding labor costs associated with final assembly at place of manufacture.
- c) Percentage of non-domestic component and subcomponent cost as compared to total “item” component and subcomponent costs, excluding labor costs associated with final assembly at place of manufacture.

Type 4 Waiver – Total cost of project using U.S. domestic source product exceeds the total project cost using non-domestic product by 25 percent. The required documentation for a Type 4 of waiver is:

- a) Detailed cost information for total project using U.S. domestic product
- b) Detailed cost information for total project using non-domestic product

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

(Attach additional sheets as necessary)

8. Provide detailed information on the Registered Massachusetts Land Surveyor intended to be used on the project. (Attach resumes and qualifications)

The undersigned acknowledges the requirements of the proposed project and certifies that their company has the resources available and ready to complete the project as scheduled for the price offered in the bid.

Dated at _____ this
day of _____, 2020.

Name of Bidder: _____

By: _____

Title: _____

State of _____ .

County of _____

Being duly sworn, deposes and says that he/she is

(Title)

of _____ and that the answers to the (name of organization)

foregoing questions and statements contained therein are true and correct. Sworn to before me this

_____ day of _____ 2020.

My commission expires: _____

Notary Public

END OF STATEMENT OF QUALIFICATIONS
Attach Land Surveyor Qualifications

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ANTICIPATED SUBCONTRACTS

Type of Work to be Sublet _____

Approximate Dollar Amount of Subcontract \$ _____

Probable Subcontractor _____

Address _____

Type of Work to be Sublet _____

Approximate Dollar Amount of Subcontract \$ _____

Probable Subcontractor _____

Address _____

Type of Work to be Sublet _____

Approximate Dollar Amount of Subcontract \$ _____

Probable Subcontractor _____

Address _____

Statement of Qualifications: The Contractor may be required to submit a statement of the subcontractor's qualifications and shall obtain written permission from the Owner prior to the actual subletting or assignment of any portion of the contract as per Section 80-01 of the General Provisions.

Bidder _____

By _____

Title _____

NOTE: Contractor may copy this page as necessary to include **all** subcontractors.

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TOWN OF ORANGE, MASSACHUSETTS

VIII. AFFIRMATIVE ACTION

Notice is hereby given that, with respect to both employment and provision of services, the undersigned provider intends to comply with the Affirmative Action/Equal Opportunity requirements and principles of all applicable Federal and State laws, including, but not limited to: Title VII of the Civil Rights Act of 1964 (as amended), the Civil Rights Act of 1991, the Americans with Disabilities Act of 1990 (as amended), federal Executive Order 11375; Section 504 of the Federal Rehabilitation Act of 1973 (as amended), the Equal Pay Act of 1963 (as amended), the Age Discrimination in Employment Act of 1967 (as amended), the Governor’s Code of Fair Practices, and applicable State Executive Orders.

The undersigned provider is aware that if its organization is the recipient of contracts with Commonwealth totaling \$50,000 or more, it must have an Affirmative Action/Equal Opportunity Plan that meets Federal and State requirements. The Provider certifies by its Officer’s signature below that it has and will comply with the purpose of assuring legally required equal opportunity and affirmative action in regards to its employment and service practices.

Provider / Contractor Name / Title (Print or Type)

Date

Signature

Commonwealth of Massachusetts
Request for Verification of Taxation Reporting Information
(Massachusetts Substitute W-9 Format)

Pursuant to IRS regulations, vendors & customers must furnish their Taxpayer Identification Number (*TIN*) to the Commonwealth. Vendors must complete, sign, and return this form before payments may be made.

LEGAL NAME (List legal name, if joint names, list first & circle the name of the person whose TIN you enter in Part I below. (See **Specific Instructions** on the back page.)

BUSINESS NAME - If different from the above. (See **Specific Instructions** on the back page)

LEGAL ADDRESS – Number, Street, and apt. or suite no., Town, State and ZIP code.

REMITTANCE (PAYMENT) ADDRESS (If different from the above) Number, Street, and apt. or suite no., Town, State and ZIP code.

PHONE # FAX #

| | |
|--|---|
| <p>PART I - Taxpayer Identification Number (TIN) Verification</p> <p>Enter your Taxpayer Identification Number (TIN) in the appropriate box.</p> <p>Enter either <i>SSN</i> OR <i>EIN</i>. DO NOT ENTER BOTH. (See PART II.)</p> | <p>PART III - Update to existing W-9 Form</p> <p><input type="checkbox"/> A Request for Verification of Taxation Reporting Information has been previously filed with the Commonwealth under this TIN. This form will replace that form.</p> <p><i>Please attach supporting documentations specified in instructions on the back page under Updates.</i></p> |
|--|---|

PART II – What Name and Number to give to the requester (one type of account box MUST be checked)

| <u>TYPE OF ACCOUNT</u> Please check one | <u>NAME</u> | <u>TIN</u> | <u>ORGANIZATION TYPE</u> |
|--|---|-------------------|---|
| <input type="radio"/> Individual | The Individual Name | <u>SSN</u> | <u>I</u> |
| <input type="radio"/> Sole Proprietorship | The Individual Name- The Owner | <u>SSN or EIN</u> | <u>I</u> |
| <input type="radio"/> Corporate | The corporation (including Canada & Mexico) | <u>EIN</u> | <u>C</u> |
| <input type="radio"/> Partnership | The Partnership | <u>EIN</u> | <u>P</u> |
| <input type="radio"/> A valid trust, estate, or pension trust | Legal entity. List first and circle the name of the legal trust, estate or pension trust. (Do not furnish the TIN of the personal representative or trustee unless the legal entity itself is not designated in the account title.) | <u>EIN</u> | <u>T</u> |
| <input type="radio"/> Association, club, religious, charitable, educational, or other tax-exempt organization. | The Organization | <u>EIN</u> | <u>O</u> |
| <input type="radio"/> A broker or registered nominee | The broker or nominee | <u>EIN</u> | <u>Any of the above except Individual</u> |

I have read and understand the Commonwealth of Massachusetts Request for Verification of Taxation Reporting Information
Please check this box

Under penalties of perjury, I declare that I have examined this request and to the best of my knowledge and belief, all information I have supplied is true, correct, and complete.

Signature

_____/_____/_____
Date

_____/_____/_____

Please print or type your name & title

Date

Revision date 05/01/2000 MA W-9 Form Commonwealth of Massachusetts Request for Verification of Taxation Reporting Information

GENERAL INSTRUCTIONS

(Section references are to the Internal Revenue Code.)

Purpose of Form - A person who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) to report payments made to you for the sales of goods & services & real estate transactions Use the Request for Verification of Taxation Reporting Information (*Massachusetts Substitute W-9 Format*) to furnish your correct TIN to the Commonwealth and, when applicable, (1) to certify that the TIN you are furnishing is correct (*or that you are waiting for a number to be issued*).

How To Obtain a TIN - If you do not have a TIN, apply for one immediately. To apply, get **Form SS-5**, Application for a Social Security Number Card (for individuals), from your local office of the Social Security Administration, or **Form SS-4**, Application for Employer Identification Number (for businesses and all other entities), from your local Internal Revenue Service office.

To complete the Request for Verification of Taxation Reporting Information if you do not have a TIN, write "Applied For" in the space for the TIN in Part 1, sign and date the form, and give it to the requester. Generally, you will then have 60 days to obtain a TIN and furnish it to the requester. Note: Writing "Applied For" on the form means that you have already applied for a TIN OR that you intend to apply for one in the near future.

As soon as you receive your TIN, complete another Request for Verification of Taxation Reporting Information, include your TIN, sign and date the form, and give it to the requester.

Penalties

Failure to Furnish TIN - If you fail to furnish your correct TIN to a requester, you are subject to a penalty of \$50 for each such failure unless your failure is due to reasonable cause and not to willful neglect.

Civil Penalty for False Information With Respect to Withholding - If you make a false statement with no reasonable basis that results in no imposition of backup withholding, you are subject to a penalty of \$500.

Criminal Penalty for Falsifying Information - Willfully falsifying certifications or affirmations may subject you to criminal penalties including fines and/or imprisonment.

SPECIFIC INSTRUCTIONS

Name - If you are an individual, you must generally provide the name shown on your social security card. However, if you have changed your last name, for instance, due to marriage, without informing the Social Security Administration of the name change, please enter your first name, the last name shown on your social security card and your new last name.

Sole proprietor- You must enter your *individual*

Name as shown on your social security card. You may enter your business, trade, or "doing business as" name on the business name line.

Other entities- Enter your business name as shown on required Federal tax documents. This name should match the name shown on the charter or legal document creating the entity. You may enter your business, trade, or "doing business as" name on the business line.

Foreign Vendors - If you are a nonresident alien or foreign entity not subject to backup withholding, give the requester a completed **Form W-8BEN** (Certificate of Foreign Status of Beneficial Owner for United States Tax Withholding).

TIN "Applied For" - Follow the instructions under How to Obtain a TIN, sign and date this form.

Signature - The form must be signed to be considered valid.

Privacy Act Notice - Section 6109 requires you to furnish your correct taxpayer identification number (TIN) to persons who must file information returns with IRS to report interest, dividends, and certain other income paid, the acquisition of property. The IRS uses the numbers for identification purposes and to help verify the accuracy of your tax return.

Organizations Recognized by the Commonwealth as Tax Exempt - Organizations seeking recognition of tax exempt status with the Commonwealth must provide documentation of the organization federal tax exempt status in the form of a ruling or determination letter issued by the Internal Revenue Service (IRS). The Commonwealth recognizes the following IRS tax exempt status organization rulings:

- . Section 501© (1 through 23)
- . Section 501 (d)
- . Section 501(e)
- . Section 501 (f)
- . Section 501(k)
- . Section 521 (a)

For more information on Tax-Exempt status, ple:

Updates to the Request for Verification of Vendor/Customer Taxation Reporting Information - If any of the information requested on this form changes (*i.e., name or address changes*), the payee must submit a new Request for Verification of Taxation Reporting Information with the updated information. Changes to name or TIN must be accompanied by IRS certification of Name & TIN.

If the payee receives notification from the IRS that an information return (*i.e., 1099-MISC*) was filed on their behalf by the Commonwealth with incorrect spelling of their name and/or incorrect or missing TIN (commonly referred to as a "B-Notice" or IRS Form 8355), the payee must immediately complete a new Request for Verification of Taxation Reporting Information with the corrected information and attach a copy of the IRS Form 8355 to the form.

If the Office of the State Comptroller or a department of the Commonwealth contacts you because the IRS has informed the Commonwealth that a return filed in your behalf has an incorrect spelling of your vendor name and /or incorrect or missing TIN. You must submit a new Request for Verification of Taxation Reporting Information and attach an IRS verification of your TIN and correct (*legal*) name.

If you have Questions on Completing this Form - Please contact the Office of the State Comptroller

Phone: (617) 973-2311 or 973-2655

Completion of Form:

Upon completion of this form, please return it to the Commonwealth department you wish to register with for the purpose of doing business.

Revision date 05/01/2000 MA W-9 Form

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OSHA CERTIFICATION REQUIREMENT

Effective **July 1, 2006**, all employees of a contractor to be employed on **public building and public works** worksites must have successfully completed at least a 10 hour course in construction safety and health approved by OSHA at the time the employee begins work.

I, _____, as _____, of the
(Print Name) (Position with the entity submitting bid)

joint venture/corporation/partnership or other legal entity submitting this bid for a public works project falling under §39M of Chapter 30 of the Massachusetts General Laws and Chapter 149 of the same, do hereby certify that any and all employees found on my worksite for this project have, or will have by the start of their work on the project, successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that was at least 10 hours in duration.

A copy of the OSHA completion cards for each employee must be submitted to the Orange Municipal Airport Commission before work on this project is to begin and must be supplemented as new employees are hired or contracted to work on this project.

_____, as
Signature

_____, of
Position

_____, on
Company/Corporation/Joint Venture/Partnership/Etc.

Date

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COMMONWEALTH OF MASSACHUSETTS REGULATIONS
REQUIRED TO BE INSERTED INTO THE
BID PROPOSAL SECTION

- A Commonwealth of Massachusetts Certification for Compliance with Minority Ratios and Affirmative Action
- B Commonwealth of Massachusetts Certification for Corporate, Firm or Individual-Owned Business Compliance with Massachusetts Tax Returns and Tax Payments
- C Commonwealth of Massachusetts Certification for Not Paying a Retainage Fee to Others for Securing This Work
- D Commonwealth of Massachusetts Disadvantaged Business Enterprise Set Aside Requirements

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COMMONWEALTH OF MASSACHUSETTS

A. BIDDER'S CERTIFICATION REQUIREMENT

The following certification statement will be inserted in the bid documents just above the bidder's signature:

"The bidder hereby certifies he shall comply with the minority manpower ratio and specific action steps contained in the state's appendix EEO attached hereto (see Section X), including compliance with the minority subcontract efforts specified in the Local DBE Plan. The Contractor receiving the award of the Contract shall be required to obtain from each of its subcontractors and submit to the contracting or administering agency prior to the performance of any work under said contract a certification by said subcontractor, regardless of tier, that it will comply with the minority manpower ratio and specific affirmative action steps contained in the appendix EEO."

DATE: _____

BIDDER'S
NAME: _____
Legal Name of Person, Firm or Corporation

BY: _____

TITLE: _____

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COMMONWEALTH OF MASSACHUSETTS

B. BIDDER'S CERTIFICATION REQUIREMENT

The following certification statement will be inserted in the bid documents just above the bidder's signature:

“Pursuant to Massachusetts General Laws, Chapter 62C, Section 62C, Section 49A, I certify under the penalty of perjury that the following firm or corporation, to the best of my knowledge and belief, has filed all Massachusetts Tax Returns and paid all Massachusetts taxes required under law.”

DATE: _____

FEDERAL
I.D. NO. _____

BIDDER'S
NAME: _____
Legal Name of Person, Firm or Corporation

BY: _____

TITLE: _____

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COMMONWEALTH OF MASSACHUSETTS

C. BIDDER’S CERTIFICATION REQUIREMENT

The following certification statement is to be signed by the bidder.

I hereby certify that I am a _____ (title of officer of the company) and duly authorized representative of _____ (name of company), who’s address is _____ and that neither I nor the above company I here represent has:

- A. Employed or retained for a commission, percentage, brokerage, contingent fee, or other consideration, any company or person (other than a bona fide employee working solely for me or the above company) to solicit or secure this Contract,
- B. Agreed, as an express or implied condition for obtaining this Contract, to employ or retain the services of any company or person in connection with carrying out the contract, or
- C. Paid, or agreed to pay, to any company, organization, or person (other than a bona fide employee working solely for me or the above company) any fee, contribution, donation, consideration of any kind for, or in connection with, procuring or carrying out the Contract;

I acknowledge that this certification is to be furnished to the Massachusetts Department of Transportation Aeronautics Division and to the Federal Aviation Administration of the United States Department of Transportation, in connection with this Contract involving participation of Airport Improvement Program (AIP) funds, and is subject to applicable State and Federal laws, both criminal and civil.

Title: _____

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COMMONWEALTH OF MASSACHUSETTS

D. DISADVANTAGED BUSINESS ENTERPRISE SET ASIDE REQUIREMENTS

General

All Federal, State and local DBE/MBE/WBE forms and documentation including Letters of Intent must be submitted with the bid. Certification of DBE's under the Massachusetts Unified Certification Program (UCP) is required.

Documents are as follows:

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Charles D. Baker, Governor
 Karyn E. Polito, Lieutenant Governor
 Stephanie Pollack, Secretary & CEO
 Jeffrey DeCarlo, Administrator



**Letter of Intent/Schedule of Participation 1
 Disadvantaged Business Enterprise (DBE) 2 Participation
 (For Federally-sponsored Projects) 3**

NOTE TO BIDDER: THE DBE GOAL FOR THIS PROJECT SHALL NOT BE LESS 5.77% THAN APPROVED DBE PLAN). IF THIS GOAL IS NOT MET, THE BIDDER MUST SUBMIT DOCUMENTATION OF A "GOOD FAITH EFFORT" TO THE SPONSOR,
 % (FROM SPONSOR'S

AIRPORT _____ **PROJECT NO.** _____

PROJECT TITLE

| | | | |
|----------------------------|-------|----------|-------|
| Name of General Contractor | | | |
| Name of DBE Contractor | | | |
| Address | | | |
| City | State | Zip Code | Phone |

1. **The undersigned DBE firm intends to perform work in connection with the above referenced project as:**
 Check One:
- An individual A partnership A corporation
- A joint venture with: _____
- Other _____
- Attach extra sheets if necessary

2. **The undersigned affirms that they are a duly authorized official representing the proposed DBE and affirms that its certification has not expired nor been revoked.**
(Attach a copy of the certification letter) 4
 Check all that apply:
- DBE
- Certification Agency _____ Certification Number _____

3. **If awarded the contract, the undersigned intends to enter into a subcontract to perform the work described on the following sheet for the prices indicated.**
- _____

¹ Use a separate form for each DBE firm to be utilized on this project.
² Must be register with the MA Supplier Diversity Office (SDO) and must be listed as a DBE with a valid certification when work is completed.
³ For projects with any federal participation.
⁴ Certification must be completed prior to Contract Award.

| Contract Item No. | Description of Work to be Performed by DBE Contractor | Estimated Quantity | Unit Price | Item Amount |
|-------------------|---|--------------------|------------|-------------|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

Total amount credited to DBE contractor (add item amounts): TOTAL \$ _____

Proposed total contract price: \$ _____

The total price to DBE contractor for work performed under this contract is _____ % of the proposed total contract price. (See note to bidder above).

The undersigned certify that they will enter into a formal agreement upon execution of the contract for the above referenced project pursuant to all conditions noted in attached documents, swearing and affirming under the pains and penalties of perjury, that the foregoing information and appropriate attachments are true and accurate to the best of their knowledge.

Name of DBE Contractor _____

Authorized Signature _____

Name and Title

Date

Name of General Contractor _____

Authorized Signature _____

Name and Title

Date

FOSTERING SMALL BUSINESS PARTICIPATION

| | |
|----------------------|--|
| Sponsor's Name: | Town of Orange Airport Commission |
| Airport Name: | Orange Municipal Airport |
| City, State: | Orange, Massachusetts |
| AIP Number: | AIP No. 3-25-0039-__-2020 |
| Federal Fiscal Year: | 2020 |

In accordance with CFR Part 26, Section 26.39 the following detailed list shall be completed by Prime Bidding Contractor for this proposed Construction Work. The Prime Contractor must list all sub-contractors meeting the federal requirement for a Small Business who provided the Prime Contractor with a quote to perform work on this project, regardless if the sub-contractor will be performing the work

| Small Business Firms to be Utilized (Name, Address, Phone) | | Work to be Performed | Total Estimated Cost of Work |
|---|--|----------------------|------------------------------|
| Name | | | |
| Address | | | |
| City, St, Zip | | | |
| Telephone | | | |
| Is the firm a Certified DBE? | <input type="checkbox"/> Yes <input type="checkbox"/> No | | |
| Name | | | |
| Address | | | |
| City, St, Zip | | | |
| Telephone | | | |
| Is the firm a Certified DBE? | <input type="checkbox"/> Yes <input type="checkbox"/> No | | |
| Name | | | |
| Address | | | |
| City, St, Zip | | | |
| Telephone | | | |
| Is the firm a Certified DBE? | <input type="checkbox"/> Yes <input type="checkbox"/> No | | |

| Small Business Firms to be Utilized (Name, Address, Phone) | Work to be Performed | Total Estimated Cost of Work |
|---|----------------------|---------------------------------|
|---|----------------------|---------------------------------|

| | | | |
|------------------------------|--|--|--|
| Name | | | |
| Address | | | |
| City, St, Zip | | | |
| Telephone | | | |
| Is the firm a Certified DBE? | <input type="checkbox"/> Yes <input type="checkbox"/> No | | |

| | | | |
|------------------------------|--|--|--|
| Name | | | |
| Address | | | |
| City, St, Zip | | | |
| Telephone | | | |
| Is the firm a Certified DBE? | <input type="checkbox"/> Yes <input type="checkbox"/> No | | |

| | | | |
|------------------------------|--|--|--|
| Name | | | |
| Address | | | |
| City, St, Zip | | | |
| Telephone | | | |
| Is the firm a Certified DBE? | <input type="checkbox"/> Yes <input type="checkbox"/> No | | |

(DUPLICATE FORM AS NECESSARY)

The following notation is for Sponsor Use Only:

Accepted by: _____ Date: _____

CONTRACTOR'S CERTIFICATION (EEO)

Name of the General Contractor

certifies that:

1. It intends to use the following listed construction trades in the work under contract:

2. Will comply with the minority/woman workforce ratio and specific affirmative action steps contained herein; and
3. Will obtain from each of its Subcontractors and submit to the contracting or administering agency prior to the award of any subcontract under this Contract the Subcontractor's certification required by these bid conditions.

Signature of Authorized Representative or Contractor

SUBCONTRACTOR'S CERTIFICATION (EEO)

Name of the Subcontractor

certifies that:

1. It intends to use the following listed construction trades in the work under contract:

2. Will comply with the minority/woman workforce ratio and specific affirmative action steps contained herein; and
3. Will obtain from each of its Subcontractors prior to the award of any subcontract under this Contract the Subcontractor's certification required by these bid conditions.

Signature of Authorized Representative or Subcontractor

BIDDER'S CERTIFICATION

The bidder hereby certifies he shall comply with the minority manpower ratio and specific action steps contained with the minority Contractor compliance specified in Section V of said appendix. The Contractor receiving the award of the Contract shall be required to obtain from each of its Subcontractors and submit to the Contracting or Administering Agency prior to the performance of any work under said contract a certification by said Subcontractor, regardless of tier, that it will comply with the minority manpower ratio and specific affirmative action steps contained in the appendix EEO.

Signature of Bidder

Name of Firm

Title

Date

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CERTIFICATION OF OFFERER/BIDDER REGARDING TAX DELINQUENCY AND FELONY CONVICTIONS

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

Certifications

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

Note

If an applicant responds in the affirmative to either of the above representations, the applicant 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 applicant 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.

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FEDERAL AVIATION ADMINISTRATION

LETTER OF INTENT

Name of bidder/offeror's firm: _____

Address: _____

City: _____ State: _____ Zip: _____

Name of DBE firm: _____

Address: _____

City: _____ State: _____ Zip: _____

Telephone: _____

Description of work to be performed by DBE firm:

The bidder/offeror is committed to utilizing the above-named DBE firm for the work described above. The estimated dollar value of this work is \$_____.

Affirmation

The above-named DBE firm affirms that it will perform the portion of the Contract for the estimated dollar value as stated above.

By: _____

Title

_____ Signature

If the bidder/offeror does not receive award of the prime Contract, any and all representatives in this Letter of Intent and Affirmation shall be null and void.

(Submit separate forms for each DBE subcontractor.)

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FEDERAL AVIATION ADMINISTRATION

DISADVANTAGED BUSINESS ENTERPRISE (DBE) UTILIZATION

The undersigned bidder/offeror has satisfied the requirements of the bid Specification in the following manner (please check the appropriate space):

_____ The bidder/offeror is committed to a minimum of _____% DBE utilization on this Contract.

_____ The bidder/offeror (if unable to meet the DBE goal of _____%) is committed to a minimum of _____% DBE utilization on this Contract and submits documentation demonstrating good faith efforts.

Name of bidder/offeror's firm: _____

State Registration No. _____

By: _____
Title

Signature _____

END OF SECTION III – FORMS FOR PROPOSAL

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Section IV
FAA Contract Provisions

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FAA CONTRACT PROVISIONS

For

IMPROVEMENTS TO

ORANGE MUNICIPAL AIRPORT

ORANGE, MASSACHUSETTS

1. ACCESS TO RECORDS AND REPORTS – 2 CFR § 200.336, 2CFR § 200.333, FAA Order 5100.38
2. AFFIRMATIVE ACTION REQUIREMENT - 41 CFR part 60-4, Executive Order 11246
3. BREACH OF CONTRACT TERMS - 2 CFR § 200 Appendix II(A)
4. BUY AMERICAN PREFERENCE – 49 USC § 50101
5. CIVIL RIGHTS – GENERAL 49 USC §47123
6. CIVIL RIGHTS – TITLE VI ASSURANCES – 49 USC §47123, FAA Order 1400.11
7. CLEAN AIR AND WATER POLLUTION CONTROL – 2 CFR § 200, Appendix II(G)
8. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT REQUIREMENTS - 2 CFR § 200 Appendix II(E)
9. COPELAND ANTI-KICKBACK ACT – 2 CFR § 200, Appendix II(D) 29 CFR Parts 3 & 5
10. DAVIS BACON REQUIREMENTS - 2 CFR § 200 Appendix II(D), 29 CFR Part 5
11. DEBARMENT AND SUSPENSION (NON-PROCUREMENT) – 2 CFR part 180 (Subpart C), 2 CFR part 1200, DOT Order 4200.5
12. DISADVANTAGED BUSINESS ENTERPRISE - 49 CFR PART 26
13. DISTRACTED DRIVING – Executive Order 13513, and DOT Order 3902.10
14. ENERGY CONSERVATION REQUIREMENTS – 2 CFR § 200 Appendix II(H)
15. EQUAL EMPLOYMENT OPPORTUNITY (EEO) – 2 CFR 200 Appendix II(c); 41 CFR § 60-1.4; 41 CFR § 60-4.3
16. FEDERAL FAIR LABOR STANDARDS ACT (FEDERAL MINIMUM WAGE) – 29 USC § 201, et. Seq.
17. TRADE RESTRICTION - 49 USC § 50104; 49 CFR part 30
18. LOBBYING AND INFLUENCING FEDERAL EMPLOYEES – 31 U.S.C. § 1352 – Byrd Anti-Lobbying Amendment, 2 CFR part 200, Appendix II(J), 49 CFR part 20, Appendix A
19. OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970 – 20 CFR part 1910
20. PROHIBITION OF SEGREGATED FACILITIES – 41 CFR § 60

- 21.** PROCUREMENT OF RECOVERED MATERIALS - 2 CFR § 200.322, 40 CFR part 247
- 22.** TAX DELIQUENCY AND FELONY CONVICTIONS
- 23.** TERMINATION OF CONTRACT - 2 CFR § 200 Appendix II(B) FAA Advisory Circular 150/5370-10, Section 80-09
- 24.** VETERAN'S PREFERENCE – 49 USC § 47112(c)

1. 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 years after final payment is made and all pending matters are closed.

2. AFFIRMATIVE ACTION REQUIREMENT

NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION to ENSURE EQUAL EMPLOYMENT OPPORTUNITY

1. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.
2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

Timetables

Goals for minority participation for each trade: **4.21%**

Goals for female participation in each trade: **6.9%**

These goals are applicable to all of the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the Contractor also is subject to the goals for both its federally involved and non-federally involved construction.

The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a) and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs (OFCCP) within 10 working days of award of any construction subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address, and telephone number of the subcontractor; employer identification number of the subcontractor; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the subcontract is to be performed.

4. As used in this notice and in the contract resulting from this solicitation, the “covered area” is Massachusetts, Franklin County, Town of Orange.

3. 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 the 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 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.

4. BUY AMERICAN PREFERENCE

For Buy American Preference requirement see Section III – Forms for Proposals

5. GENERAL CIVIL RIGHTS PROVISIONS

The Contractor agrees to comply with pertinent statutes, Executive Orders and such rules as are promulgated to ensure that no person shall, on the grounds of race, creed, color, national origin, sex, age, or disability be excluded from participating in any activity conducted with or benefiting from Federal assistance.

This provision binds the Contractor and subcontractors from the bid solicitation period through the completion of the contract. This provision is in addition to that required by Title VI of the Civil Rights Act of 1964.

6. TITLE VI CLAUSES FOR COMPLIANCE WITH NONDISCRIMINATION REQUIREMENTS

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, or national origin 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.
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 USC § 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);
- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 USC § 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 USC § 794 *et seq.*), as amended (prohibits discrimination on the basis of disability); and 49 CFR part 27;
- The Age Discrimination Act of 1975, as amended (42 USC § 6101 *et seq.*) (prohibits discrimination on the basis of age);
- Airport and Airway Improvement Act of 1982 (49 USC § 471, Section 47123), as amended (prohibits discrimination based on race, creed, color, national origin, or sex);
- The Civil Rights Restoration Act of 1987 (PL 100-209) (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, which 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 (42 USC §§ 12131 – 12189) as implemented by U.S. Department of Transportation regulations at 49 CFR parts 37 and 38;
- The Federal Aviation Administration’s Nondiscrimination statute (49 USC § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures nondiscrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;
- Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);
- Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 USC 1681 *et seq.*).
-

7. 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 exceeds \$150,000.

8. 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 therefor 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 \$10 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.

9. 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.

10. 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 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 Part 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 to the 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, Employment Standards Administration, 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 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 CFR 5.5(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 that 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 www.dol.gov/whd/forms/wh347instr.htm 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) 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) 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) 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, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, 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 Bureau of Apprenticeship and Training 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 Bureau of Apprenticeship and Training, or a State Apprenticeship Agency recognized by the Bureau, 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 not 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.

(iii) Equal Employment Opportunity. The utilization of apprentices, trainees, and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

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 Part 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 the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR Part 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.

11. DEBARMENT AND SUSPENSION

CERTIFICATION OF OFFERER/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.

Lower Tier Contract Certification

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 Certification of Offerer /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.

12. DISADVANTAGED BUSINESS ENTERPRISES

Contract Assurance (§ 26.13) – The Contractor 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 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 (§26.29) – The prime contractor agrees to pay each subcontractor under this prime contract for satisfactory performance of its contract no later than ten (10) days from the receipt of each payment the prime contractor receives from the Owner. The prime contractor agrees further to

return retainage payments to each subcontractor within ten (10) 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.

13. DISTRACTED DRIVING

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 \$3,500 that involve driving a motor vehicle in performance of work activities associated with the project.

14. ENERGY CONSERVATION REQUIREMENTS

Contractor and Subcontractor agree to comply with mandatory standards and policies relating to energy efficiency as contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act (42 USC 6201*et seq*).

15. EQUAL EMPLOYMENT OPPORTUNITY (EEO)

EQUAL OPPORTUNITY CLAUSE

During the performance of this contract, the Contractor agrees as follows:

(1) The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, sexual orientation, gender identify, or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff, or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

(2) The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive considerations for employment without regard to race, color, religion, sex, or national origin.

(3) The Contractor will send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the Contractor's commitments under this section and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(4) The Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(5) The Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(6) In the event of the Contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(7) The Contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance: *Provided, however*, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

**STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY
CONSTRUCTION CONTRACT SPECIFICATIONS**

1. As used in these specifications:

- a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;
- b. "Director" means Director, Office of Federal Contract Compliance Programs (OFCCP), U.S. Department of Labor, or any person to whom the Director delegates authority;
- c. "Employer identification number" means the Federal social security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941;

d. "Minority" includes:

- (1) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
- (2) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin regardless of race);
- (3) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
- (4) American Indian or Alaskan native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

2. Whenever the Contractor, or any subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.

3. If the Contractor is participating (pursuant to 41 CFR part 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors shall be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each contractor or subcontractor participating in an approved plan is individually required to comply with its obligations under the EEO clause and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other contractors or subcontractors toward a goal in an approved Plan does not excuse any covered contractor's or subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7a through 7p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered construction contractors performing construction work in a geographical area where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the Federal Register in notice form, and such notices may be obtained from any Office of Federal Contract Compliance Programs office or from Federal procurement contracting officers. The Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement nor the failure by a union with whom the Contractor has a collective bargaining agreement to refer either minorities or women shall excuse

the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.

6. In order for the non-working training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees shall be employed by the Contractor during the training period and the Contractor shall have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees shall be trained pursuant to training programs approved by the U.S. Department of Labor.

7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully and shall implement affirmative action steps at least as extensive as the following:

a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other onsite supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.

c. Maintain a current file of the names, addresses, and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source, or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefore along with whatever additional actions the Contractor may have taken.

d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or female sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7b above.

f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination, or other employment decisions, including specific review of these items, with onsite supervisory personnel such as superintendents, general foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other contractors and subcontractors with whom the Contractor does or anticipates doing business.

i. Direct its recruitment efforts, both oral and written, to minority, female, and community organizations, to schools with minority and female students; and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations, such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer, and vacation employment to minority and female youth both on the site and in other areas of a contractor's workforce.

k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR part 60-3.

l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel, for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

m. Ensure that seniority practices, job classifications, work assignments, and other personnel practices do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are non-segregated except that separate or single user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisor's adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations, which assist in fulfilling one or more of their affirmative action obligations (7a through 7p). The efforts of a contractor association, joint contractor union, contractor community, or other similar groups of which the Contractor is a member and participant may be asserted as fulfilling any one or more of its obligations under 7a through 7p of these specifications provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, if the particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally), the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized.

10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

11. The Contractor shall not enter into any subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.

12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination, and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these

specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR part 60-4.8.

14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government, and to keep records. Records shall at least include for each employee, the name, address, telephone number, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g. those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

16. 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, 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.

17. TRADE RESTRICTIONS CLAUSE

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 Section 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.

18. LOBBYING AND INFLUENCING FEDERAL EMPLOYEES

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, subgrants, 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.

19. OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970

All contracts and subcontracts that result from this solicitation 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 (20 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.

20. PROHIBITION OF SEGREGATED FACILITIES

(a) The Contractor agrees that it does not and will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not and will not permit its employees to perform their services at any location under its control where segregated facilities are maintained. The Contractor agrees that a breach of this clause is a violation of the Equal Employment Opportunity clause in this contract.

(b) "Segregated facilities," as used in this clause, means any waiting rooms, work areas, rest rooms and wash rooms, 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 that are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, sex, or national origin because of written or oral policies or employee custom. The term does not include separate or single-user rest rooms or necessary dressing or sleeping areas provided to assure privacy between the sexes.

(c) The Contractor shall include this clause in every subcontract and purchase order that is subject to the Equal Employment Opportunity clause of this contract.

21. 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:

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

22. TAX DELIQUENCY AND FELONY CONVICTIONS**CERTIFICATION OF OFFERER/BIDDER REGARDING TAX DELIQUENCY AND FELONY CONVICTIONS**

For Tax Delinquency and Felony Convictions certification see Section III – Forms for Proposals

23. TERMINATION OF CONTRACT**TERMINATION FOR CONVENIENCE (CONSTRUCTION CONTRACTS)**

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:

- c) completed and acceptable work executed in accordance with the contract documents prior to the effective date of termination;
- d) 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;
- e) reasonable and substantiated claims, costs, and damages incurred in settlement of terminated contracts with Subcontractors and Suppliers; and
- f) 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 DEFAULT (CONSTRUCTION)

Section 80-09 of FAA Advisory Circular 150/5370-10 establishes conditions, rights, and remedies associated with Owner termination of this contract due to default of the Contractor.

24. VETERANS 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 Title 49 United States Code Section 47112. Covered veterans include Vietnam-era veterans, Persian Gulf veterans, Afghanistan-Iraq war veterans, disabled veterans, and small business concerns (as defined by 15 USC 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.

END OF SECTION IV - FAA CONTRACT PROVISIONS

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Section V
Successful Bidder Forms

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SUCCESSFUL BIDDER FORMS

for

RECONSTRUCT RUNWAY 1-19

AIP Project No. 3-25-0039-____-2020

at the

**ORANGE MUNICIPAL AIRPORT
ORANGE, MASSACHUSETTS**

DOCUMENTS

- Performance Bond
- Payment Bond
- Notice of Award
- Notice to Proceed
- Contract Agreement
- MassDOT Contract Approval
- Contractor's Guarantee
- Certificate of Insurance

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PERFORMANCE BOND

KNOW ALL MEN/WOMEN BY THESE PRESENTS:

That we, the undersigned, _____

as Principal, and _____

_____ a corporation organized and existing under and by virtue of the laws of the State of _____

and duly authorized to transact business in the Commonwealth of Massachusetts, as Surety, are held and firmly bound unto the **Orange Municipal Airport, Orange, Massachusetts**, hereinafter referred to as the Owner, in the penal sum of _____

_____ dollars

(100 percent of Contract Value)

(\$_____), lawful money of the United States of America, for the payment of which well and truly to be made the said Principal and the said Surety do hereby bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents, as follows:

The condition of the above obligation is such that:

WHEREAS, the said Principal has entered into a written contract with **the Town of Orange, Massachusetts**, for improvements to the Orange Municipal Airport, under **AIP No. 3-25-0039- -2020**, Bid items in conformity with the plans, general and special conditions, and all other requirements contained in the contract specifications prepared by Airport Solutions Group, LLC of Burlington, MA, which contract, plans, general and special conditions, and all other requirements contained in the contract specifications are hereby referred to and made a part hereof, the same to all intents and purposes as if written at length herein, in which contract the said Principal has contracted to perform the work specified in said contract in accordance with the terms hereof;

NOW THEREFORE, THE CONDITIONS OF THIS OBLIGATION are such that if the above bonded Principal shall well, truly, and faithfully perform said contract and any alterations in and additions thereto and comply with all of the terms and provisions thereof except that no change will be made which increases the total contract price by more than 25 percent in excess of the original contract price without notice to the Surety, then this obligation to be void, otherwise to remain in full force and virtue, and comply; and shall fully indemnify and save harmless the Owner from all damages, claims, demands, expense and charge of every kind (including claims of patent infringement) arising from any act, omission, or neglect of said Principal, his/her agents, or employees with relation to said work; and shall fully reimburse and repay to the Owner all costs, damages, and expenses which they may incur in making good any default based upon the failure of the Principal to fulfill his/her obligation to furnish maintenance, repairs or replacements for the full guarantee period provided in the specification contained herein then this obligation shall be null and void, otherwise it shall remain in full force and effect.

Further conditions of the foregoing obligations are such that the Principal and Surety will guarantee the work performed under this contract against defects in workmanship performed by the Principal and all defects in materials furnished by him which appear within a period of one calendar year after the final acceptance of the work by the Owner. Under this guarantee, the Principal and Surety shall repair or replace all defective workmanship and material provided by the Principal appearing within one year after the completion and acceptance of the work, at no cost to the Owner.

PROVIDED FURTHER, that the Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of the contract or to the work to be performed thereunder, or the specifications accompanying the same shall in anywise affect its obligations of this bond, and it does hereby waive notice of any such change, extension of time, alteration, or addition to the terms of the contract or to the work, or the specifications.

IN WITNESS WHEREOF, said Principal and Surety have set their hands and seals at _____,
this ____ day of _____ 2020, A.D.

Principal (Contractor)

By: _____

Attest: _____

(Surety)

By: _____

Attest: _____
(SEAL)

(Accompany this bond with Attorney-In-Fact's authority from the Surety to execute bond, certified to include the date of the bond.)

PAYMENT BOND

KNOWN ALL MEN BY THESE PRESENTS:

That we, the undersigned, _____

as Principal, and _____

_____ a corporation organized and existing under and by virtue of the laws of the State of _____,

and duly authorized to transact business in the Commonwealth of Massachusetts, as Surety, are held and firmly bound unto the **Orange Municipal Airport, Orange, Massachusetts**, hereinafter referred to as the Owner, in the penal sum of _____ dollars

(100 percent of Contract Value)

(\$ _____), lawful money of the United States of America, for the payment of which well and truly to be made the said Principal and the said Surety do hereby bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents, as follows:

The condition of the above obligation is such that:

WHEREAS, the said Principal has entered into a written contract with the **Town of Orange, Massachusetts**, for improvements to Orange Municipal Airport, under **AIP No. 3-25-0039- -2020**, Bid items in conformity with the plans, general and special conditions, and all other requirements contained in the contract specifications prepared by Airport Solutions Group, LLC of Burlington, MA, which contract, plans, general and special conditions, and all other requirements contained in the contract specifications are hereby referred to and made a part hereof, the same to all intents and purposes as if written at length herein, in which contract the said Principal has contracted to perform the work specified in said contract in accordance with the terms hereof;

NOW THEREFORE, THE CONDITIONS OF THIS OBLIGATION are such that if the above Principal shall well, truly, and faithfully satisfy all claims and demands incurred by the Principal in the performance of said contract and any additions thereto, except that no change will be made which increases the total contract price by more than 25 percent in excess of the original contract price without notice to the Surety, then this obligation to be void, otherwise to remain in full force and virtue, and comply; and shall satisfy all claims and demands incurred in the performance of said contract and shall fully indemnify and save harmless the Owner from all damages, claims, demands, expense and charge of every kind (including claims of patent infringement) arising from any act, omission, or neglect of said Principal, his/her agents, or employees with relation to said work; and shall fully reimburse and repay to the Owner all costs, damages, and expenses which they may incur in making good any default based upon the failure of the Principal to fulfill his/her obligation to furnish maintenance, repairs or replacements for the full guarantee period provided in the specification contained herein and a condition of this bond shall be that the Contractor shall at all times promptly make payments of all amounts lawfully due to all persons supplying or furnishing him or his/her subcontractors with labor and materials used or performed in the prosecution of work provided for in the above contract, and that the undersigned will

indemnify and save harmless the Owner for the extent of any and all payments in connection with the carrying out of such contract, then this obligation shall be null and void, otherwise it shall remain in full force and effect.

PROVIDED FURTHER, that if the said Contractor fails to fully pay for any labor, materials, team hire, sustenance, provision, provender, gasoline, lubricating oils, fuels, oils, grease, coal, or any other supplies or materials used or consumed by said Contractor or his/her subcontractors in performance of the work contracted to be done, the Surety will pay the same in any amount as provided by law.

PROVIDED FURTHER, that the Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of the contract or the specifications accompanying the same shall in anywise affect its obligations of this bond, and it does hereby waive notice of any such change, extension of time, alteration, or addition to the terms of the contract or to the work, or the specifications.

IN WITNESS WHEREOF, said Principal and Surety have set their hands and seals

at _____, this ____ of _____, 2020, A.D.

Principal (Contractor)

By: _____

Attest: _____

(Surety)

By: _____

Attest: _____
(SEAL)

NOTICE OF AWARD

TO: _____

PROJECT DESCRIPTION

RECONSTRUCT RUNWAY 1-19 (BASE BID)
MILL AND OVERLAY RUNWAY 1-19 (ADD ALTERNATE NO. 1)
GROOVE RUNWAY 1-19 (ADD ALTERNATE NO. 2)
AIP Project No. 3-25-0039-____-2020

The OWNER has considered the BID submitted by you for the above described WORK in response to its Advertisement for Bids dated _____2020 and Information for Bidders.

You are hereby notified that your BID has been accepted for items in the amount of \$ _____.

You are required by the Information for Bidders to execute the Agreement and furnish the required CONTRACTOR’S PERFORMANCE BOND, PAYMENT BOND and Certificates of Insurance within five (5) calendar days from the date of this notice to you.

If you fail to execute said Agreement and to furnish said BONDS within five (5) calendar days from the date of this Notice, said OWNER will be entitled to consider all your rights arising out of the OWNER’S acceptance of your BID as abandoned and as a forfeiture of your BID BOND. The OWNER will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this NOTICE OF AWARD to the OWNER.

Dated this _____ day of _____, 2020

ORANGE MUNICIPAL AIRPORT COMMISSION

Ms. Julie M. Cole
Chairman

ACCEPTANCE OF NOTICE

by _____ this _____ day of _____, 2020

By: _____

Title: _____

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NOTICE TO PROCEED

Date: _____

TO: _____

You are hereby notified to commence WORK in accordance with the Agreement dated _____, 2020 on or before _____, 2020, for the project titled,

RECONSTRUCT RUNWAY 1-19 (BASE BID)
MILL AND OVERLAY RUNWAY 1-19 (ADD ALTERNATE NO. 1)
GROOVE RUNWAY 1-19 (ADD ALTERNATE NO. 2)
AIP Project No. 3-25-0039-__-2020

in accordance with the Contract Documents and your Proposal. The Contractor must complete all work within **one hundred and thirty one (131)** calendar days of the date of this notice for the Award of the Base Bid and any Additive Alternates awarded.

ORANGE MUNICIPAL AIRPORT COMMISSION

Ms. Julie M. Cole
Chairman

ACCEPTANCE OF NOTICE

by _____ this _____ day of _____, 2020

By: _____

Title: _____

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CONTRACT AGREEMENT

For

RECONSTRUCT RUNWAY 1-19 (BASE BID)

MILL AND OVERLAY RUNWAY 1-19 (ADD ALTERNATE NO. 1)

GROOVE RUNWAY 1-19 (ADD ALTERNATE NO. 2)

AIP Project No. 3-25-0039-____-2020

ORANGE MUNICIPAL AIRPORT

THIS AGREEMENT, made and entered into this _____ day of _____ 2020, by and between the **Town of Orange, Massachusetts**, acting through the **Orange Municipal Airport Commission**, hereinafter referred to as the "Owner" and _____, hereinafter referred to as the "Contractor."

WITNESSETH:

Article 1. STATEMENT OF THE WORK. The Contractor shall furnish all labor and materials and perform all work for the project titled: **RECONSTRUCT RUNWAY 1-19 (BASE BID); MILL AND OVERLAY RUNWAY 1-19 (ADD ALTERNATE NO. 1); GROOVE RUNWAY 1-19 (ADD ALTERNATE NO. 2), AIP Project No. 3-25-0039-____-2020**, and the Contract Documents, Plans, and Specifications dated _____ 2020 prepared by Airport Solutions Group, LLC (Engineer).

The Contractor must complete all work within **one hundred and thirty one (131)** calendar days of the date specified in the "Notice to Proceed" for the Award of the Base Bid and any Additive Alternates awarded. Liquidated damages will accrue and will be deducted from the contractor's final payment as outlined in Specification M-001 beyond the performance period in which contract work remains less than complete in the opinion of the Owner.

Article 2. It is hereby further agreed, that, in consideration of the faithful performance of the work by the Contractor, the Owner shall pay the Contractor the compensation due him/her by reason of said faithful performance of the work, at stated intervals and in the amounts certified by the Engineer in accordance with the provisions of this Contract.

Article 3. It is hereby further agreed, that, in the completion of the work and its acceptance by the Owner all sums due the Contractor by reason of his/her faithful completion of the work, taking into consideration additions to or deductions from the contract price by reason of "Force Account" work authorized under this Contract in accordance with the provisions of this Contract, will be paid the Contractor by the Owner after said completion and acceptance. Final acceptance cannot be made by the Owner until any and all proper legal advertisements have been made.

Article 4. It is hereby further agreed that any reference herein to the "Contract" shall include all "Contract Documents" as the same are listed and described in the General Provisions and Proposal of the Specifications, issued in connection with the improvements to, under **AIP No. 3-25-0039-____-2020**, and said "Contract Documents" are hereby made a part of this agreement as fully as if set out at length herein.

Article 5. Contract Clauses and Requirements for Construction Contracts.A. General and Labor Clauses for All Construction Contracts and Subcontracts.

1. Consent to Assignment. The Contractor shall obtain the prior written consent of the Owner to any proposed assignment of any interest in or part of this contract.
2. Convict Labor. No convict labor shall be employed under this contract.
3. Veterans' Preference. In the employment of labor (except in executive, administrative, and supervisory positions), preference shall be given to Veterans of the Vietnam era and disabled veterans as defined in Section 515(c)(1) and (2) of the Airport and Airway Improvement Act of 1982. However, this preference shall apply only where the individuals are available and qualified to perform the work to which the employment relates.
4. Withholding, Owner from Contractor. Whether or not payments or advances to the Owner are withheld or suspended by the FAA or the MassDOT Aeronautics Division, the Owner may withhold or cause to be withheld from the Contractor so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics employed by the Contractor or any subcontractor on the work the full amount of wages required by this contract.
5. Nonpayment of Wages. If the Contractor or any subcontractor fails to pay any laborer or mechanic employed or working on the site of the work any of the wages required by this contract, the Owner may, after written notice to the Contractor, take such action as may be necessary to cause the suspension of any further payment or advance of funds until the violations cease.
6. FAA and MassDOT Aeronautics Division Inspection and Review. The Contractor shall allow any authorized representative of the FAA or MassDOT Aeronautics Division to inspect and review any work or materials used in the performance of this contract.
7. Subcontracts. The Contractor shall insert in each of his/her subcontracts the provisions contained in paragraphs 1, 3, 4, 5, 6, and 7 of this section and also a clause requiring the subcontractors to include these provisions in any lower tier subcontracts which they may enter into, together with a clause requiring this insertion in any further subcontracts that may in turn be made.
8. Contract Termination. A breach of paragraphs 6, 7 and/or 8 may be grounds for termination of the contract.

Article 6. The Contractor agrees to accept as his/her full and only compensation for the performance of all the work required under this Contract such sum or sums of money as may be proper in accordance with the price or prices set forth in the Contractor's Proposal attached hereto and made a part hereof covering all of the items.

Article 7. It is agreed that all wages paid to workmen employed by the Contractor or any subcontractor upon this project shall be in accordance with the Massachusetts Prevailing Wage Law and shall be in amounts and at rates not less than those specified in the wage determination issued by the for this Project, and incorporated into these Contract Documents herein.

Article 8. Liability and Indemnity. The parties mutually agree to the following:

- a. To the fullest extent permitted by law, Contractor shall defend, indemnify, and save harmless the Owner, and its respective duly elected or appointed officials, agents including Engineer, and employees (referred to collectively as the "Owner") from and against all demands, claims, damages, liabilities, losses, costs, and expenses (including, but not limited to, reasonable attorney fees) (referred to collectively as "demands") arising out of or resulting from acts, errors, or omissions of the Contractor, any subcontractors of the Contractor, or any person directly or indirectly employed by any of them, or by a defect of a product or design supplied by the Contractor or subcontractors, or by an action or omission of any other person for whom Contractor or subcontractors may be liable. Such obligation shall not negate, abridge, or reduce in any way any additional indemnification right of Owner, that otherwise may exist under statute or in law or equity.
- b. Contractor assumes full responsibility for relations with subcontractors and Contractor shall defend, indemnify, and save harmless Owner or Engineer from all demands made against Owner and Engineer by any subcontractor, any subcontractor's agent or employee, or any other person, as the result of any subcontractor's act, error, or omission that arises out of, results from, or is connected with the performance of this Agreement or any Subsequent Contract and is not otherwise subject to indemnifications under subparagraph "a" above.
- c. Contractor shall defend, indemnify, and hold harmless Owner and Engineer from any and all demands relating to wages, overtime compensation, or other employee benefits for work performed in connection with the project, or required by state or federal law, including but not limited to Fair Labor Standards Act and Prevailing Wage Law.
- d. The indemnification obligations of Contractor and subcontract shall not be limited in any way by any limitations on the amount or type of damages, compensations, or benefits payable by or for Contractor or subcontractor under any federal or state law.

Article 9. Venue and jurisdiction of any action will only be brought in the Circuit Court in and for the appropriate Judicial District Court of the County in which the Owner is located.

Article 10. Attorney Fees, Costs, and Expenses of Litigation. In the event of a breach of this agreement by the Contractor, the Contractor shall pay to the Owner all reasonable attorney fees, costs and other related expenses incurred by the Owner, including costs incurred by the Engineer, in enforcing its rights as a result of said breach. The Owner shall reimburse the Engineer for all such costs.

IN WITNESS WHEREOF, The Orange Municipal Airport has caused its corporate seal to be hereto affixed and the parties have executed this Agreement, signed this the _____ day of _____, 2020.

AWARDING AUTHORITY: TOWN OF ORANGE, MA – ORANGE MUNICIPAL AIRPORT COMMISSION

BY:

Julie M. Cole
Chair, Orange Municipal Airport Commission

CERTIFIED that fund are available and encumbered: Approved as to form and legality:

BY:

Gail Weiss
Town Accountant

CONTRACTOR:

BY:

TITLE: _____



CONTRACT APPROVAL

The Massachusetts Department of Transportation – Aeronautics Division, this ____ day of _____, 2020 hereby approves this Contract between the Orange Municipal Airport and

_____ in the amount of \$ _____ for construction services in connection with:

RECONSTRUCT RUNWAY 1-19 (BASE BID)
MILL AND OVERLAY RUNWAY 1-19 (ADD ALTERNATE NO. 1)
GROOVE RUNWAY 1-19 (ADD ALTERNATE NO. 2)
AIP Project No. 3-25-0039-__-2020

ORANGE MUNICIPAL AIRPORT

This approval is granted in accordance with Section 51K, Chapter 90 of the General Laws of Massachusetts, as amended, and in no way makes the Massachusetts Department of Transportation – Aeronautics Division a party to the Contract and in no way interferes with the right of either principal here above, and is not to be considered as a commitment of funding unless so voted by The Massachusetts Department of Transportation – Aeronautics Division.

 Jeffrey DeCarlo, Administrator
 Massachusetts Department of Transportation
 Aeronautics Division

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CONTRACTOR'S GUARANTEE

WHEREAS _____
(Contractor)

OF _____
(Address)

herein called "the Contractor" has completed construction of the following project:

Owner : _____ Orange Municipal Airport Commission _____

Address of Owner: _____ 80 Airport St, Orange, MA 01364 _____

Title of Project:

RECONSTRUCT RUNWAY 1-19 (BASE BID)
MILL AND OVERLAY RUNWAY 1-19 (ADD ALTERNATE NO. 1)
GROOVE RUNWAY 1-19 (ADD ALTERNATE NO. 2)
AIP Project No. 3-25-0039-____-2020

ORANGE MUNICIPAL AIRPORT

Location: _____ Orange Municipal Airport, Orange, Massachusetts _____

Date of Completion: _____

Date Guarantee Expires: _____

Whereas, at the inception of such work the Contractor agreed to guarantee the construction against faulty materials or workmanship for a limited period and subject to the conditions herein set forth:

Now, therefore, the Contractor hereby guarantees, subject to the conditions herein set forth, that during a period of one (1) year from the date of completion of said construction, it will, at its own cost and expense, following receipt of written notice, make or cause to be made such repairs to said construction resulting solely from faulty construction or defects in materials or workmanship applied by or through the Contractor as may be necessary to maintain the construction in defect-free condition.

This guarantee is made subject to the following conditions:

1. Specifically excluded from this guarantee is any and all damage caused by the following: lightning, windstorm greater than 125 mph, hailstorm or other extreme acts of God; or fire. If the construction is damaged by reason of any of the foregoing, this guarantee shall thereupon become null and void for the balance of the guarantee period unless such damage is repaired by the Contractor at the expense of the party requesting such repairs.
2. This guarantee shall not be, or become, effective unless and until the Contractor has been paid in full for all of his/her work.

3. This guarantee runs in favor of the Owner only and is not transferable.

4. Additional Conditions: This Contractor Warranty is in Addition to all other legal and specified Warranties and Guarantees required on the project's Contract Documents for materials, systems and performance of the manufacturer or supplier.

In Witness Whereof, this instrument has been duly executed this

_____ day of _____, 2020

_____ Company Name

By: _____
Authorized Signature

(Seal)

Title: _____

NOTE: Form shall bear seal if Contractor is a Corporation.

CERTIFICATES OF INSURANCE

The Contractor shall furnish the Owner at the time of executing the Contract, Certificates of Insurance showing clearly the types and amounts of insurance coverage, the operations covered, effective dates, and expiration dates for all of the required insurance coverage. For insurance requirements see **Section VII, subsection 13** of these specifications.

END OF SECTION V – SUCCESSFUL BIDDER FORMS

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Section VI
FAA General Provisions

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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). |

| Paragraph Number | Term | Definition |
|------------------|--|--|
| 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. |
| 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 | <p>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.</p> <p>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.</p> |
| 10-17 | Contract Item (Pay Item) | A specific unit of work for which a price is provided in the contract. |

| Paragraph Number | Term | Definition |
|------------------|--|---|
| 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). |
| 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, inspection, and/or observation 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. |

| Paragraph Number | Term | Definition |
|------------------|-------------------------------|---|
| 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. |
| 10-30 | Force Account | <p>a. Contract Force Account - A method of payment that addresses extra work performed by the Contractor on a time and material basis.</p> <p>b. Owner Force Account - Work performed for the project by the Owner's employees.</p> |
| 10-31 | Intention of Terms | <p>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.</p> <p>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.</p> |
| 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. |

| Paragraph Number | Term | Definition |
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| 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 Orange Municipal Airport Commission. |
| 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, considered 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. |

| Paragraph Number | Term | Definition |
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| | | 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. |
| 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 |

| Paragraph Number | Term | Definition |
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| | | 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. |
| 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 |

| Paragraph Number | Term | Definition |
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| | | 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 | None |

END OF SECTION 10

Section 20 Proposal Requirements and Conditions

20-01 Advertisement (Notice to Bidders). See Section I – Invitation to Bids.

20-02 Qualification of bidders. Each bidder shall submit evidence of competency and evidence of financial responsibility to perform the work to the Owner at the time of bid opening.

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.

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*.

A prebid conference is required on this project to 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.

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.

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.

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 Section II – Instruction to Bidders for delivery requirements. Each proposal submitted shall be placed in a sealed envelope plainly marked with the project number, location of airport, and name and business address of the bidder on the outside. When sent by mail, preferably registered, the sealed proposal, marked as indicated above, should be enclosed in an additional envelope. No proposal will be considered unless received at the place specified in the advertisement or as modified by Addendum before the time specified for opening all bids. Proposals received after the bid opening time shall be returned to the bidder unopened.

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 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.

20-14 Disqualification of bidders. A bidder shall be considered disqualified for any of the following reasons:

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 any such participating bidder has been reinstated by the Owner as a qualified bidder.

c. If the bidder is considered to be in "default" for any reason specified in paragraph 20-04, *Issuance of Proposal Forms*, of this section.

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 **six (6) 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.

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 **one hundred and twenty (120)** 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.

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. At the time of the execution of the contract, the successful bidder shall furnish the Owner a surety bond or bonds that have been fully executed by the bidder and the surety guaranteeing the performance of the work and the payment of all legal debts that may be incurred by reason of the Contractor's performance of the work. The surety and the form of the bond or bonds shall be acceptable to the Owner. Unless otherwise specified in this subsection, the surety bond or bonds shall be in a sum equal to the full amount of the contract.

30-06 Execution of contract. The successful bidder shall sign (execute) the necessary agreements for entering into the contract and return the signed contract to the Owner, along with the fully executed surety bond or bonds specified in paragraph 30-05, *Requirements of Contract Bonds*, of this section, within 5 calendar days from the date mailed or otherwise delivered to the successful bidder.

30-07 Approval of contract. Upon receipt of the contract and contract bond or bonds that have been executed by the successful bidder, the Owner shall complete the execution of the contract in accordance with local laws or ordinances, and return the fully executed contract to the Contractor. Delivery of the fully executed contract to the Contractor shall constitute the Owner's approval to be bound by the successful bidder's proposal and the terms of the contract.

30-08 Failure to execute contract. Failure of the successful bidder to execute the contract and furnish an acceptable surety bond or bonds within the period specified in paragraph 30-06, *Execution of Contract*, of this section shall be just cause for cancellation of the award and forfeiture of the proposal guaranty, not as a penalty, but as liquidated damages to the Owner.

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.

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.

END OF SECTION 40

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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. Refer to Section VII – Supplemental General Provisions

50-05 Cooperation of Contractor. The Contractor shall be supplied with one hard copy 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): AutoCAD 2019 in .DWG and .DXf format.

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.

No direct payment will be made, unless otherwise specified in contract documents, for this labor, materials, or other expenses. The cost shall be included in the price of the bid for the various items of the Contract.

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

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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.

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.

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.

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 Contractor shall provide dedicated space for the use of the engineer, 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. Refer to Section M-001 for Engineer’s Trailer Requirements

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

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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 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.

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, 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:

| <u>OWNER</u> (Utility or Other Facility) | <u>PERSON TO CONTACT</u> (Name, Title, Address and Phone) |
|---|--|
| FAA | John Merck, Project Manager FAA, Airports Division, ANE-620 1200 District Avenue Burlington, MA 01803 |
| Orange Municipal Airport | Len Bedaw, Airport Manager 80 Airport St, Orange, MA 01364 978.554.8189 |
| NOAA (NWS) | Al Dunham (Taunton) 508.823.1900 |

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 on sheet(s) of the project plans.

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.

70-11 Responsibility for damage claims. The Contractor shall indemnify and hold harmless the Engineer/RPR and the Owner and their officers, agents, and employees from all suits, actions, or claims, of any character, 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 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.

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. Upon completion of any portion of work listed in the project documents, 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 whatever, 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.

| <u>OWNER</u> (Utility or Other Facility) | <u>PERSON TO CONTACT</u> (Name, Title, Address and Phone) |
|---|--|
| FAA | John Merck, Project Manager FAA, Airports Division, ANE-620 1200 District Avenue Burlington, MA 01803 |
| Orange Municipal Airport | Len Bedaw, Airport Manager 80 Airport St, Orange, MA 01364 978.554.8189 |
| Orange Water Department | Kenneth Wysk, Superintendent 16 W Myrtle St, Orange, MA 01364 978.544.115 |
| NOAA (NWS) | Al Dunham (Taunton) 508.823.1900 |

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 manager 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.

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*.

70-21 Insurance Requirements. Refer to Section VII- Supplemental General Provisions for insurance requirements.

END OF SECTION 70

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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 10 days of the NTP date. The Contractor shall notify the RPR at least 72 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 14 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 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:

| AOA | Time Periods AOA Can Be Closed | Type of Communications Required When Working in AOA | Control Authority |
|-----|---|--|---|
| | See Construction Safety and Phasing Plans | Monitor aviation radio frequency 122.80 MHz ground frequency | Orange Municipal Airport, Airport Manager |

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.

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.

If the contract time requires extension for reasons beyond the Contractor's control, it shall be adjusted as follows:

80-07.1 Contract time based on calendar days. Contract Time based on calendar days shall consist of the number of calendar days stated in the contract counting from the effective date of the Notice to Proceed and including all Saturdays, Sundays, holidays, and non-work days. All calendar days elapsing between the effective dates of the Owner's orders to suspend and resume all work, due to causes not the fault of the Contractor, shall be excluded.

At the time of final payment, the contract time shall be increased in the same proportion as the cost of the actually completed quantities bears to the cost of the originally estimated quantities in the proposal. Such increase in the contract time shall not consider either cost of work or the extension of contract time that has been covered by a change order or supplemental agreement. Charges against the contract time will cease as of the date of final acceptance.

80-08 Failure to complete on time. For each calendar day or working day, as specified in the contract, that any work remains uncompleted after the contract time (including all extensions and adjustments as provided in paragraph 80-07, *Determination and Extension of Contract Time*) the sum specified in the contract and proposal as liquidated damages (LD) will be deducted from any money due or to become due the Contractor or their own surety. Such deducted sums shall not be deducted as a penalty but shall be considered as liquidation of a reasonable portion of damages including but not limited to additional engineering services that will be incurred by the Owner should the Contractor fail to complete the work in the time provided in their contract. Refer to Section M-001 for liquidated damages

The maximum construction time allowed for this project will not more than **131** calendar days. Permitting the Contractor to continue and finish the work or any part of it after the time fixed for its completion, or after the date to which the time for completion may have been extended, will in no way operate as a waiver on the part of the Owner of any of its rights under the contract.

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 a new 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. |

| Term | Description |
|------------------------------|---|
| 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 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 | <p>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.</p> <p>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</p> |

| Term | Description |
|-------------------------|--|
| | <p>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.</p> <p>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%.</p> <p>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.</p> <p>Beams, dials, platforms, and other scale equipment shall be so arranged that the operator and the RPR can safely and conveniently view them.</p> <p>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.</p> <p>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.</p> |
| Rental Equipment | <p>Rental of equipment will be measured by time in hours of actual working time and necessary traveling time of the equipment within the limits of the work. Special equipment ordered in connection with extra work will be measured as agreed in the change order or supplemental agreement authorizing such work as provided in paragraph 90-05 <i>Payment for Extra Work</i>.</p> |
| Pay Quantities | <p>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.</p> |

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. Extra work, performed in accordance with Section 40, paragraph 40-04, *Extra Work*, will be paid for at the contract prices or agreed prices specified in the change order or supplemental agreement authorizing the extra work.

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 50-14. 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 30 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 30 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.

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.

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.

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.

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).
- k.** Security for Construction Warranty.
- l.** Equipment commissioning documentation submitted, if required.

END OF SECTION 90

END OF SECTION VI

Section VII
Supplemental General Provisions

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SUPPLEMENTAL GENERAL PROVISIONS

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SUPPLEMENTAL GENERAL PROVISIONS

1. ENUMERATION OF FORMS, SPECIFICATIONS AND PLANS.

The various Forms, Specifications, Plans, and Addenda constitute the Contract Documents.

2. SHOP DRAWINGS

- A Submittals shall include but not be limited to: shop drawings, schedules, samples, and manufacturer's literature as required by the Specifications or requested by the Engineer.

No work shall be fabricated until such approval has been received. Work performed without shop drawing approval is at the Contractor's own risk.

- B All submissions shall include a "CONTRACTOR SUBMITTAL FORM" as a cover sheet to the submittal information. For submittals generated from subcontractors, two (2) submittal forms are required, one (1) from the general contractor and one (1) from the subcontractor. Submittals received without the completed submittal form will be returned to the Contractor as incomplete and not reviewed. Contractor submittal forms shall be printed on colored paper of the Contractor's choice and shall remain the same color throughout the project.

Sample Contractor submittal forms are provided on **pages VII-II-1 and VII-II-2**.

- C Submissions made directly by subcontractors will not be accepted. All business concerning approval will be conducted through the General Contractor.

The Contractor shall submit for the approval of the Engineer, the following number of submittal copies:

- (1) Three (3) copies for the Engineer
- (2) Plus the number of copies required by the Contractor/subcontractor

- D Submissions shall be made sufficiently in advance of construction requirements to allow ample time for checking, resubmitting and rechecking without causing delay in the work. Failure to submit shop drawings in a timely manner shall not be considered as a valid reason for a Contract time extension.

- E Each submission, including the submission of subcontractors shall be checked by the Contractor for accuracy and compliance with the Contract Documents. The certification on the submittal form shall constitute as evidence of such checking and coordination. Submissions without this certification will not be considered for review by the Engineer.

Submittal certification shall include one of the following:

1. Submitted "as specified" for the product
 2. Submitted "AS EQUAL" to the product specified
 3. Submitted "IN SUBSTITUTION" for the product specified
 4. "OTHER"
- (1) Submitted "as specified" shall mean the Contractor is certifying that the submittal item or system is of the same manufacture and model number, or performance standard as specified. For these items, manufacturer's data sheets shall be attached to the Contractor submittal form.

- (2) Submitted "AS EQUAL" to the product or system specified shall mean the Contractor is certifying the proposed submittal, although supplied by a manufacturer other than the one specified for the item meets or exceeds the physical requirements, specifications, quality, speed, reliability, and/or maintenance costs of the product specified, and is capable of being incorporated into the overall project without design revisions and will perform equally or better than the specified item. For these items, manufacturer's data sheets shall be attached to the Contractor submittal to demonstrate that the performance, durability and/or maintenance standards of the product are as specified.
- (3) Submitted "IN SUBSTITUTION" to the product or system specified means the Contractor is proposing an item or system of different physical requirements, specifications, quality, reliability, and/or maintenance costs, than the product specified. For a submission "IN SUBSTITUTION" of the product or system specified the following information and procedure shall be followed to determine if the Owner's requirements will be satisfied:
- a. Design the system to meet or exceed the operational requirements, physical requirements, specifications, quality, reliability, maintenance costs, and ease of operation of the specified system.
 - b. Submit full Specifications for the system and all components in the form of shop drawings for review by the Owner and the Engineer.
 - c. Submit a revised design for the system, stamped by a licensed Professional Engineer within the state in which the work is to be performed.
 - d. Submit revised details for any and all components of the proposed system that are different than those of the specified system. A licensed Professional Engineer within the state in which the work is to be performed shall stamp details.
 - e. Demonstrate the proposed system to the satisfaction of the Owner and Engineer.
 - f. Reimburse the Engineer at the rate of \$140.00 per hour for Project Managers and \$90.00 per hour plus expenses for Project Engineers for all time spent reviewing, discussing and otherwise being involved with the substitute system. The payment shall be made based on an estimate of the time required and shall be paid in advance of the review. If the estimated amount is exceeded, additional amounts must be provided by the Contractor for the review to continue. Upon completion of the review, a summary invoice will be provided to the Contractor indicating the hours spent and amount billed. Any money not spent on the review will be returned to the Contractor.
 - g. Provide a credit satisfactory to the Owner for any cost savings associated with the substitution. The Contractor should anticipate providing a credit equal to one-half of the cost differential between the specified system and the system proposed for substitution.
- Acceptance of any alternate item or system will be at the discretion of the Owner. Upon acceptance or rejection of a system or component thereof, the Engineer shall provide a written response to the Contractor in the form of a shop drawing review.
- (4) Submitted Certified as "OTHER". The Contractor shall provide information to demonstrate the proposed item or system will satisfy the design intent and provide the Owner performance, reliability and maintenance ease over its anticipated service life that exceeds that of the specified product. The final determination of suitability shall be the sole responsibility of the Owner.

- F The approval of shop drawing submissions will be general, but approval shall not be construed as permitting any departure from the Contract requirements, or as relieving the Contractor of the responsibility for any errors including details, dimensions, materials, etc.
- G Shop drawings for pipe, fittings, and masonry items shall consist of certificates of conformance of affidavits from the manufacturer's signifying that all materials conform to the Specifications.
- H The Contractor shall allow for sufficient time within the project schedule for shop drawing review and processing. Items requiring long lead times which impact the start or completion of the project shall be identified, brought to the Engineer's attention and noted on the shop drawing submission. Additional Contract time will not be provided for failure to submit shop drawings for approval in a timely manner.
- I The Owner reserves the right to back charge the Contractor for expenses incurred in reviewing and returning incomplete shop drawings. Expenses shall include the costs of the Engineer at the rate of \$140.00 per hour for Project Managers and \$90.00 per hour plus expenses for Project Engineer's for the actual time incurred. The Contractor will be provided documentation of the expenses incurred. Contractor back charges will be deducted from payments due to the Contractor. The Owner further reserves the right to back charge the Contractor for all review efforts after two (2) submissions for an item.

3. MATERIALS SERVICES AND FACILITIES

It is understood that, except as otherwise specifically stated in the Contract Documents, the Contractor shall provide at no cost to the Owner all materials, labor, tools, equipment, water, light, power, transportation, superintendence, temporary construction of any nature, and all other services and facilities of any nature whatsoever necessary to execute, complete, and deliver the work for the specified item.

Any work to be performed after regular hours, on Sundays or Legal Holidays, shall be performed without additional expense to the Owner.

4. CONTRACTOR'S TITLE TO MATERIALS

No materials or supplies for the work shall be purchased by the Contractor or by any subcontractor subject to any chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller. The Contractor warrants that he/she has good title to all materials and supplies used by him/her in the work free from all liens, claims or encumbrances.

5. LUMP SUM AND UNIT PRICES

Only those items for which unit prices are shown in the Bid Form will be considered for separate payment. Compensation for all other work shall be included in the appropriate Contract items.

Quantities listed in the Bid Form are estimated for bidding purposes only and do not necessarily represent the exact amount of work to be done. Payment for unit price items will be based on the unit prices specified or bid and the actual amount of work performed.

6. "OR EQUAL" CLAUSE

Whenever materials are identified on the Plans or in the Specifications by reference to manufacturer's or vendors' names, trade names, catalogue numbers, etc., it is intended merely to establish a standard; and any material of other manufacturers and vendors which will perform adequately the duties imposed by the general design will be considered equally acceptable provided the materials so proposed are, in the opinion of the Engineer, of equal substance and function. Such materials shall not be purchased or installed by the Contractor without the Engineer's written approvals.

7. CONTRACT SECURITY

The successful bidder must deliver to the Owner an executed Performance Bond in an amount at least equal to one hundred percent (100%) of the accepted bid as security for the faithful performance of the Contract, and also must deliver to the Owner a separate executed Payment Bond in an amount at least equal to one hundred percent (100%) of the accepted bid as security for the payment of all persons performing labor and furnishing materials in connection with this Contract. The sureties of all bonds shall be such surety company or companies as are approved by the Owner, and as are authorized to transact business in the State where the proposed project is located. The bonds must be approved by the Owner prior to execution of the formal Contract. On Contracts for materials and equipment only, involving no labor on the site, Performance and Payment Bonds will not be required unless expressly so stated.

8. REPRESENTATIONS OF CONTRACTOR

The Contractor represents and warrants:

- (1) that he/she is financially solvent and that he/she is experienced in and competent to perform the type of work or to furnish the plant, materials, supplies or equipment, to be so performed or furnished by him/her; and
- (2) that he/she is familiar with all Federal, State, municipal and department laws, ordinances and regulations, which may in any way affect the work or those employed therein, including but not limited to, rulings or actions specifically relating to the work or to the project of which it is a part; and
- (3) that such temporary and permanent work provided by the Contract Documents as is to be done by him/her can be satisfactorily constructed and used for the purpose for which it is intended, and that such construction will not injure any person or damage any property; and
- (4) that he/she has carefully examined the Plans, Specifications and site of the work, and that from his/her own investigations, he/she has satisfied themselves as to the nature and location of the work, the character, quality and quantity of equipment and other facilities needed for the performance of the work, the general and local conditions and all other materials which may in any way affect the work or its performance.

9. PROTECTION OF WORK AND PROPERTY - EMERGENCY

The Contractor shall at all times safely guard the Owner's property from injury or loss in connection with this Contract. The Contractor shall at all times safeguard and protect his/her own work and adjacent property from damage. The Contractor shall correct any such damage, loss or injury unless such is caused directly by errors contained in the Contract or caused by the Owner, or the Owner's duly authorized representative.

In case of an emergency which threatens loss or injury of property, and/or safety of life, the Contractor will be allowed to act, without previous instructions from the Engineer, in a diligent manner. She/he shall notify the Engineer immediately thereafter. Any claim for compensation by the Contractor due to such extra work shall be promptly submitted to the Engineer for approval.

The amount of reimbursement claimed by the Contractor on account of any emergency action shall be determined in the manner provided in these specifications.

Where the Contractor has not taken action but has notified the Engineer of any emergency threatening injury to persons or damage to the work or any adjoining property, he/she shall act as instructed or authorized by the Engineer.

10. INSPECTION BY OWNER AND PUBLIC AGENCIES

The authorized representatives and agents of the **Owner, Airport Manager, FAA, MassDOT Aeronautics, and local Conservation Commissions** having jurisdiction shall be permitted to inspect all work, materials, payrolls, records of personnel, invoices of materials, and other relevant data and records. Representatives of the Owner shall have access to the work wherever it is in preparation or progress and the Contractor shall provide facilities for such access and inspection.

11. REPORTS, RECORDS AND DATA

The Contractor shall submit to the Owner such schedule of quantities and costs, progress schedules, payrolls, reports, estimates, records and other data, as the Owner may request concerning work performed or to be performed under this Contract.

12. SUBSURFACE CONDITIONS FOUND DIFFERENT

Should the Contractor encounter subsurface and/or latent conditions at the site materially differing from those shown on the Plans or indicated in the Specifications, he/she shall immediately give notice to the Engineer of such conditions before they are disturbed. The Engineer will there upon promptly investigate the conditions, and if he/she finds that they materially differ from those shown on the Plans or indicated in the Specifications, he/she will at once make such changes in the Plans and/or Specifications as he/she may find necessary; any increase or decrease of cost resulting from such changes to be adjusted in the manner provided in the General Provisions.

13. CONTRACTOR'S AND SUBCONTRACTOR'S INSURANCE

The Contractor shall not commence work under this Contract until he/she has obtained all the insurance required hereunder and such insurance has been approved by the Owner, nor shall the Contractor allow any subcontractor to commence work on his/her subcontract until all similar insurance required of the subcontractor has been so obtained and approved. Approval of the insurance by the Owner shall not relieve or decrease the liability of the Contractor hereunder. All required insurance shall be maintained at or above the required limits for the duration of this Contract. All policies shall be issued by companies authorized to write that type of insurance under the laws and statutes of the Commonwealth of Massachusetts.

- A Worker's Compensation and Employer's Liability Insurance: The Contractor shall take out and maintain during the life of this Contract, the statutory Workmen's Compensation and Employer's Liability Insurance in accordance with M.G.L. c.149 section 34A and c.152 as amended, for all of his/her employees to be engaged in work on the project under this Contract, and in case any such work is sublet, the Contractor shall require the subcontractor similarly to provide Workmen's Compensation and Employer's Liability Insurance for all of the latter's employees to be engaged in such work. The minimum coverage shall be as required by statute or as listed below, whichever is higher.

| | |
|----------------------------------|----------------------------------|
| Worker's Compensation Coverage A | Provide Statutory Minimum |
| Employer's Liability Coverage B | \$500,000 – each accident |
| | \$500,000 – disease per employee |
| | \$500,000 – disease policy |

- B Contractor's Public Liability and Property Damage Insurance and Vehicle Liability Insurance: The Contractor shall procure and shall maintain during the life of this Contract, Contractor's Public Liability Insurance, Contractor's Property Damage Insurance, and Vehicle Liability Insurance in the amounts herein specified. The minimum coverage shall be as required by statute or as listed below, whichever is higher.

Public Liability and Property Damage:

| | |
|---------------------------------|-----------------------------|
| Bodily Injury | \$1,000,000 each occurrence |
| Property Damage | \$1,000,000 each occurrence |
| Products & Completed Operations | \$1,000,000 each occurrence |
| Personal & Advertising Injury | \$1,000,000 each occurrence |

Vehicle Liability:

| | |
|---------------------------------|--|
| Bodily Injury & Property Damage | \$1,000,000 each person \$1,000,000 each accident |
| Combined Single Limit | \$1,000,000 |

Umbrella Policy:

| | |
|-----------------|-----------------------|
| Umbrella Policy | \$2,000,000 aggregate |
|-----------------|-----------------------|

Coverage shall include but not be limited to injuries, including accidental death, to any one person; and subject to the same limit for each person.

- C Subcontractor's Public Liability and Property Damage Insurance and Vehicle Liability Insurance: The Contractor shall either (1) require each of his/her subcontractors to procure and to maintain during the life of his/her subcontract, Subcontractor's Public Liability and Property Damage Insurance and Vehicle Liability Insurance of the type and in the amounts specified above, or (2) insure the activities of his/her subcontractors in his/her policy, specified in subparagraph (b) hereof.
- D Owner's Protective Liability Insurance: The Contractor shall take out and furnish to the Owner and maintain during the life of this Contract a separate complete Owner's Protective Liability Insurance in the amounts specified in subparagraph (b) hereof.
- E Fire and Extended Coverage Insurance: The Contractor shall procure and maintain during the life of this Contract fire and extended coverage insurance on all work in place and/or materials stored at the site in the amounts specified herein. The minimum coverage shall be as required by statute or as listed below, whichever is higher.

| | |
|------------------------------------|--------------------------------------|
| Fire & Extended Coverage Insurance | At least 80% of this Contract Amount |
|------------------------------------|--------------------------------------|
- F Scope of Insurance and Special Hazards: The insurance required under subparagraph (b) and (c) hereof shall provide adequate protection for the Contractor and his/her subcontractors, respectively, against damage claims which may arise from operations under this Contract, whether such operations be by the insured or by anyone directly or indirectly employed by him/her, and also against any of the special hazards which may be encountered in the performance of this Contract as enumerated in the Supplemental General Provisions.
- G Insurance Certificates: The Contractor shall furnish the Owner at the time of executing the Contract, Certificates of Insurance showing clearly the types and amounts of insurance coverage, the operations covered, effective dates, and expiration dates for all of the required insurance coverage. Certificates of Insurance shall be endorsed essentially as follows: "None of the coverage indicated on the Certificate will be modified or canceled without ten days prior written notice to the Owner". The Certificates of Insurance shall clearly state all of the requirements specified in all these subparagraphs and shall state the month and year of the Contract. All insurance policies and certificates shall list the **Town of Orange, Orange Municipal Airport Commission, and Airport Solutions Group, LLC** as the insured and

acceptance of the insurance certificates by the Owner shall not relieve or decrease the liability of the Contractor under the Contract.

14. MUTUAL RESPONSIBILITY OF CONTRACTORS

If, through acts of neglect on the part of the Contractor, any other Contractor or any subcontractor shall suffer loss or damage on work, the Contractor agrees to settle with such other Contractor or subcontractor by agreement or arbitration if such other Contractor or subcontractor will so settle. If such other Contractor or subcontractor shall assert any claim against the Owner on account of any damage alleged to have been sustained, the Owner shall notify the Contractor who shall indemnify and save harmless the Owner against any such claim.

15. USE OF PREMISES AND REMOVAL OF DEBRIS

The Contractor expressly undertakes at his/her own expense:

- (1) to take every precaution against injuries to persons or damage to property;
- (2) to store his/her apparatus, materials, supplies and equipment in such orderly fashion at the site of the work as will not unduly interfere with the progress of his/her work or the work of any other contractors;
- (3) to place upon the work or any part thereof only such loads as are consistent with the safety of that portion of the work;
- (4) to clean up frequently all refuse, rubbish, scrap materials, and debris caused by his/her operations, to the end that at all times the site of the work shall present a neat, orderly and workmanlike appearance;
- (5) before final payment, to remove all surplus material, false work, temporary structures, including foundations thereof, plant of any description and debris of every nature resulting from his/her operations, and to put the site in a neat, orderly condition;
- (6) to effect all cutting, fitting or patching of his/her work required to make the same conform to the Plans and Specifications and, except with the consent of the Engineer, not to cut or otherwise alter the work of any other contractor.

16. GENERAL GUARANTEE

Neither the final certificate of payment nor any provision in the Contract Documents nor partial or entire occupancy of the premises by the Owner shall constitute an acceptance of work not done in accordance with the Contract Documents or relieve the Contractor of liability in respect to any express warranties or responsibility for faulty materials or workmanship. The Contractor shall remedy any defects in the work and pay for any damage to other work resulting therefrom, which shall appear within a period of one year of the date of final acceptance of the work unless a longer period is specified. The Owner will give notice of observed defects with reasonable promptness.

17. NOTICE AND SERVICE THEREOF

Any notice to any Contractor from the Owner relative to any part of this Contract shall be in writing and considered delivered and the service thereof completed when said notice is posted, by certified or registered mail, to the said Contractor as his/her last given address, or delivered in person to said Contractor or his/her authorized representative on the work.

18. PRECONSTRUCTION CONFERENCE

Prior to commencement of any site activities, a Pre-Construction Conference will be held by the Airport Manager as the Sponsor's representative who will meet with the **Engineer's Resident Engineer, the Engineer's Project Manager, the Contractors Site Superintendent, the Contractors Project Manager, FAA, MassDOT Aeronautics, local Conservation Commission** having jurisdiction, and other representatives who are involved and or impacted by the project. The Pre-Construction Conference will be held to discuss the work in general, including administrative matters, accident prevention, and safety; to answer any questions of the Engineer or Contractor; to discuss the environmental impacts and restoration, to introduce all parties and describe responsibilities, and to resolve any potential problems before the work commences.

19. JOB-SITE ADMINISTRATION

Contract Documents and Plans: The Owner will furnish the Contractor without charge one (1) copy of the Contract Documents, including General Provisions, Supplemental General Provisions, Technical Provisions and Plans. Additional copies requested by the Contractor shall be furnished at cost.

Plans and Specifications: Interpretations: The Contractor shall keep at the site of the work one copy of the Plans and Specifications signed and identified by the Engineer, and shall at all times give the Engineer, and other representatives of the Owner access thereto. Anything shown on the Plans and not mentioned in the Specifications or stated in the Specifications and not shown on the Plans, shall have the same effect as if shown or mentioned respectively in both. In case of any conflict or inconsistency between the Plans and Specifications, the Plans shall govern. Any discrepancy in the Plans shall be submitted by the Contractor to the Engineer whose decision thereon shall be conclusive.

Any Contractor whose place of business is located outside of the boundary of the City or Town where the Airport is located and who does not maintain local headquarters 24 hours a day within that City or Town must make satisfactory arrangements with the Owner for taking care of emergencies or complaints which may occur at night, over the weekend, or when the job is shut down. If he/she does not, the Owner may make arrangements and the cost will be charged to the Contractor. Before the final estimate is certified for payment, the Contractor shall make similar arrangements to cover the guarantee period.

20. REQUIRED PROVISIONS DEEMED INSERTED

Each and every provision of law and clause required by law to be inserted in this Contract shall be deemed to be inserted herein and the Contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon the application of either party, the Contract shall forthwith be physically amended to make such insertion or correction.

21. EMPLOYMENT QUALIFICATIONS AND PREFERENCE

No person under the age of sixteen years shall be employed on the project under this Contract. No person whose age or physical condition is such as to make his/her employment dangerous to his/her health or safety, or to the project, shall be employed under this Contract. Provided, that this shall not operate against the employment of physically handicapped persons, otherwise employable, where such persons may be safely assigned to work which they can ably perform. Preference shall be given to qualified local residents in the employment of laborers and mechanics for work on the project under this Contract.

22. MINIMUM WAGES

All mechanics and laborers employed or working upon the site of the work will be paid unconditionally and not less than once a week, the full amount due at the time of payment computed at wage rates not less than those of the Federal or State Wage Rates which are attached hereto and made a part hereof,

regardless of any contractual relationship which may be alleged to exist between the Contractor or subcontractor and such laborers and mechanics. Wage Determination Decision shall be posted by the Contractor at the site of the work in a prominent place where it can be easily seen by the workers.

23. PAYROLLS AND BASIC RECORDS

Payrolls and basic records relating thereto will be maintained during the course of the work and preserved for a period of six years thereafter for all workmen. Contractor must submit three (3) complete copies of the Certified Payrolls to the Engineer weekly for the Engineer and Owner's review.

24. SUBCONTRACTS

The Contractor will insert in any subcontracts the requirements contained in the preceding Paragraphs **22** and **23** and also a clause requiring subcontractors to include these requirements in any lower tier contracts into which they may enter.

25. OFFICIAL NOT TO BENEFIT

No official of the Owner who is authorized in such capacity and on behalf of the Owner to negotiate, make, accept, or approve, or to take part in negotiating, making, accepting, or approving any architectural, engineering, inspection, construction or material supply Contract or any subcontract in connection with the construction of the project, shall become directly or indirectly interested personally in this Contract or in any part hereof. No officer, employee, architect, attorney, engineer or inspector of or for the Owner who is authorized in such capacity and on behalf of the Owner to exercise any legislative, executive, supervisory or other similar functions in connection with the construction of the project, shall become directly or indirectly interested personally in this Contract or in any part thereof, any material supply contract, subcontract, insurance contract, or any other contract pertaining to the project.

26. ARBITRATION

Any controversy or claim arising out of or relating to this Contract, or the breach thereof, except for claims which have been waived by the acceptance of final payment, which cannot be resolved by mutual agreement, shall, at the discretion of the Owner, be settled by arbitration in accordance with the Construction Industry Arbitration Rules of American Arbitration, and judgment upon the award rendered by the Arbitrator(s) may be entered in any court having jurisdiction thereof.

The Contractor shall carry on the work and maintain the progress schedule during the arbitration proceedings, unless otherwise agreed by him/her and the Owner in writing.

27. INDEMNIFICATION

- A The Contractor shall indemnify and hold harmless the Owner and the Engineer and their agencies and employees from and against all claims, damages, losses and expenses, including but not limited to, attorney's fees, arising out of or resulting from the performance of the work, provided that any such claim, damage, loss or expense (a) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the work itself) including the loss of use resulting therefrom and (b) is caused in whole or in part by any negligent act or omission of the Contractor, any subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless of whether it is caused in part by a party indemnified hereunder.
- B In any and all claims against the Owner or the Engineer or any of their agents or employees by an employee of the Contractor, any subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation under this paragraph shall not be limited in any way by a limitation on the amount or type of

damages, compensation or benefits payable by or for the Contractor or any subcontractor under workmen's compensation acts, disability benefit acts or other employee benefit acts.

- C The obligations of the Contractor under this paragraph shall not extend to the liability of the Engineer, his/her agents or employees arising out of (a) the preparation or approval of maps, plans, opinions, reports, surveys, change orders, designs or Specifications or (b) the giving of or the failure to give directions or instructions by the Engineer, his/her agents or employees provided such giving or failure to give is the primary cause of injury or damage, or (c) any other error or omission in the performance of the Contract between the Engineer and the Owner.

28. RECORD "AS BUILT" PLANS

The Contractor shall, during the progress of the work, keep a master set of prints on the job site, on which he/she shall keep a careful and neat record of all deviations from the Contract Plans prepared by the Engineer which are made during the course of the work.

Upon completion of the project, these "as built" prints shall be certified as to their correctness by the signature of the Contractor and turned over to the Engineer for use by him/her in the preparation of a permanent set of "as built" plans.

29. SUMMARY OF WORK

The documents enumerated under Supplemental General Provisions - Enumeration of Forms, Specifications, Plans and Addenda are intended to describe and illustrate all material, labor, and equipment necessary to construct and complete the work of this Contract. The Contractor shall take no advantage of any error or omission in the Plans, or any discrepancy between the Plans and Specifications, and the Engineer will make such correction and interpretations as may be deemed necessary for the fulfillment of the Plans and Specifications as prepared by him/her, and his/her decisions shall be final.

30. GOOD FAITH EFFORTS

APPENDIX A TO PART 26 –GUIDANCE CONCERNING GOOD FAITH

I. When, as a recipient, you establish a Contract goal on a DOT-assisted Contract, a bidder must, in order to be responsible and/or responsive, make good faith efforts to meet the goal. The bidder can meet this requirement in either of two ways. First, the bidder can meet the goal, documenting commitments for participation by DBE firms sufficient for this purpose. Second, even if it doesn't meet the goal, the bidder can document adequate good faith efforts. This means that the bidder must show that it took all necessary and reasonable steps to achieve a DBE goal or other requirement of this part which, by their scope, intensity, and appropriateness to the objective, could reasonably be expected to obtain sufficient DBE participation, even if they were not fully successful.

II. In any situation in which you have established a Contract goal, Part 26 requires you to use the good faith efforts mechanism of this part. As a recipient, it is up to you to make a fair and reasonable judgment whether a bidder that did not meet the goal made adequate good faith efforts. It is important for you to consider the quality, quantity, and intensity of the different kinds of efforts that the bidder has made. The efforts employed by the bidder should be those that one could reasonably expect a bidder to take if the bidder were actively and aggressively trying to obtain DBE participation sufficient to meet the DBE Contract goal. Mere pro forma efforts are not good faith efforts to meet the DBE Contract requirements. We emphasize, however, that your determination concerning the sufficiency of the firm's good faith efforts is a judgment call: meeting quantitative formulas is not required.

III. The Department also strongly cautions you against requiring that a bidder meet a Contract goal (i.e., obtain a specified amount of DBE participation) in order to be awarded a Contract, even though the

bidder makes an adequate good faith efforts showing. This rule specifically prohibits you from ignoring bona fide good faith efforts.

IV. The following is a list of types of actions, which you should consider as part of the bidder's good faith efforts to obtain DBE participation. It is not intended to be a mandatory checklist, nor is it intended to be exclusive or exhaustive. Other factors or types of efforts may be relevant in appropriate cases.

A. Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising and/or written notices) the interest of all certified DBE's who have the capability to perform the work of the Contract. The bidder must solicit this interest within sufficient time to allow the DBE's to respond to the solicitation. The bidder must determine with certainty if the DBE's are interested by taking appropriate steps to follow up initial solicitations.

B. Selecting portions of the work to be performed by DBEs in order to increase the likelihood that the DBE goals will be achieved. This includes, where appropriate, breaking out Contract work items into economically feasible units to facilitate DBE participation, even when the prime contractor might otherwise prefer to perform these work items with its own forces.

C. Providing interested DBEs with adequate information about the Plans, Specifications, and requirements of the Contract in a timely manner to assist them in responding to a solicitation.

D. (1) Negotiating in good faith with interested DBEs. It is the bidder's responsibility to make a portion of the work available to DBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available DBE subcontractors and suppliers, so as to facilitate DBE participation. Evidence of such negotiation includes the names, addresses, and telephone numbers of DBEs that were considered; a description of the information provided regarding the Plans and Specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for DBEs to perform the work.

(2) A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including DBE subcontractors, and would take a firm's price and capabilities as well as Contract goals into consideration. However, the fact that there may be some additional costs involved in finding and using DBEs is not in itself sufficient reason for a bidder's failure to meet the Contract DBE goal, as long as such costs are reasonable. Also, the ability or desire of a prime contractor to perform the work of a Contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts. Prime contractors are not, however, required to accept higher quotes from DBEs if the price difference is excessive or unreasonable.

E. Not rejecting DBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities. The Contractor's standing within its industries, membership in specific groups, organizations, or associations and political or social affiliations (for example union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids in the Contractor's efforts to meet the project goal.

F. Making efforts to assist interested DBEs in obtaining bonding, lines of credit, or insurance as required by the recipient or Contractor.

G. Making efforts to assist interested DBEs in obtaining necessary equipment, supplies, materials, or related assistance or services.

H. Effectively using the services of available minority/women community organizations; minority/women Contractor's groups; local, State, and Federal minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of DBEs.

V. In determining whether a bidder has made good faith efforts, you may take into account the performance of other bidders in meeting the contract. For example, when the apparent successful bidder fails to meet the Contract goal, but others meet it, you may reasonably raise the question of whether, with additional reasonable efforts, the apparent successful bidder could have met the goal. If the apparent successful bidder fails to meet the goal, but meets or exceeds the average DBE participation obtained by other bidders, you may view this, in conjunction with other factors, as evidence of the apparent successful bidder having made good faith efforts.

49 CFR Part 26 Section 26.53

(a) When you have established a DBE Contract goal, you must award the Contract only to a bidder/offeror who makes good faith efforts to meet it. You must determine that a bidder/offeror has made good faith efforts if the bidder/offeror does either of the following things:

- (1) Documents that it has obtained enough DBE participation to meet the goal; or
- (2) Documents that it made adequate good faith efforts to meet the goal, even though it did not succeed in obtaining enough DBE participation to do so. If the bidder/offeror does document adequate good faith efforts, you must not deny award of the Contract on the basis that the bidder/offeror failed to meet the goal. See Appendix A of this part for guidance in determining the adequacy of a bidder/offeror's good faith efforts.

(b) In your solicitations for DOT-assisted Contracts for which a Contract goal has been established, you must require the following:

- (1) Award of the Contract will be conditioned on meeting the requirements of this section;
- (2) All bidders/offerors will be required to submit the following information to the recipient, at the time provided in paragraph (b)(3) of this section:
 - (i) The names and addresses of DBE firms that will participate in the Contract;
 - (ii) A description of the work that each DBE will perform;
 - (iii) The dollar amount of the participation of each DBE firm participating;
 - (iv) Written documentation of the bidder/offeror's commitment to use a DBE subcontractor whose participation it submits to meet a Contract goal;
 - (v) Written confirmation from the DBE that it is participating in the Contract as provided in the prime Contractor's commitment; and
 - (vi) If the Contract goal is not met, evidence of good faith efforts (see Appendix A of this part); and

(3) At your discretion, the bidder/offeror must present the information required by paragraph (b)(2) of this section –

- (i) Under sealed procedures, as a matter of responsiveness, or with initial proposals, under Contract negotiation procedures; or
- (ii) At any time before you commit yourself to the performance of the Contract by the bidder/offeror, as a matter of responsibility.

(c) You must make sure all information is complete and accurate and adequately documents the bidder/offeror's good faith efforts before committing yourself to the performance of the Contract by the bidder/offeror.

(d) If you determine that the apparent successful bidder/offeror has failed to meet the requirements of paragraph (a) of this section, you must, before awarding the Contract, provide the bidder/offeror an opportunity for administrative reconsideration.

(1) As part of this reconsideration, the bidder/offeror must have the opportunity to provide written documentation or argument concerning the issue of whether it met the goal or made adequate good faith efforts to do so.

(2) Your decision on reconsideration must be made by an official who did not take part in the original determination that the bidder/offeror failed to meet the goal or make adequate good faith efforts to do so.

(3) The bidder/offeror must have the opportunity to meet in person with your reconsideration official to discuss the issue of whether it met the goal or made adequate good faith efforts to do so.

(4) You must send the bidder/offeror a written decision on reconsideration, explaining the basis for finding that the bidder did or did not meet the goal or made adequate good faith efforts to do so.

(5) The result of the reconsideration process is not administratively appealable to the Department of Transportation.

(e) In a “design-build” or “turnkey” contracting situation, in which the recipient lets a master Contract to a Contractor, who in turn lets subsequent subcontractors for the work of the project, a recipient may establish a goal for the project. The master Contractor then establishes Contract goals, as appropriate, for the subcontracts it lets. Recipients must maintain oversight of the master Contractor’s activities to ensure that they are conducted consistent with the requirements of this part.

(f) (1) You must require that a prime Contractor not terminate for convenience a DBE subcontractor listed in response to paragraph (b)(2) of this section (or an approved substitute DBE firm) and then perform the work of the terminated subcontract with its own forces or those of an affiliate, without your prior written consent.

(2) When a DBE subcontractor is terminated, or fails to complete its work on the Contract for any reason, you must require the prime Contractor to make good faith efforts to find another DBE subcontractor to substitute for the original DBE. The good faith efforts shall be directed at finding another DBE to perform at least the same amount of work under the Contract as the DBE that was terminated, to the extent needed to meet the Contract goal you established for the procurement.

(3) You must include in each prime Contract a provision for appropriate administrative remedies that you will invoke if the prime Contractor fails to comply with the requirements of this section.

(g) You must apply the requirements of this section to DBE bidders/offerors for prime Contracts. In determining whether a DBE bidder/offeror for a prime Contract has met a Contract goal you count the work the DBE has committed to performing with its own forces as well as the work that it has committed to be performed by DBE subcontractors and DBE suppliers.

49 CFR Part 26 Section 26.55

(a) When a DBE participates in a Contract, you count only the value of the work actually performed by the DBE toward DBE goals.

(1) Count the entire amount of that portion of a construction Contract (or other Contract not covered by paragraph (a)(2) of this section) that is performed by the DBE’s

own forces. Include the cost of supplies and materials obtained by the DBE for the work of the Contract, including supplies purchased or equipment leased by the DBE (except supplies and equipment the DBE subcontractor purchases or leases from the prime Contractor or its affiliate).

(2) Count the entire amount of fees or commissions charged by a DBE firm for providing a bona fide service, such as professional, technical, consultant, or managerial services, or for providing bonds or insurance specifically required for the performance of a DOT-assisted Contract, toward DBE goals, provided you determine the fee to be reasonable and not excessive as compared with fees customarily allowed for similar services.

(3) When a DBE subcontracts part of the work of its Contract to another firm, the value of the subcontracted work may be counted toward DBE goals only if the DBE's subcontractor is itself a DBE. Work that a DBE subcontracts to a non-DBE firm does not count toward DBE goals.

(b) When a DBE performs as a participant in a joint venture count a portion of the total dollar value of the Contract equal to the distinct, clearly defined portion of the work Contract that the DBE performs with its own forces toward DBE goals.

(c) Count expenditures to a DBE Contractor toward DBE goals only if the DBE is performing a commercially useful function on that Contract.

(1) A DBE performs a commercially useful function when it is responsible for execution of the work of the Contract and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. To perform a commercially useful function, the DBE must also be responsible, with respect to materials and supplies used on the Contract, for negotiating price, determining quality and quantity, ordering the material, and installing (where applicable) and paying for the material itself. To determine whether a DBE is performing a commercially useful function, you must evaluate the amount of work subcontracted, industry practices, whether the amount the firm is to be paid under the Contract is commensurate with the work it is actually performing and the DBE credit claimed for its performance of the work, and other relevant factors.

(2) A DBE does not perform a commercially useful function if its role is limited to that of an extra participant in a transaction, Contract, or project through which funds are passed in order to obtain the appearance of DBE participation. In determining whether a DBE is such an extra participant, you must examine similar transactions, particularly those in which DBEs do not participate.

(3) If a DBE does not perform or exercise responsibility for at least 30 percent of the total cost of its Contract with its own work force, or the DBE subcontracts a greater portion of the work of a Contract than would be expected on the basis of normal industry practice for the type of work involved, you must presume that it is not performing a commercially useful function.

(4) When DBE is presumed not to be performing a commercially useful function as provided in paragraph (c)(3) of this section, the DBE may present evidence to rebut the presumption. You may determine that the firm is performing a commercially useful function given the type of work involved and normal industry practices.

(5) Your decision on commercially useful function matters are subject to review by the concerned operating administration, but are not administratively appealable to DOT.

(d) Use the following factors in determining whether a DBE trucking company is performing a commercially useful function:

- (1) The DBE must be responsible for the management and supervision of the entire trucking operation for which it is responsible on a particular Contract, and there cannot be a contrived arrangement for the purpose of meeting DBE goals.
- (2) The DBE must itself own and operate at least one fully licensed, insured, and operational truck used on the Contract.
- (3) The DBE receives credit for the total value of the transportation services it provides on the Contract using trucks it owns, insures, and operates using drivers it employs.
- (4) The DBE may lease trucks from another DBE firm, including owner-operator who is certified as a DBE. The DBE who leases trucks from another DBE receives credit for the total value of the transportation services the lessee DBE provides on the Contract.
- (5) The DBE may also lease trucks from a non-DBE firm, including an owner-operator. The DBE who leases trucks from a non-DBE is entitled to credit only for the fee or commission it receives as a result of the lease arrangement. The DBE does not receive credit for the total value of the transportation services provided by the lessee, since these services are not provided by a DBE.
- (6) For purposes of this paragraph (d), a lease must indicate that the DBE has exclusive use of and control over the truck. This does not preclude the leased truck from working for others during the term of the lease with the consent of the DBE, so long as the lease gives the DBE absolute priority for the use of the leased truck. Leased trucks must display the name and identification number of the DBE.

(e) Count expenditures with DBEs for materials or supplies toward DBE goals as provided in the following:

- (1)
 - (i) If the material or supplies are obtained from a DBE manufacturer, count 100 percent of the cost of the materials or supplies toward DBE goals.
 - (ii) For purposes of this paragraph (e)(1), a manufacturer is a firm that operates or maintains a factory or establishment that produces, on the premises, the materials, supplies, articles, or equipment required under the Contract and of the general character described by the Specifications.
- (2)
 - (i) If the material or supplies are purchased from a DBE regular dealer, count 60 percent of the cost of the materials or supplies toward DBE goals.
 - (ii) For purposes of this section, a regular dealer is a firm that owns, operates, or maintains a store, warehouse, or other establishment in which the materials, supplies, articles or equipment of the general character described by the Specifications and required under the Contract are brought, kept in stock, and regularly sold or leased to the public in the usual course of business.
 - (A) To be a regular dealer, the firm must be an established, regular business that engages, as its principal business and under its own name, in the purchase and sale or lease of the products in question.
 - (B) A person may be a regular dealer in such bulk items as petroleum products, steel, cement, gravel, stone, or asphalt without owning, operating, or maintaining a place of business as provide in this paragraph (e)(2)(ii) if the person both owns and operates distribution equipment for the products.

Any supplementing of regular dealers' own distribution equipment shall be by a long-term lease agreement and not on an ad hoc or contract-by-contract basis.

(C) Packagers, brokers, manufacturers' representatives, or other persons who arrange or expedite transactions are not regular dealers within the meaning of this paragraph (e)(2).

(5) With respect to materials or supplies purchased from a DBE which is neither a manufacturer nor a regular dealer, count the entire amount of fees or commissions charged for assistance in the procurement of the materials and supplies, or fees or transportation charges for the delivery of materials or supplies required on a job site, toward DBE goals, provided you determine the fees to be reasonable and not excessive as compared with fees customarily allowed for similar services. Do not count any portion of the cost of the materials and supplies themselves toward DBE goals, however.

(f) If a firm is not currently certified as a DBE in accordance with the standards of subpart D of this part at the time of the execution of the Contract do not count the firm's participation toward any DBE goals, except as provided for in §26.87 (i).

(g) Do not count the dollar value of work performed under a Contract with a firm after it has ceased to be certified toward your overall goal.

(h) Do not count the participation of a DBE subcontractor toward the prime Contractor's DBE achievements or your overall goal until the amount being counted toward the goal has been paid to the DBE.

31. PAYMENT

Payment shall be made after inspection, approval and acceptance of the work and receipt of the Contractor's request for payment on FAA Form 5100-8 and Form 5100-9. Measurement and payment shall be as described in Section 90 of the General Provisions and in the individual payment items.

The Contractor shall complete and deliver eight (8) copies of which all shall be deemed originals of the request for payment, all DBE/MBE/WBE forms and all associated documentation and certified payrolls to the Engineer. Only one request for payment will be accepted for each thirty (30) day calendar period.

32. DEFINITIONS

Acceptance: All Contracts require proper acceptance of the described goods or services by the Owner. Proper acceptance shall be understood to include inspection of goods and certification of acceptable performance of services by Authorized Representative(s) of the Town to insure that the goods or services are complete and are as specified in the Contract.

Contract Documents: All the documents making up the "Contract" and enumerated in this Supplemental General Provision Section – enumeration of Forms, Specifications and Plans. The Contract Documents are complementary, and what is called for by any one shall be as binding as if called for by all. The intention of the documents is to include all labor and materials, equipment and transportation necessary for the proper performance of the Contract. In the event there is a conflict between the Contract and the General Conditions or Supplemental General Provisions and the Bid documents, the Bid documents shall supersede and control.

The Contractor: The "other party" to any Contract with the Owner. This term shall (as the sense and particular Contract so require) include, Vendor, Contractor, Engineer, or other label used to

identify the other party in the particular Contract. Use of the term “Contractor” shall be understood to refer to any other such label used.

Goods: Goods, Supplies or Materials.

Subcontractor: Those having a direct Contract with the Contractor. The term includes one who furnished material worked to a special design according to the Plans or Specifications of this work, but does not include one who merely furnishes material not so worked.

Work: The services or materials contracted for, or both.

33. SUBJECT TO APPROPRIATION

Notwithstanding anything in the Contract Documents to the contrary, any and all payments which the Owner is required to make under this Contract shall be subject to appropriation or other availability of funds as certified by the Owner’s Treasurer.

34. PERMITS AND APPROVALS

It is the Contractor's responsibility to secure, obtain and pay for any Permits, Licenses, Approvals and all other legal or administrative prerequisites to its performance of the Contract.

35. THE CONTRACTOR’S BREACH AND THE REMEDIES

Failure of the Contractor to comply with any of the terms or conditions of this Contract shall be deemed a material breach of this Contract, and the Owner shall have all the rights and remedies provided in the Contract Documents, the right to cancel, terminate, cure or cover the breach and/or suspend the Contract in whole or in part, the right to maintain any and all actions at law or in equity or other proceedings with respect to a breach of the Contract including damages and specific performance, and the right to select one or more of the remedies available to it.

Attorney’s Fees: in the event that any dispute arises concerning this Contract or in the event of any claim, suit, action, proceeding, either judicial or administrative in nature, as a result of a default, delay, breach, wrongdoing, action or inaction of the Contractor, then the Contractor shall be liable for and shall pay for all reasonable costs, fees and expenses of the Owner including expenses for hiring experts and for attorney’s fees at the rate of \$150.00 per hour. The obligations created herein arise regardless of whether an administrative proceeding, arbitration or litigation is commenced and shall include-consultation, advice or counsel sought from any attorney or expert in connection with any such default, delay, breach, wrongdoing, action or inaction of the Contractor.

36. TERMINATION

The following shall constitute default or material breach of this Contract by the Contractor entitling the Owner to the remedies described in paragraph 39.

- (1) any material misrepresentation made by the Contractor;
- (2) any failure by the Contractor to perform any of its obligation under the Contract including but not limited to (i) failure to commence performance at the time specified or if not specified, in a reasonable time, (ii) failure to complete the Contract on time, (iii) failure to perform the work in a manner to the reasonable satisfaction of the Owner, (iv) failure to re-perform, cure or correct performance services or delivery of goods which were rejected by the Owner, (v) discontinuance of services, or (vi) violation of any provision of this Contract and in strict conformity with the Specification,

The Owner may terminate this Contract in whole or in part when and if it determines that termination would be in the best interest of the Owner. The Owner’s

determination shall be in writing and delivered to the Contractor. If the Contract is terminated under this section the Contractor shall be entitled to be paid for goods delivered, services rendered and work completed in accordance with the Contract and accepted by the Owner before such termination.

37. AMENDMENTS/MODIFICATION

No officer, official or employee of the Owner shall have the power to amend, modify or alter this Agreement or waive any of its provisions or to bind the Owner by making any promise or representation not contained herein except by an amendment, in writing, executed in the same manner as this Agreement is executed. The Contractor may not rely on any conduct, statements, action, inaction or course of conduct of the employees or officers of the other party as having changed, modified, or amended this Agreement, the Owner shall not be construed as waiving any provision of this Agreement unless the waiver is executed in writing as an amendment to this Agreement. No waiver by the Owner of any default or breach shall constitute a waiver of any subsequent default or breach. Forbearance or indulgence in any form or manner by the Owner shall not be construed as waiver nor shall it limit the legal or equitable remedies available to it.

38. STATUTORY COMPLIANCE

This Contract will be construed and governed by the provisions of applicable State and local laws and regulations; and whenever any provision of the Contract or Contract Documents shall conflict with any provision or requirement of state or local law or regulation, then the provisions of law and regulation shall control. Where applicable to the Contract, the provisions of General Laws are incorporated by reference into this Contract, including but not limited to the following:

Chapter 30B (Procurement of Goods and Services); Chapter 30, Sections 39A through 39G, Section 39I, Section 39J, Sections 39L through 39P, Section 39R, and Section 40; and Chapter 149, Section 25, Section 26, Section 27, Section 27B, Section 27F, Section 29, Sections 29 A through 29C, Section 30, Section 34; Section 34A; Section 34B, Section 44J, and Section 129A.

Whenever applicable law mandates the inclusion of any term and provision into a municipal Contract, this Section shall be understood to import such term as provision into this Contract. To whatever extent any provision of this Contract shall be inconsistent with any law or regulation limiting the power or liability of cities and towns, such law or regulation shall control.

The Contractor shall give all notices and comply with all laws and regulations bearing on the performance of the Contract. If the Contractor performs the Contract in violation of any applicable law or regulation, the Contractor shall bear all costs, damages and expenses arising therefrom.

The Contractor shall keep itself fully informed of all existing and future state laws and Association by-laws and regulations and of all orders and decrees of any bodies or tribunals having jurisdiction in any manner affecting those engaged or employed in the work, of the material used in the work or in any way affecting the conduct of the work. If any discrepancy or inconsistency is discovered in the Plans, Specifications or Contract for this work in violation of any such law, by-law, regulations, order or decree, the Contractor shall forthwith report the same in writing to the Owner. It shall, at all times, itself observe and comply with and shall cause all its agents, employees and Subcontractors to observe and comply with all such existing and future laws, bylaws, regulations, orders and decrees; and shall protect and indemnify the Owner, and its duly appointed agents against any Claim or liability arising from or based on any such law, bylaw, regulation or decree.

39. CONFLICT OF INTEREST

Both the Owner and the Contractor acknowledge the applicability of the State Conflict Of Interest Law (General Laws Chapter 269A) to the relationship(s) established by this Contract. This Contract expressly prohibits any activity that shall constitute a violation of that law. The Contractor shall be deemed to have investigated its applicability to the performance of this Contract; and by executing the Contract Documents, the Contractor certifies to the Owner that neither it nor its agents or subcontractors are thereby in violation of General Laws Chapter 268A.

40. CERTIFICATE OF TAX COMPLIANCE

This Contract must include a certification of tax compliance by the Contractor as required by General Laws Chapter 62C, Sec. 49A, (Requirement of Tax Compliance by All Contractors Providing Goods, Services, or Real Estate Space to the Commonwealth or Subdivision).

41. DISCRIMINATION

The Contractor will carry out the obligations of this Contract in full compliance with all of the requirements imposed by or pursuant to General Laws Chapter 151B (Law Against Discrimination), and any executive orders, rules, regulations, and requirements of the Commonwealth of Massachusetts as they may from time to time be amended.

42. ASSIGNMENT

Assignment of this Contract is prohibited, unless assignment is provided for expressly in the Contract Documents.

45. CONDITION OF ENFORCEABILITY AGAINST THE OWNER

This Contract is only binding upon, and enforceable against, the Owner if, (1) the Contract is signed by the Mayor or Acting Mayor in the Mayor's absence or the chair of the Board of Selectman; (2) endorsed with approval by the Owner's Treasurer/Collector as to Appropriation or availability of funds; (3) endorsed with approval by the Owner's Council as to form; (4) signed by the Owner's officer, department head or board chairman of the department making the Contract; and (5) it has been formed and executed in accordance with municipal ordinances and state laws.

43. CORPORATE CONTRACTOR

If the Contractor is a corporation, it shall endorse upon this Contract (or attach hereto) its Clerk's Certificate certifying the corporate capacity and authority of the party signing this Contract for the corporation. Such certificate shall be – accompanied by a letter or other instrument stating that such authority continues in full force and effect as of the date the Contract is executed by the Contractor. This Contract shall not be enforceable against the Owner unless and until the Contractor complies with this section.

The Contractor (and Subcontractors), if a foreign corporation shall comply with the provisions of the General Laws, Ch. 181, Sections 3 & 5, and any Acts and Amendments thereof, and in addition thereto, relating to the appointment of the Commissioner of Corporations as its attorney, shall file with the Commissioner of Corporations a Power of Attorney and duly authenticated copies of its Charter or Certificate of Incorporation; and said Contractor shall comply with all the laws of the Commonwealth.

44. LIABILITY OF PUBLIC OFFICIALS

To the full extent permitted by law, no official, employee, agent or representative of the Owner shall be individually or personally liable on any obligation of the Owner under this Contract.

45. NOTICE

Any notice permitted or required under the provisions of this Contract to be given or served by either of the parties hereto upon the other party hereto shall be in writing and signed in the name or on behalf of the party giving or serving the same. Notice shall be deemed to have been received at the time of actual service of three (3) business days after the date of a certified or registered mailing properly addressed. Notice to/from the Contractor shall be deemed sufficient only if sent to the **Orange Municipal Airport Commission** at the following addresses:

Orange Municipal Airport
80 Airport Street
Orange, Massachusetts 01364

46. BINDING ON SUCCESSORS

This Contract shall be binding upon the Contractor, its assigns; transferees, and/or successors in interest (and where not to incorporate, the heirs and estate of the Contractor).

47. COMPLETE CONTRACT

This instrument, together with its endorsed supplements, and the other components of the Contract Documents, constitutes the entire Contract between the parties, with no agreements other than those incorporated herein.

II CONTRACTOR SUBMITTAL FORMS

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Submittal Number: _____

Revision Number: _____

**CONTRACTOR SUBMITTAL FORM
(GENERAL CONTRACTOR)**

Job Name: _____

AIP No. _____

Airport Solutions Group Job No. _____

Contractor: _____

Address: _____

Contractor's Contact: _____ Phone Number: _____

Reviewed By: _____ Date Submitted: _____

Check here if submittal is from a subcontractor

Item No.: _____

Specification Section and Paragraph: _____

CERTIFICATION

I HEREBY CERTIFY that the attached submittal has been reviewed under the terms of the Contract Documents and is in conformity with the requirements of the plans and specifications unless specifically noted otherwise. It is understood that the Contractor is responsible for dimensions and quantities to be confirmed and correlated at the site, for information that pertains solely to the fabrication process or to the means, methods, techniques, sequences and procedures of construction, and for coordination of the Work of all trades.

- 1- Submitted as specified
- 2 - Submitted "AS EQUAL" to the product specified
- 3 - Submitted "IN SUBSTITUTION" to the product specified
- 4 - Subcontractor submittal form included
- 5 - Other

Description of Submittal Components: _____

For additional comments attach and number additional pages.

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Submittal Number: _____

Revision Number: _____

**CONTRACTOR SUBMITTAL FORM
(SUBCONTRACTOR)**

Job Name: _____

AIP No. _____

Airport Solutions Group Job No. _____

Subcontractor: _____

Address: _____

Subcontractor's Contact: _____ Phone Number: _____

Reviewed By: _____ Date Submitted: _____

Check here if submittal is from a subcontractor

Item No.: _____

Specification Section and Paragraph: _____

CERTIFICATION

I HEREBY CERTIFY that the attached submittal has been reviewed under the terms of the Contract Documents and is in conformity with the requirements of the plans and specifications unless specifically noted otherwise. It is understood that the Contractor is responsible for dimensions and quantities to be confirmed and correlated at the site, for information that pertains solely to the fabrication process or to the means, methods, techniques, sequences and procedures of construction, and for coordination of the Work of all trades.

- 1- Submitted as specified
- 2 - Submitted "AS EQUAL" to the product specified
- 3 - Submitted "IN SUBSTITUTION" to the product specified
- 4 - Subcontractor submittal form included
- 5 - Other

Description of Submittal Components: _____

For additional comments attach and number additional pages.

END OF SECTION VII – SUPPLEMENTAL GENERAL PROVISIONS

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Section VIII
Notice to Contractors

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NOTICE: TO AWARDING AUTHORITIES AND CONTRACTORS

ISSUED: SEPTEMBER 1, 2006

DRIVERS WHO HAUL BITUMINOUS CONCRETE (ASPHALT)

The Massachusetts Supreme Judicial Court recently affirmed that drivers who haul bituminous concrete to public construction projects are not covered by the Prevailing Wage Law while off-site, including time spent over-the-road and picking-up materials. These drivers are covered by the Prevailing Wage Law only while on-site at the public construction project.

In *Teamsters Joint Council No. 10 v. Department of Labor, et al.*, 447 Mass. 100 (2006), the SJC upheld a 2001 administrative decision limiting the applicability of prevailing wage rates to the time bituminous drivers spend at the public construction site. This most recent decision of the SJC followed a 1989 ruling that had upheld an earlier Department of Labor (and Industries') policy that had deemed this category of drivers to be "teamsters" under the Law and, therefore, entitled to prevailing wage rates. See *Construction Industries of Massachusetts v. Commissioner of Labor and Industries*, 406 Mass. 162 (1989). However, the earlier court case had left open the question of whether this entitled these bituminous drivers to prevailing wage rates for their over-the-road time as well as their on-site time. This most recent decision has now answered that question.

All of the requirements of the Prevailing Wage Law, including certified weekly payroll requirements, apply to bituminous drivers for all time spent at the public construction site.

DRIVERS WHO HAUL READY-MIX CONCRETE (CEMENT)

Drivers who haul ready-mix concrete to public construction projects are not covered by the Prevailing Wage Law while off-site, including time spent over-the-road and picking-up materials. These drivers are covered by the Prevailing Wage Law while on-site at the public construction project. This applicability determination was established by a 2001 administrative decision of the Department of Labor's Division of Occupational Safety.

All of the requirements of the Prevailing Wage Law, including certified weekly payroll requirements, apply to ready-mix drivers for all time spent at the public construction site.

Please feel free to contact the Division of Occupational Safety at 617.626.6953 if you have any questions. Questions about enforcement of the Prevailing Wage Law may be directed to the Attorney General's Fair Labor and Business Practices Division at 617.727.3465.

END OF SECTION VIII – NOTICE TO CONTRACTORS

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Section IX
MassDOT Form E3

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DISADVANTAGED BUSINESS ENTERPRISE (DBE) PARTICIPATION

(THIS FORM MUST BE COMPLETED IN FULL AND SUBMITTED BY THE CONTRACTOR WITH EACH REQUEST FOR PAYMENT.)

PROJECT: _____

DBE CONTRACTOR _____ MASSDOT PAYMENT VOUCHER NO. _____

TOTAL DBE CONTRACT PARTICIPATION \$ _____ PERCENTAGE OF CONTRACT _____

| CONTRACT ITEM NO | DESCRIPTION OF WORK PERFORMED BY DBE CONTRACTOR | ITEM QUANTITY | UNIT PRICE | ITEM AMOUNT |
|---------------------|--|------------------|---------------|----------------|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

TOTAL AMOUNT REQUESTED BY DBE THIS INVOICE (ADD ITEM AMOUNTS) \$ _____

TOTAL AMOUNT PREVIOUSLY REQUESTED BY DBE \$ _____

TOTAL AMOUNT REQUESTED BY DBE TO DATE \$ _____

The undersigned certifies that the DBE Contractor has successfully completed the above referenced work associated with this project and further assures that said DBE Contractor will be paid in full for the amount indicated above for said services.

Contractor Signature Date

Approved By:

DBE Contractor Signature Date

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END OF SECTION IX – MASSDOT FORM E3

SECTION X
MASSACHUSETTS SUPPLEMENTAL EEO AND ANTI-DISCRIMINATION
AND AFFIRMATIVE ACTION PROGRAM

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COMMONWEALTH OF MASSACHUSETTS REGULATIONS

- A Supplemental Equal Employment Opportunity Anti-Discrimination and Affirmative Action Program
- B Contractors and Subcontractors Certifications
- C Supplemental Equal Employment Opportunity Anti-Discrimination and Affirmative Action Program Contract Compliance Procedures

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**THE COMMONWEALTH OF MASSACHUSETTS
SUPPLEMENTAL EQUAL EMPLOYMENT OPPORTUNITY
ANTI-DISCRIMINATION AND AFFIRMATIVE ACTION PROGRAM**

- A For purposes of this Contract, "minority" refers to Asian-Americans, Blacks, Spanish Surnamed Americans, North American Indians, and Cape Verdeans. "Commission" refers to the Massachusetts Commission Against Discrimination.
- B During the performance of this Contract, the Contractor and all of (his) Subcontractors (hereinafter collectively referred to as the Contractor), for himself, his assignees, and successors in interest, agree as follows:
- (1) In connection with the performance of work under this Contract, the Contractor shall not discriminate against any employee or applicant for employment because of race, color, religious creed, national origin, age or sex. The aforesaid provision shall include, but not be limited to, the following: employment upgrading, demotion, or transfer; recruitment advertising; recruitment layoff; termination; rates of pay or other forms of compensation; conditions or privileges of employment; and selection for apprenticeship. The Contractor shall post hereafter in conspicuous places, available for employees and applicants for employment, notices to be provided by the Commission setting forth the provisions of the Fair Employment Practices Law of the Commonwealth (M.G.L. Chapter 151B).
 - (2) In connection with the performance of work under this Contract, the Contractor shall undertake in good faith affirmative action measures designed to eliminate any discriminatory barriers in terms and conditions of employment on the grounds of race, color, religious creed, national origin, age or sex, and to eliminate and remedy any effects of such discrimination in the past. Such affirmative action shall entail positive and aggressive measures to ensure equal opportunity in the areas of hiring, upgrading, demotion or transfer, recruitment, layoff or termination, rate of compensation, and in service or apprenticeship training programs. This affirmative action shall include all action required to guarantee equal employment opportunity for all persons, regardless of race, color, religious creed, national origin, age, or sex. A purpose of this provision is to ensure to the fullest extent possible an adequate supply of skilled tradesmen for this and future Commonwealth public construction projects.
- C
- (1) As part of his obligation of remedial action under the foregoing section, the Contractor to total man hours in each job category including but not limited to bricklayers, carpenters, cement masons, electricians, ironworkers, operating engineers, and those "classes of work" enumerated in Section 44C of Chapter 149 of the Massachusetts General Laws.
 - (2) In the hiring of minority journeymen, apprentices, trainees and advanced trainees, the Contractor shall rely on referrals from a multi-employer affirmative action program approved by the Commission, traditional referral methods utilized by the construction industry, and referrals from agencies, not more than three in number at any one time, designated by the Liaison Committee or the Commission.
- D
- (1) At the discretion of the Commission there may be established for the life of this Contract a body to be known as the Liaison Committee. The Liaison Committee shall be

composed of one representative each from the agency or agencies administering this project, hereinafter called the administering agency, the Commission and such other representatives as may be designated by the Commission in conjunction with the administering agency.

- (2) The Contractor (or his agent, if any, designated by him as the on-site equal employment opportunity officer) shall recognize the Liaison Committee as an affirmative action body, and shall establish a continuing working relationship with the Liaison Committee, consulting with the Liaison Committee on all matters related to minority recruitment, referral, employment and training.
- (3) The Contractor shall prepare projected manning tables on a quarterly basis. These shall be broken down into projections, by week, or workers required in each trade. Copies shall be furnished one week in advance of the commencement of the period covered, and also when updated, to the Commission and Liaison Committee.
- (4) Records of employment referral orders, prepared by the Contractor, shall be made available to the Commission and to the Liaison Committee on request.
- (5) The Contractor shall prepare weekly reports in a form approved by the Commission of hours worked in each trade by each employee, identified as minority or non-minority. Copies of these shall be provided at the end of each such week to the Commission and to the Liaison Committee.

E If the Contractor shall use any Subcontractor on any work performed under this Contract, he shall take affirmative action to negotiate with qualified minority Subcontractors. This affirmative action shall cover both pre-bid and post-bid periods. It shall include notification to the Office of Minority Business Assistance (within the Executive Office of Communities and Development) or its designee, while bids are in preparation, of all products, work or services for which the Contractor intends to negotiate bids.

F In the employment of journeymen, apprentices, trainees and advanced trainees, the Contractor shall give preference, first, to citizens of the Commonwealth who have served in the armed forces of the United States in time of war and have been honorably discharged therefrom or released from active duty therein, and who are qualified to perform the work to which the employment relates, and, secondly, to citizens of the Commonwealth generally, and, if such cannot be obtained in sufficient numbers, then to citizens of the United States.

G A designee of the Commission and a designee of the Liaison Committee shall each have right of access to the construction site.

H Compliance with Requirements

The Contractor shall comply with the provisions of Executive Order No. 74, as amended by Executive Order No. 116 dated May 1, 1975, and of Chapter 151B as amended, of the Massachusetts General Laws, both of which are herein incorporated by reference and made a part of this contract.

I Non-Discrimination

The Contractor, in the performance of all work after award, and prior to completion of the contract work, will not discriminate on grounds of race, color, religious creed, national origin, age or sex in employment practices, in the selection or retention of Subcontractors, or in the procurement of materials and rentals of equipment.

J Solicitation for Subcontracts, and for the Procurement of Materials and Equipment

In all solicitations either by competitive bidding or negotiation made by the Contractor either for work to be performed under a subcontract or for the procurement of materials or equipment, each potential Subcontractor or supplier shall be notified in writing by the Contractor of the Contractor's obligations under this Contract relative to non-discrimination and affirmative action.

K Bidders Certification Requirement

- (1) The bidders certification form currently in use will be deleted from all future bid documents.
- (2) The following certification statement will be inserted in the bid document just above the bidder's signature, as a substitute for the present bidder certification form **(see Section III – Forms for Proposals)**:

"The bidder hereby certifies he shall comply with the minority manpower ratio and specific action steps contained with the minority Contractor compliance specified in Section V of said appendix. The Contractor receiving the award of the Contract shall be required to obtain from each of its Subcontractors and submit to the Contracting or Administering Agency prior to the performance of any work under said contract a certification by said Subcontractor, regardless of tier, that it will comply with the minority manpower ratio and specific affirmative action steps contained in the appendix EEO".

L Contractor's Certification

The Contractor's certification form must be signed by all successful low bidder(s) prior to award by the Contracting Agency.

M Compliance-Information, Reports and Sanctions

- (1) The Contractor will provide all information and reports required by the administering agency of the Commission on instructions issued by either of them and will permit access to its facilities and any books, records, accounts and other sources of information which may be determined by the Commission to affect the employment of personnel. This provision shall apply only to information pertinent to the Commonwealth's supplementary affirmative action contract requirements. Where information required is in the exclusive possession of another who fails or refuses to furnish this information, the Contractor shall so certify to the administering agency or the Commission as appropriate and shall set forth what efforts he has made to obtain the information.
- (2) Whenever the administering agency, the Commission, or the Liaison Committee believes the General Contractor or any Subcontractor may not be operating in compliance with the terms of this Section, the Commission directly, or through its designated agent, shall conduct an appropriate investigation, and may confer with the parties, to determine if such Contractor is operating in compliance with the terms of this Section. If the Commission or its agent finds the General Contractor or any Subcontractor not in compliance, it shall make a preliminary report on non-compliance, and notify such Contractor in writing of such steps as will in the judgement of the Commission or its agent bring such Contractor into compliance. In the event that such Contractor fails or refuses to fully perform such steps, the Commission shall make a final report of non-compliance, and recommend to the administering agency the imposition of one or more

of the sanctions listed below. If, however, the Commission believes the General Contractor or any Subcontractor has taken or is taking every possible measure to achieve compliance, it shall not make a final report of non-compliance. Within fourteen days of the receipt of the recommendations of the Commission, the administering agency shall move to impose one or more of the following sanctions, as it may deem appropriate to attain full and effective enforcement:

- a. The recovery by the administering agency from the General Contractor of 1/100 of 1% of the contract award price or \$1,000 whichever is greater, in the nature of liquidated damages, or, if a Subcontractor is in non-compliance, the recovery by the administering agency from the General Contractor, to be assessed by the General Contractor as a back charge against the Subcontractor of 1/10 of 1% of the subcontract price, or \$400 whichever sum is greater, in the nature of liquidated damages, for each week that such party fails or refuses to comply;
 - b. The suspension of any payment or part thereof due under the Contract until such time as the General Contractor or any Subcontractor is able to demonstrate his compliance with the terms of the Contract;
 - c. The termination, or cancellation, of the Contract, in whole or in part, unless the General Contractor or any Subcontractor is able to demonstrate within a specified time his compliance with the terms of the Contract;
 - d. The denial to the General Contractor or any Subcontractor of the right to participate in any future contracts awarded by the administering agency for a period of up to three years.
- (3) If at any time after the imposition of one or more of the above sanctions a Contractor is able to demonstrate that he is in compliance with this Section, he may request the administering agency, in consultation with the Commission, to suspend the sanctions conditionally, pending a final determination by the Commission as to whether the Contractor is in compliance. Upon final determination of the Commission, the administering agency, based on the recommendation of the Commission shall either lift the sanctions or reimpose them.
- (4) Sanctions enumerated under Section XIII-2 shall not be imposed by the administering agency except after an adjudicatory proceeding, as that term is used M.G.L. C. 30A, has been conducted. No investigation by the Commission or its agent shall be initiated without prior notice to the Contractor.

N Severability

The provisions of this section are severable, and if any of these provisions shall be held unconstitutional by any court of competent jurisdiction, the decision of such court shall not affect or impair any of the remaining provisions.

**MINIMUM MINORITY PERCENTAGES TO BE APPLIED TO
STATE AND STATE ASSISTED CONTRACTS
WITHIN THE COMMONWEALTH OF MASSACHUSETTS**

| The following percentages shall apply | | <u>No Less Than</u> |
|---------------------------------------|--|---------------------|
| Boston: | Impact Area (Jamaica Plan (part), Mattapan, South Cove, Chinatown, Bay Village, Roxbury, Dorchester, South End) | 30% |
| | Others | 10% |
| Cambridge: | | 12% |
| New Bedford: | | 18% |
| Springfield: | | 10% |
| All other cities and Towns | | 5% |

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Attachment A-1

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A. Contractor's Certification (**already included under Section III – Forms for Proposal**)

A Contractor will not be eligible for award of a contract unless such Contractor has submitted the following certification, which is deemed a part of the resulting contract:

CONTRACTOR'S CERTIFICATION

Name of the General Contractor

certifies that:

- 1. It intends to use the following listed construction trades in the work under contract:

- 2. Will comply with the minority/woman workforce ratio and specific affirmative action steps contained herein; and
- 3. Will obtain from each of its Subcontractors and submit to the contracting or administering agency prior to the award of any subcontract under this Contract the Subcontractor's certification required by these bid conditions.

Signature of Authorized Representative or Contractor

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Attachment A-2

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A. Subcontractor's Certification (**already included under Section III – Forms for Proposal**)

A Contractor will not be eligible for award of a contract unless such Contractor has submitted the following certification, which is deemed a part of the resulting contract:

SUBCONTRACTOR'S CERTIFICATION

Name of the Subcontractor

certifies that:

1. It intends to use the following listed construction trades in the work under contract:

2. Will comply with the minority/woman workforce ratio and specific affirmative action steps contained herein; and
3. Will obtain from each of its Subcontractors prior to the award of any subcontract under this Contract the Subcontractor's certification required by these bid conditions.

Signature of Authorized Representative or Subcontractor

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Attachment B

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BIDDER'S CERTIFICATION (already included under Section III – Forms for Proposal)

The bidder hereby certifies he shall comply with the minority manpower ratio and specific action steps contained with the minority Contractor compliance specified in Section V of said appendix. The Contractor receiving the award of the Contract shall be required to obtain from each of its Subcontractors and submit to the Contracting or Administering Agency prior to the performance of any work under said contract a certification by said Subcontractor, regardless of tier, that it will comply with the minority manpower ratio and specific affirmative action steps contained in the appendix EEO.

Signature of Bidder

Name of Firm

Title

Date

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**THE COMMONWEALTH OF MASSACHUSETTS SUPPLEMENTAL EQUAL EMPLOYMENT OPPORTUNITY,
ANTI-DISCRIMINATION AND AFFIRMATIVE ACTION PROGRAM**

CONTRACT COMPLIANCE PROCEDURE

Pursuant to Section XI of the Commonwealth of Massachusetts Supplemental Equal Employment Opportunity, Anti-Discrimination and Affirmative Action Program for construction contracts, the administering and/or the contracting agency's Contract Compliance Officer or the Affirmative Action Staff is the designated agent of the Massachusetts Commission Against Discrimination (MCAD). The responsibilities of the Contract Compliance Officer (MCAD agent) are to conduct compliance monitoring and enforcement of the program requirements.

To ensure that the minority/women workforce utilization goals on all construction contracts in excess of \$50,000, as well as disadvantaged business enterprise (DBE) goals are enforced effectively, the following procedures will be followed commencing with the initial contract specifications preparation and continuing throughout the life of the contract on all projects.

1. Contract Specification
2. Bid Advertisement
3. Pre-Bid Conference
4. Pre-Construction Conference
5. Reporting System
6. Monitoring System
7. Identifying and Reporting of Non-Compliance
8. Non-Compliance Procedures
9. Recommendation and Sanction

1. CONTRACT SPECIFICATION

At the initial stage of contract specification preparation, the Contract Compliance Officer of the contracting agency must ensure the incorporation of the proper EEO/AA provisions in the general conditions of the Contract.

2. BID ADVERTISEMENT

The Contract Compliance Officer will review all Bid Advertisements before the notice is published to ensure that reference to the EEO/AA requirements is included.

3. PRE-BID CONFERENCE

At the Pre-Bid Conference, the Contract Compliance Officer will inform potential bidders of the EEO/AA requirements of the contract. These include, but are not limited to the following:

- A Adhering to minority/women workforce utilization and DBE participation goals for the Contract.
- B Informing potential bidders that the requirements are for the life of the Contract.
- C Informing potential bidders that the Subcontractors are obligated to comply with the same requirements and it is the responsibility of the Prime Contractor to ensure that Subcontractors comply with the contract provisions.
- D Informing potential bidders of the required documents and forms that they must sign and submit with their bids, i.e., Bidder's Certification (Attachment B); Schedules for DBE Participation; DBE Letter of Intent; etc.
- E Making information and/or resources available for DBE; i.e., State Office of Minority/Women Business Assistance (SOMWBA); Contractor's Association of Boston (CAB); Small Business Development Corporation (SBDC); New England Minority Purchasing Council (NEMPC) and any other information that will assist the Prime Contractor in attaining the stated goals for DBE compliance.
- F Making available minority/women workforce referral agencies, i.e., Community agencies; Third World Jobs Clearing House; Apprentice Recruitment Program, etc.
- G Question and answer period.

4. PRE-CONSTRUCTION CONFERENCE

At the Pre-Construction Conference, the Contract Compliance Officer will discuss the specific EEO/AA requirements with the Prime and Subcontractors. The Contract Compliance Officer will also:

- A Distribute all necessary documents and reporting forms as required under the Contract provisions.
- B Review EEO/AA requirements and goals in detail.
- C Explain the Contractor's obligations to comply with the EEO/AA requirements and goals.
- D Emphasize the EEO/AA provisions in Section III and Section XIV.
- E If non-compliance is found, sanctions and recommendations will be imposed.

- F Provide information such as resources of minority/women workforce and DBE referrals to assist the Contractor in achieving compliance with the Contract obligations.
- G Review the necessary reporting forms, i.e., Contractor's Quarterly Projected Workforce Table (Form CAD 85-1), Contractor's Weekly Workforce Utilization Report (Form CAD 85), Contractor Certification (Attachment A-1 for Prime Contractor, Attachment A-2 for Subcontractor), etc.
- H Secure the name and title of the EEO/AA Officer and Project Manager from the Contractor with a letter signed by the Chief Executive Officer of the Contractor.

5. REPORTING SYSTEM

To ensure the proper compliance of the Contractor's obligations in the utilization of his/her workforce, the following reporting system will be implemented:

- A Contractors must submit the Contractor's Quarterly Projected Workforce Table (CAD 85-1) prior to the commencement of work and no later than five (5) working days prior to the start of each new quarter to the Contract Compliance Officer.
- B Contractors must submit the Contractor's Weekly Workforce Utilization Report (CAD 85) to the Contract Compliance Officer no later than the following Tuesday of each week.
- C The Prime Contractor is responsible for the submission of all reports from all of his/her Subcontractors.
- D The Contracting/Administering Agency's Contract Compliance Officer must prepare the Agency's Monthly Contract Compliance Report (CAD 75) for Minority/Women Workforce Utilization and DBE Contract Activities Report and send them to MCAD no later than the 15th of the month following the end of each quarter.

6. MONITORING SYSTEM

In order for the Contract Compliance Officer to effectively implement and enforce the EEO/AA requirements, the following mechanism will be utilized:

- A Review of the weekly utilization reports submitted by the Contractors.
- B Verify the data on the weekly reports, by conducting on-site monitoring.
 - (1) On-site monitoring will be conducted either on a weekly or daily basis according to specific projects.
 - (2) When conducting on-site monitoring, the Contract Compliance Officer will initially meet with the Contractor's on-site supervisor to obtain the necessary data.
 - (3) The Contract Compliance Officer will conduct a visual headcount of all the workers on-site used by each Contractor, identifying the minority workers of each trade. If needed, an interview of each worker may be conducted to verify the information submitted by the Contractor.

7. IDENTIFYING AND REPORTING OF NON-COMPLIANCE

When the Contractor's Weekly Workforce Utilization Reports indicate that the Contractor is in a condition of non-compliance and it is then verified by the Contract Compliance Officer's actual on-site visit, the procedures are as follows:

- A The Contract Compliance Officer will notify and meet with the Contractor to remedy their condition of non-compliance in an attempt to bring the Contractor into compliance. All activities with the Contractor must be documented.
- B If the Contract Compliance Officer is unable to bring the Contractor into compliance, then the Contract Compliance Officer shall send a preliminary notification of apparent non-compliance, citing specific sections of the contract EEO/AA provisions to the Prime Contractor and/or the Subcontractor via Registered Mail, detailing the necessary remedies and granting a time-frame of (14) days for the Contractor to come into compliance. If the Contractor remains in non-compliance, then the Contract Compliance Officer shall notify the MCAD and issue a second notice of apparent non-compliance, informing the Contractor that a formal non-compliance investigation will be conducted. This will include a request for specific records and documentation that the Contractor must submit within the specific compliance time frame of 14 days.

8. NON-COMPLIANCE PROCEDURES

- A Upon the completion of the investigation, if it is found that the Contractor is still in a condition of non-compliance, then a final notice of apparent non-compliance will be issued, informing the Contractor that a formal complaint of non-compliance will be filed at MCAD.
- B When a non-compliance complaint is filed at MCAD, the complaint must include all documentation, such as reports; on-site reviews; correspondence; minutes of meetings and a copy of the Contract.
- C MCAD will conduct a conciliation conference in an attempt to bring the Contractor into compliance. If the conference is unsuccessful, the MCAD will conduct an adjudicatory hearing pursuant to M.G.L. Chapter 30A and 804 CMR 9.00.
- D The adjudicatory hearing will provide an opportunity for the Contractor to present proof of his/her efforts to comply with the EEO/AA requirements. If the Contractor can document that he/she has exhausted every possible measure to achieve compliance, then the Contractor would be found in compliance with the EEO/AA contract obligations. If the Contractor is unable to document every possible measure taken, then the Contractor can be found in non-compliance. A final report of non-compliance will then be issued.

9. RECOMMENDATIONS OF SANCTIONS

At the adjudicatory hearing, if the Contractor is found to be in non-compliance with the EEO/AA requirements, MCAD will make a final report of non-compliance. Once MCAD issues a final finding of non-compliance, MCAD will recommend that the administering contracting agency impose on the Contractor one or more of the sanctions outlined in the Commonwealth of Massachusetts Supplemental Equal Employment Opportunity Anti-Discrimination and Affirmative Action Program Section XIV within fourteen (14) days.

- A The recovery by the administering agency from the General Contractor of 1/100 of 1% of the contract award price or \$1,000.00, whichever sum is greater, in the nature of liquidated damages or, if a sub-contractor is in non-compliance, the recovery by the administering agency from the General Contractor, to be assessed by the General Contractor as a back-charge against the sub-contractor, of 1/10 of 1% of the subcontract price, or \$400.00, whichever sum is greater, in the nature of liquidated damages, for each week that such party fails or refuses to comply;

- B The suspension of any payment or part thereof due under the contract until such time as the General Contractor or any sub-contractor is able to demonstrate his compliance with the term of the Contract;
- C The termination, or cancellation, of the contract in whole, or in part, unless the General Contractor or any sub-contractor is able to demonstrate within the specified time period compliance with the terms of the Contract;
- D The denial to the General Contractor or any sub-contractor of the right to participate in any future contracts awarded by the administering agency for a period of up to three years;
- E If at any time after the imposition of one or more of the above sanctions, a Contractor is able to demonstrate that he is in compliance with the EEO/AA requirements, the Contractor may request the administering agency, in consultation with the Law Department, to suspend the sanctions conditionally pending a final determination by the Law Department as to whether the Contractor is in compliance.

Upon final determination by the Law Department, the administering agency, based on the recommendation of the Law Department, shall either lift the sanctions or reimpose them.

- NOTE:
- (1) Non-compliance investigation will NOT be conducted without prior notice to the Contractor.
 - (2) Sanctions will NOT be imposed without providing an adjudicatory hearing (Due Process) to the Contractor.

**END OF SECTION X - MASSACHUSETTS SUPPLEMENTAL EEO AND ANTI-DISCRIMINATION AND
AFFIRMATIVE ACTION PROGRAM**

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Section XI
Massachusetts Prevailing Wage Rates

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The Massachusetts Prevailing Wage Law**M.G.L. c. 149, §§26-27****NOTICE TO AWARDING AUTHORITIES**

- The enclosed wage schedule applies only to the specific project listed at the top of the schedule, and these rates will remain in effect for the duration of the project, except in the case of multi-year projects. For projects lasting longer than one year, awarding authorities must request updated rates.
- You should request an updated wage schedule from the Division of Occupational Safety if you have not opened bids or selected a contractor within 90 days of the date of issuance of the enclosed wage schedule.
- The wage schedule shall be incorporated in any advertisement or call for bids for the project for which it has been issued.
- Once a contractor has been selected by the awarding authority, the wage schedule shall be made a part of the contract for that project.

NOTICE TO CONTRACTORS

- The enclosed wage schedule must be posted in a conspicuous place at the work site during the life of the project.
- The wages listed on the enclosed wage schedule must be paid to employees on public works projects regardless of whether they are employed by the prime contractor, a filed sub-bidder, or any sub-contractor.
- The enclosed wage schedule applies to all phases of the project, including the final clean-up. Contractors whose only role is to perform final clean-up must pay their employees according to this wage schedule.

All apprentices must be registered with the Massachusetts Division of Apprenticeship Training (DAT) in order to be paid at the lower apprentice rates. All apprentices must keep his/her apprentice identification card on his/her person during all work hours. If a worker is not registered with DAT, they must be paid the "total rate" listed on the wage schedule regardless of experience or skill level. For further information, please call 617-626-5409, or write to:
DAT, 19 Staniford Street, 1st Floor, P.O. Box 146759, Boston, MA 02114.

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**THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF LABOR AND WORKFORCE DEVELOPMENT
DEPARTMENT OF LABOR STANDARDS**

Prevailing Wage Rates

**As determined by the Director under the provisions of the
Massachusetts General Laws, Chapter 149, Sections 26 to 27H**

CHARLES D. BAKER
Governor

ROSALIN ACOSTA
Secretary

KARYN E. POLITO
Lt. Governor

MICHAEL FLANAGAN
Director

Awarding Authority: Orange Airport Commission
Contract Number: **City/Town:** ORANGE
Description of Work: Reconstruction of Runway 1-19 which includes: grading, paving, runway edge lights, top soil and seeding, drainage, markings, tree clearing, and earth work.
Job Location: Runway 1-19

Information about Prevailing Wage Schedules for Awarding Authorities and Contractors

- This wage schedule applies only to the specific project referenced at the top of this page and uniquely identified by the “Wage Request Number” on all pages of this schedule.
- An Awarding Authority must request an updated wage schedule from the Department of Labor Standards (“DLS”) if it has not opened bids or selected a contractor within 90 days of the date of issuance of the wage schedule. For CM AT RISK projects (bid pursuant to G.L. c.149A), the earlier of: (a) the execution date of the GMP Amendment, or (b) the bid for the first construction scope of work must be within 90-days of the wage schedule issuance date.
- The wage schedule shall be incorporated in any advertisement or call for bids for the project as required by M.G.L. c. 149, § 27. The wage schedule shall be made a part of the contract awarded for the project. The wage schedule must be posted in a conspicuous place at the work site for the life of the project in accordance with M.G.L. c. 149 § 27. The wages listed on the wage schedule must be paid to employees performing construction work on the project whether they are employed by the prime contractor, a filed sub-bidder, or any sub-contractor.
- All apprentices working on the project are required to be registered with the Massachusetts Department of Labor Standards, Division of Apprentice Standards (DLS/DAS). Apprentice must keep his/her apprentice identification card on his/her person during all work hours on the project. An apprentice registered with DAS may be paid the lower apprentice wage rate at the applicable step as provided on the prevailing wage schedule. **Any apprentice not registered with DLS/DAS regardless of whether or not they are registered with any other federal, state, local, or private agency must be paid the journeyworker's rate for the trade.**
- The wage rates will remain in effect for the duration of the project, except in the case of multi-year public construction projects. For construction projects lasting longer than one year, awarding authorities must request an updated wage schedule. Awarding authorities are required to request these updates no later than two weeks before the anniversary of the date the contract was executed by the awarding authority and the general contractor. For multi-year CM AT RISK projects, awarding authority must request an annual update no later than two weeks before the anniversary date, determined as the earlier of: (a) the execution date of the GMP Amendment, or (b) the execution date of the first amendment to permit procurement of construction services. Contractors are required to obtain the wage schedules from awarding authorities, and to pay no less than these rates to covered workers. The annual update requirement is not applicable to 27F “rental of equipment” contracts.
- Every contractor or subcontractor which performs construction work on the project is required to submit weekly payroll reports and a Statement of Compliance directly to the awarding authority by mail or email and keep them on file for three years. Each weekly payroll report must contain: the employee’s name, address, occupational classification, hours worked, and wages paid. Do not submit weekly payroll reports to DLS. A sample of a payroll reporting form may be obtained at <http://www.mass.gov/dols/pw>.
- Contractors with questions about the wage rates or classifications included on the wage schedule have an affirmative obligation to inquire with DLS at (617) 626-6953.
- Employees not receiving the prevailing wage rate set forth on the wage schedule may report the violation to the Fair Labor Division of the office of the Attorney General at (617) 727-3465.
- Failure of a contractor or subcontractor to pay the prevailing wage rates listed on the wage schedule to all employees who perform construction work on the project is a violation of the law and subjects the contractor or subcontractor to civil and criminal penalties.

| Classification | Effective Date | Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|---|----------------|-----------|---------|---------|---------------------------|------------|
| Construction | | | | | | |
| (2 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i> | 12/01/2019 | \$34.25 | \$12.41 | \$13.72 | \$0.00 | \$60.38 |
| | 06/01/2020 | \$35.15 | \$12.41 | \$13.72 | \$0.00 | \$61.28 |
| | 08/01/2020 | \$35.15 | \$12.91 | \$13.72 | \$0.00 | \$61.78 |
| | 12/01/2020 | \$35.15 | \$12.91 | \$14.82 | \$0.00 | \$62.88 |
| | 06/01/2021 | \$35.95 | \$12.91 | \$14.82 | \$0.00 | \$63.68 |
| | 08/01/2021 | \$35.95 | \$13.41 | \$14.82 | \$0.00 | \$64.18 |
| | 12/01/2021 | \$35.95 | \$13.41 | \$16.01 | \$0.00 | \$65.37 |
| (3 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i> | 12/01/2019 | \$34.32 | \$12.41 | \$13.72 | \$0.00 | \$60.45 |
| | 06/01/2020 | \$35.22 | \$12.41 | \$13.72 | \$0.00 | \$61.35 |
| | 08/01/2020 | \$35.22 | \$12.91 | \$13.72 | \$0.00 | \$61.85 |
| | 12/01/2020 | \$35.22 | \$12.91 | \$14.82 | \$0.00 | \$62.95 |
| | 06/01/2021 | \$36.02 | \$12.91 | \$14.82 | \$0.00 | \$63.75 |
| | 08/01/2021 | \$36.02 | \$13.41 | \$14.82 | \$0.00 | \$64.25 |
| | 12/01/2021 | \$36.02 | \$13.41 | \$16.01 | \$0.00 | \$65.44 |
| (4 & 5 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i> | 12/01/2019 | \$34.44 | \$12.41 | \$13.72 | \$0.00 | \$60.57 |
| | 06/01/2020 | \$35.34 | \$12.41 | \$13.72 | \$0.00 | \$61.47 |
| | 08/01/2020 | \$35.34 | \$12.91 | \$13.72 | \$0.00 | \$61.97 |
| | 12/01/2020 | \$35.34 | \$12.91 | \$14.82 | \$0.00 | \$63.07 |
| | 06/01/2021 | \$36.14 | \$12.91 | \$14.82 | \$0.00 | \$63.87 |
| | 08/01/2021 | \$36.14 | \$13.41 | \$14.82 | \$0.00 | \$64.37 |
| | 12/01/2021 | \$36.14 | \$13.41 | \$16.01 | \$0.00 | \$65.56 |
| ADS/SUBMERSIBLE PILOT <i>PILE DRIVER LOCAL 56 (ZONE 3)</i> | 08/01/2019 | \$102.78 | \$9.90 | \$21.15 | \$0.00 | \$133.83 |
| For apprentice rates see "Apprentice- PILE DRIVER" | | | | | | |
| AIR TRACK OPERATOR <i>LABORERS - ZONE 2</i> | 12/01/2019 | \$34.81 | \$8.10 | \$15.38 | \$0.00 | \$58.29 |
| | 06/01/2020 | \$34.81 | \$8.60 | \$15.77 | \$0.00 | \$59.18 |
| | 12/01/2020 | \$35.70 | \$8.60 | \$15.77 | \$0.00 | \$60.07 |
| | 06/01/2021 | \$36.62 | \$8.60 | \$15.77 | \$0.00 | \$60.99 |
| | 12/01/2021 | \$37.53 | \$8.60 | \$15.77 | \$0.00 | \$61.90 |
| For apprentice rates see "Apprentice- LABORER" | | | | | | |
| ASBESTOS WORKER (PIPES & TANKS) <i>HEAT & FROST INSULATORS LOCAL 6 (SPRINGFIELD)</i> | 12/01/2019 | \$33.30 | \$12.50 | \$8.35 | \$0.00 | \$54.15 |
| | 06/01/2020 | \$34.20 | \$12.50 | \$8.35 | \$0.00 | \$55.05 |
| | 12/01/2020 | \$35.10 | \$12.50 | \$8.35 | \$0.00 | \$55.95 |
| ASPHALT RAKER <i>LABORERS - ZONE 2</i> | 12/01/2019 | \$34.31 | \$8.10 | \$15.38 | \$0.00 | \$57.79 |
| | 06/01/2020 | \$34.31 | \$8.60 | \$15.77 | \$0.00 | \$58.68 |
| | 12/01/2020 | \$35.20 | \$8.60 | \$15.77 | \$0.00 | \$59.57 |
| | 06/01/2021 | \$36.12 | \$8.60 | \$15.77 | \$0.00 | \$60.49 |
| | 12/01/2021 | \$37.03 | \$8.60 | \$15.77 | \$0.00 | \$61.40 |
| For apprentice rates see "Apprentice- LABORER" | | | | | | |
| AUTOMATIC GRADER-EXCAVATOR (RECLAIMER) <i>OPERATING ENGINEERS LOCAL 98</i> | 12/01/2019 | \$35.40 | \$11.94 | \$14.35 | \$0.00 | \$61.69 |
| For apprentice rates see "Apprentice- OPERATING ENGINEERS" | | | | | | |
| BACKHOE/FRONT-END LOADER OPERATOR <i>OPERATING ENGINEERS LOCAL 98</i> | 12/01/2019 | \$35.40 | \$11.94 | \$14.35 | \$0.00 | \$61.69 |
| For apprentice rates see "Apprentice- OPERATING ENGINEERS" | | | | | | |

| Classification | Effective Date | Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|---|----------------|-----------|---------|---------|---------------------------|------------|
| BARCO-TYPE JUMPING TAMPER <i>LABORERS - ZONE 2</i> | 12/01/2019 | \$34.31 | \$8.10 | \$15.38 | \$0.00 | \$57.79 |
| | 06/01/2020 | \$34.31 | \$8.60 | \$15.77 | \$0.00 | \$58.68 |
| | 12/01/2020 | \$35.20 | \$8.60 | \$15.77 | \$0.00 | \$59.57 |
| | 06/01/2021 | \$36.12 | \$8.60 | \$15.77 | \$0.00 | \$60.49 |
| | 12/01/2021 | \$37.03 | \$8.60 | \$15.77 | \$0.00 | \$61.40 |
| For apprentice rates see "Apprentice- LABORER" | | | | | | |
| BATCH/CEMENT PLANT - ON SITE <i>OPERATING ENGINEERS LOCAL 98</i> | 12/01/2019 | \$34.87 | \$11.94 | \$14.35 | \$0.00 | \$61.16 |
| For apprentice rates see "Apprentice- OPERATING ENGINEERS" | | | | | | |
| BLOCK PAVER, RAMMER / CURB SETTER <i>LABORERS - ZONE 2</i> | 12/01/2019 | \$34.81 | \$8.10 | \$15.38 | \$0.00 | \$58.29 |
| | 06/01/2020 | \$34.81 | \$8.60 | \$15.77 | \$0.00 | \$59.18 |
| | 12/01/2020 | \$35.70 | \$8.60 | \$15.77 | \$0.00 | \$60.07 |
| | 06/01/2021 | \$36.62 | \$8.60 | \$15.77 | \$0.00 | \$60.99 |
| | 12/01/2021 | \$37.53 | \$8.60 | \$15.77 | \$0.00 | \$61.90 |
| For apprentice rates see "Apprentice- LABORER" | | | | | | |
| BOILER MAKER <i>BOILERMAKERS LOCAL 29</i> | 01/01/2020 | \$46.10 | \$7.07 | \$17.98 | \$0.00 | \$71.15 |

Apprentice - BOILERMAKER - Local 29

Effective Date - 01/01/2020

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 65 | \$29.97 | \$7.07 | \$11.69 | \$0.00 | \$48.73 |
| 2 | 65 | \$29.97 | \$7.07 | \$11.69 | \$0.00 | \$48.73 |
| 3 | 70 | \$32.27 | \$7.07 | \$12.59 | \$0.00 | \$51.93 |
| 4 | 75 | \$34.58 | \$7.07 | \$13.49 | \$0.00 | \$55.14 |
| 5 | 80 | \$36.88 | \$7.07 | \$14.38 | \$0.00 | \$58.33 |
| 6 | 85 | \$39.19 | \$7.07 | \$15.29 | \$0.00 | \$61.55 |
| 7 | 90 | \$41.49 | \$7.07 | \$16.18 | \$0.00 | \$64.74 |
| 8 | 95 | \$43.80 | \$7.07 | \$17.09 | \$0.00 | \$67.96 |

Notes:

Apprentice to Journeyworker Ratio:1:4

| | | | | | | |
|---|------------|---------|---------|---------|--------|---------|
| BRICK/STONE/ARTIFICIAL MASONRY (INCL. MASONRY WATERPROOFING) <i>BRICKLAYERS LOCAL 3 (SPRINGFIELD/PITTSFIELD)</i> | 02/01/2020 | \$42.81 | \$10.75 | \$19.96 | \$0.00 | \$73.52 |
| | 08/01/2020 | \$44.16 | \$10.75 | \$20.11 | \$0.00 | \$75.02 |
| | 02/01/2021 | \$44.71 | \$10.75 | \$20.11 | \$0.00 | \$75.57 |
| | 08/01/2021 | \$46.11 | \$10.75 | \$20.27 | \$0.00 | \$77.13 |
| | 02/01/2022 | \$46.64 | \$10.75 | \$20.27 | \$0.00 | \$77.66 |

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - BRICK/PLASTER/CEMENT MASON - Local 3 Springfield/Pittsfield

Effective Date - 02/01/2020

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 50 | \$21.41 | \$10.75 | \$19.96 | \$0.00 | \$52.12 |
| 2 | 60 | \$25.69 | \$10.75 | \$19.96 | \$0.00 | \$56.40 |
| 3 | 70 | \$29.97 | \$10.75 | \$19.96 | \$0.00 | \$60.68 |
| 4 | 80 | \$34.25 | \$10.75 | \$19.96 | \$0.00 | \$64.96 |
| 5 | 90 | \$38.53 | \$10.75 | \$19.96 | \$0.00 | \$69.24 |

Effective Date - 08/01/2020

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 50 | \$22.08 | \$10.75 | \$20.11 | \$0.00 | \$52.94 |
| 2 | 60 | \$26.50 | \$10.75 | \$20.11 | \$0.00 | \$57.36 |
| 3 | 70 | \$30.91 | \$10.75 | \$20.11 | \$0.00 | \$61.77 |
| 4 | 80 | \$35.33 | \$10.75 | \$20.11 | \$0.00 | \$66.19 |
| 5 | 90 | \$39.74 | \$10.75 | \$20.11 | \$0.00 | \$70.60 |

Notes:

Apprentice to Journeyworker Ratio:1:5

| | | | | | | |
|---|------------|---------|---------|---------|--------|---------|
| BULLDOZER/POWER SHOVEL/TREE SHREDDER /CLAM SHELL OPERATING | 12/01/2019 | \$35.40 | \$11.94 | \$14.35 | \$0.00 | \$61.69 |
|---|------------|---------|---------|---------|--------|---------|

ENGINEERS LOCAL 98

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

| | | | | | | |
|---|------------|---------|--------|---------|--------|---------|
| CAISSON & UNDERPINNING BOTTOM MAN LABORERS - FOUNDATION AND MARINE | 12/01/2019 | \$40.25 | \$8.10 | \$16.80 | \$0.00 | \$65.15 |
| | 06/01/2020 | \$40.30 | \$8.60 | \$17.24 | \$0.00 | \$66.14 |
| | 12/01/2020 | \$41.28 | \$8.60 | \$17.24 | \$0.00 | \$67.12 |
| | 06/01/2021 | \$42.30 | \$8.60 | \$17.24 | \$0.00 | \$68.14 |
| | 12/01/2021 | \$43.31 | \$8.60 | \$17.24 | \$0.00 | \$69.15 |

For apprentice rates see "Apprentice- LABORER"

| | | | | | | |
|--|------------|---------|--------|---------|--------|---------|
| CAISSON & UNDERPINNING LABORER LABORERS - FOUNDATION AND MARINE | 12/01/2019 | \$39.10 | \$8.10 | \$16.80 | \$0.00 | \$64.00 |
| | 06/01/2020 | \$39.15 | \$8.60 | \$17.24 | \$0.00 | \$64.99 |
| | 12/01/2020 | \$40.13 | \$8.60 | \$17.24 | \$0.00 | \$65.97 |
| | 06/01/2021 | \$41.15 | \$8.60 | \$17.24 | \$0.00 | \$66.99 |
| | 12/01/2021 | \$42.16 | \$8.60 | \$17.24 | \$0.00 | \$68.00 |

For apprentice rates see "Apprentice- LABORER"

| | | | | | | |
|--|------------|---------|--------|---------|--------|---------|
| CAISSON & UNDERPINNING TOP MAN LABORERS - FOUNDATION AND MARINE | 12/01/2019 | \$39.10 | \$8.10 | \$16.80 | \$0.00 | \$64.00 |
| | 06/01/2020 | \$39.15 | \$8.60 | \$17.24 | \$0.00 | \$64.99 |
| | 12/01/2020 | \$40.13 | \$8.60 | \$17.24 | \$0.00 | \$65.97 |
| | 06/01/2021 | \$41.15 | \$8.60 | \$17.24 | \$0.00 | \$66.99 |
| | 12/01/2021 | \$42.16 | \$8.60 | \$17.24 | \$0.00 | \$68.00 |

For apprentice rates see "Apprentice- LABORER"

| Classification | Effective Date | Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|---|----------------|-----------|--------|---------|---------------------------|------------|
| CARBIDE CORE DRILL OPERATOR <i>LABORERS - ZONE 2</i> | 12/01/2019 | \$34.31 | \$8.10 | \$15.38 | \$0.00 | \$57.79 |
| | 06/01/2020 | \$34.31 | \$8.60 | \$15.77 | \$0.00 | \$58.68 |
| | 12/01/2020 | \$35.20 | \$8.60 | \$15.77 | \$0.00 | \$59.57 |
| | 06/01/2021 | \$36.12 | \$8.60 | \$15.77 | \$0.00 | \$60.49 |
| | 12/01/2021 | \$37.03 | \$8.60 | \$15.77 | \$0.00 | \$61.40 |

For apprentice rates see "Apprentice- LABORER"

| | | | | | | |
|---|------------|---------|--------|---------|--------|---------|
| CARPENTER <i>CARPENTERS LOCAL 336 - HAMPDEN HAMPSHIRE FRANKLIN</i> | 03/01/2020 | \$38.04 | \$7.84 | \$16.87 | \$0.00 | \$62.75 |
| | 09/01/2020 | \$38.54 | \$7.84 | \$16.87 | \$0.00 | \$63.25 |
| | 03/01/2021 | \$39.04 | \$7.84 | \$16.87 | \$0.00 | \$63.75 |
| | 09/01/2021 | \$39.54 | \$7.84 | \$16.87 | \$0.00 | \$64.25 |
| | 03/01/2022 | \$40.04 | \$7.84 | \$16.87 | \$0.00 | \$64.75 |
| | 09/01/2022 | \$40.54 | \$7.84 | \$16.87 | \$0.00 | \$65.25 |
| | 03/01/2023 | \$41.04 | \$7.84 | \$16.87 | \$0.00 | \$65.75 |

Apprentice - CARPENTER - Local 336 Hampden Hampshire Franklin

Effective Date - 03/01/2020

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 50 | \$19.02 | \$7.84 | \$1.32 | \$0.00 | \$28.18 |
| 2 | 60 | \$22.82 | \$7.84 | \$1.32 | \$0.00 | \$31.98 |
| 3 | 70 | \$26.63 | \$7.84 | \$12.91 | \$0.00 | \$47.38 |
| 4 | 75 | \$28.53 | \$7.84 | \$12.91 | \$0.00 | \$49.28 |
| 5 | 80 | \$30.43 | \$7.84 | \$14.23 | \$0.00 | \$52.50 |
| 6 | 80 | \$30.43 | \$7.84 | \$14.23 | \$0.00 | \$52.50 |
| 7 | 90 | \$34.24 | \$7.84 | \$15.55 | \$0.00 | \$57.63 |
| 8 | 90 | \$34.24 | \$7.84 | \$15.55 | \$0.00 | \$57.63 |

Effective Date - 09/01/2020

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 50 | \$19.27 | \$7.84 | \$1.32 | \$0.00 | \$28.43 |
| 2 | 60 | \$23.12 | \$7.84 | \$1.32 | \$0.00 | \$32.28 |
| 3 | 70 | \$26.98 | \$7.84 | \$12.91 | \$0.00 | \$47.73 |
| 4 | 75 | \$28.91 | \$7.84 | \$12.91 | \$0.00 | \$49.66 |
| 5 | 80 | \$30.83 | \$7.84 | \$14.23 | \$0.00 | \$52.90 |
| 6 | 80 | \$30.83 | \$7.84 | \$14.23 | \$0.00 | \$52.90 |
| 7 | 90 | \$34.69 | \$7.84 | \$15.55 | \$0.00 | \$58.08 |
| 8 | 90 | \$34.69 | \$7.84 | \$15.55 | \$0.00 | \$58.08 |

Notes:

% Indentured After 10/1/17; 45/45/55/55/70/70/80/80
Step 1&2 \$26.28/ 3&4 \$31.36/ 5&6 \$48.70/ 7&8 \$53.82

Apprentice to Journeyworker Ratio:1:5

| | | | | | | |
|--|------------|---------|--------|--------|--------|---------|
| CARPENTER WOOD FRAME <i>CARPENTERS LOCAL 336 - HAMPDEN HAMPSHIRE FRANKLIN</i> | 10/01/2019 | \$23.49 | \$7.07 | \$7.86 | \$0.00 | \$38.42 |
|--|------------|---------|--------|--------|--------|---------|

All Aspects of New Wood Frame Work

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - CARPENTER (Wood Frame) - 336 Hampden Hampshire

Effective Date - 10/01/2019

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 60 | \$14.09 | \$7.07 | \$0.00 | \$0.00 | \$21.16 |
| 2 | 60 | \$14.09 | \$7.07 | \$0.00 | \$0.00 | \$21.16 |
| 3 | 65 | \$15.27 | \$7.07 | \$7.86 | \$0.00 | \$30.20 |
| 4 | 70 | \$16.44 | \$7.07 | \$7.86 | \$0.00 | \$31.37 |
| 5 | 75 | \$17.62 | \$7.07 | \$7.86 | \$0.00 | \$32.55 |
| 6 | 80 | \$18.79 | \$7.07 | \$7.86 | \$0.00 | \$33.72 |
| 7 | 85 | \$19.97 | \$7.07 | \$7.86 | \$0.00 | \$34.90 |
| 8 | 90 | \$21.14 | \$7.07 | \$7.86 | \$0.00 | \$36.07 |

Notes:
 % Indentured After 10/1/17; 45/45/55/55/70/70/80/80
 Step 1&2 \$17.64/ 3&4 \$24.74/ 5&6 \$31.37/ 7&8 \$33.72

Apprentice to Journeyworker Ratio:1:5

| | | | | | | |
|---|------------|---------|---------|---------|--------|---------|
| CEMENT MASONRY/PLASTERING BRICKLAYERS LOCAL 3 (SPRINGFIELD/PITTSFIELD) | 01/01/2020 | \$41.94 | \$12.70 | \$17.64 | \$0.62 | \$72.90 |
|---|------------|---------|---------|---------|--------|---------|

Apprentice - CEMENT MASONRY/PLASTERING - Springfield/Pittsfield

Effective Date - 01/01/2020

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 50 | \$20.97 | \$12.70 | \$15.41 | \$0.00 | \$49.08 |
| 2 | 60 | \$25.16 | \$12.70 | \$17.64 | \$0.62 | \$56.12 |
| 3 | 65 | \$27.26 | \$12.70 | \$17.64 | \$0.62 | \$58.22 |
| 4 | 70 | \$29.36 | \$12.70 | \$17.64 | \$0.62 | \$60.32 |
| 5 | 75 | \$31.46 | \$12.70 | \$17.64 | \$0.62 | \$62.42 |
| 6 | 80 | \$33.55 | \$12.70 | \$17.64 | \$0.62 | \$64.51 |
| 7 | 90 | \$37.75 | \$12.70 | \$17.64 | \$0.62 | \$68.71 |

Notes:
 Steps 3,4 are 500 hrs. All other steps are 1,000 hrs.

Apprentice to Journeyworker Ratio:1:3

| | | | | | | |
|---|------------|---------|--------|---------|--------|---------|
| CHAIN SAW OPERATOR LABORERS - ZONE 2 | 12/01/2019 | \$34.31 | \$8.10 | \$15.38 | \$0.00 | \$57.79 |
| | 06/01/2020 | \$34.31 | \$8.60 | \$15.77 | \$0.00 | \$58.68 |
| | 12/01/2020 | \$35.20 | \$8.60 | \$15.77 | \$0.00 | \$59.57 |
| | 06/01/2021 | \$36.12 | \$8.60 | \$15.77 | \$0.00 | \$60.49 |
| | 12/01/2021 | \$37.03 | \$8.60 | \$15.77 | \$0.00 | \$61.40 |

For apprentice rates see "Apprentice- LABORER"

| | | | | | | |
|---|------------|---------|---------|---------|--------|---------|
| COMPRESSOR OPERATOR OPERATING ENGINEERS LOCAL 98 | 12/01/2019 | \$34.87 | \$11.94 | \$14.35 | \$0.00 | \$61.16 |
|---|------------|---------|---------|---------|--------|---------|

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

| | | | | | | |
|--|------------|---------|---------|---------|--------|---------|
| CRANE OPERATOR OPERATING ENGINEERS LOCAL 98 | 12/01/2019 | \$38.90 | \$11.94 | \$14.35 | \$0.00 | \$65.19 |
|--|------------|---------|---------|---------|--------|---------|

| Classification | Effective Date | Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|--|-----------------------|------------------|---------------|----------------|----------------------------------|-------------------|
| For apprentice rates see "Apprentice- OPERATING ENGINEERS" | | | | | | |
| DELEADER (BRIDGE) <i>PAINTERS LOCAL 35 - ZONE 3</i> | 01/01/2020 | \$50.96 | \$8.20 | \$22.10 | \$0.00 | \$81.26 |
| | 07/01/2020 | \$52.06 | \$8.20 | \$22.10 | \$0.00 | \$82.36 |
| | 01/01/2021 | \$53.16 | \$8.20 | \$22.10 | \$0.00 | \$83.46 |
| For apprentice rates see "Apprentice - PAINTER - BRUSH NEW" | | | | | | |
| DEMO: ADZEMAN <i>LABORERS - ZONE 2</i> | 12/01/2019 | \$39.30 | \$8.10 | \$16.60 | \$0.00 | \$64.00 |
| For apprentice rates see "Apprentice- LABORER" | | | | | | |
| DEMO: BACKHOE/LOADER/HAMMER OPERATOR <i>LABORERS - ZONE 2</i> | 12/01/2019 | \$40.30 | \$8.10 | \$16.60 | \$0.00 | \$65.00 |
| For apprentice rates see "Apprentice- LABORER" | | | | | | |
| DEMO: BURNERS <i>LABORERS - ZONE 2</i> | 12/01/2019 | \$40.05 | \$8.10 | \$16.60 | \$0.00 | \$64.75 |
| For apprentice rates see "Apprentice- LABORER" | | | | | | |
| DEMO: CONCRETE CUTTER/SAWYER <i>LABORERS - ZONE 2</i> | 12/01/2019 | \$40.30 | \$8.10 | \$16.60 | \$0.00 | \$65.00 |
| For apprentice rates see "Apprentice- LABORER" | | | | | | |
| DEMO: JACKHAMMER OPERATOR <i>LABORERS - ZONE 2</i> | 12/01/2019 | \$40.05 | \$8.10 | \$16.60 | \$0.00 | \$64.75 |
| For apprentice rates see "Apprentice- LABORER" | | | | | | |
| DEMO: WRECKING LABORER <i>LABORERS - ZONE 2</i> | 12/01/2019 | \$39.30 | \$8.10 | \$16.60 | \$0.00 | \$64.00 |
| For apprentice rates see "Apprentice- LABORER" | | | | | | |
| DIVER <i>PILE DRIVER LOCAL 56 (ZONE 3)</i> | 08/01/2019 | \$68.52 | \$9.90 | \$21.15 | \$0.00 | \$99.57 |
| For apprentice rates see "Apprentice- PILE DRIVER" | | | | | | |
| DIVER TENDER <i>PILE DRIVER LOCAL 56 (ZONE 3)</i> | 08/01/2019 | \$48.94 | \$9.90 | \$21.15 | \$0.00 | \$79.99 |
| For apprentice rates see "Apprentice- PILE DRIVER" | | | | | | |
| DIVER TENDER (EFFLUENT) <i>PILE DRIVER LOCAL 56 (ZONE 3)</i> | 08/01/2019 | \$73.41 | \$9.90 | \$21.15 | \$0.00 | \$104.46 |
| For apprentice rates see "Apprentice- PILE DRIVER" | | | | | | |
| DIVER/SLURRY (EFFLUENT) <i>PILE DRIVER LOCAL 56 (ZONE 3)</i> | 08/01/2019 | \$102.78 | \$9.90 | \$21.15 | \$0.00 | \$133.83 |
| For apprentice rates see "Apprentice- PILE DRIVER" | | | | | | |
| ELECTRICIAN (Including Core Drilling) <i>ELECTRICIANS LOCAL 7</i> | 12/29/2019 | \$43.41 | \$11.00 | \$12.60 | \$0.00 | \$67.01 |

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - ELECTRICIAN - Local 7

Effective Date - 12/29/2019

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 40 | \$17.36 | \$6.00 | \$0.52 | \$0.00 | \$23.88 |
| 2 | 45 | \$19.53 | \$6.00 | \$0.59 | \$0.00 | \$26.12 |
| 3 | 50 | \$21.71 | \$11.00 | \$6.95 | \$0.00 | \$39.66 |
| 4 | 55 | \$23.88 | \$11.00 | \$7.02 | \$0.00 | \$41.90 |
| 5 | 65 | \$28.22 | \$11.00 | \$8.15 | \$0.00 | \$47.37 |
| 6 | 70 | \$30.39 | \$11.00 | \$9.21 | \$0.00 | \$50.60 |

Notes:

Steps 1-2 are 1000 hrs; Steps 3-6 are 1500 hrs.

Apprentice to Journeyworker Ratio:2:3****

| | | | | | | |
|--------------------------------|------------|---------|---------|---------|--------|---------|
| ELEVATOR CONSTRUCTOR | 01/01/2020 | \$54.85 | \$15.73 | \$18.41 | \$0.00 | \$88.99 |
| ELEVATOR CONSTRUCTORS LOCAL 41 | 01/01/2021 | \$56.69 | \$15.88 | \$19.31 | \$0.00 | \$91.88 |
| | 01/01/2022 | \$58.62 | \$16.03 | \$20.21 | \$0.00 | \$94.86 |

Apprentice - ELEVATOR CONSTRUCTOR - Local 41

Effective Date - 01/01/2020

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 50 | \$27.43 | \$15.73 | \$0.00 | \$0.00 | \$43.16 |
| 2 | 55 | \$30.17 | \$15.73 | \$18.41 | \$0.00 | \$64.31 |
| 3 | 65 | \$35.65 | \$15.73 | \$18.41 | \$0.00 | \$69.79 |
| 4 | 70 | \$38.40 | \$15.73 | \$18.41 | \$0.00 | \$72.54 |
| 5 | 80 | \$43.88 | \$15.73 | \$18.41 | \$0.00 | \$78.02 |

Effective Date - 01/01/2021

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 50 | \$28.35 | \$15.88 | \$0.00 | \$0.00 | \$44.23 |
| 2 | 55 | \$31.18 | \$15.88 | \$19.31 | \$0.00 | \$66.37 |
| 3 | 65 | \$36.85 | \$15.88 | \$19.31 | \$0.00 | \$72.04 |
| 4 | 70 | \$39.68 | \$15.88 | \$19.31 | \$0.00 | \$74.87 |
| 5 | 80 | \$45.35 | \$15.88 | \$19.31 | \$0.00 | \$80.54 |

Notes:

Steps 1-2 are 6 mos.; Steps 3-5 are 1 year

Apprentice to Journeyworker Ratio:1:1

| | | | | | | |
|--------------------------------|------------|---------|---------|---------|--------|---------|
| ELEVATOR CONSTRUCTOR HELPER | 01/01/2020 | \$38.40 | \$15.73 | \$18.41 | \$0.00 | \$72.54 |
| ELEVATOR CONSTRUCTORS LOCAL 41 | 01/01/2021 | \$39.68 | \$15.88 | \$19.31 | \$0.00 | \$74.87 |
| | 01/01/2022 | \$41.03 | \$16.03 | \$20.21 | \$0.00 | \$77.27 |

For apprentice rates see "Apprentice - ELEVATOR CONSTRUCTOR"

| Classification | Effective Date | Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|---|----------------|-----------|---------|---------|---------------------------|------------|
| FENCE & GUARD RAIL ERECTOR <i>LABORERS - ZONE 2</i> | 12/01/2019 | \$34.31 | \$8.10 | \$15.38 | \$0.00 | \$57.79 |
| | 06/01/2020 | \$34.31 | \$8.60 | \$15.77 | \$0.00 | \$58.68 |
| | 12/01/2020 | \$35.20 | \$8.60 | \$15.77 | \$0.00 | \$59.57 |
| | 06/01/2021 | \$36.12 | \$8.60 | \$15.77 | \$0.00 | \$60.49 |
| | 12/01/2021 | \$37.03 | \$8.60 | \$15.77 | \$0.00 | \$61.40 |
| For apprentice rates see "Apprentice- LABORER" | | | | | | |
| FIELD ENG.INST/ROD-BLDG,SITE,HVY/HWY <i>OPERATING ENGINEERS LOCAL 98</i> | 06/01/1999 | \$18.84 | \$4.80 | \$4.10 | \$0.00 | \$27.74 |
| FIELD ENG.PARTY CHIEF:BLDG,SITE,HVY/HWY <i>OPERATING ENGINEERS LOCAL 98</i> | 06/01/1999 | \$21.33 | \$4.80 | \$4.10 | \$0.00 | \$30.23 |
| FIELD ENG.SURVEY CHIEF-BLDG,SITE,HVY/HWY <i>OPERATING ENGINEERS LOCAL 98</i> | 06/01/1999 | \$22.33 | \$4.80 | \$4.10 | \$0.00 | \$31.23 |
| FIRE ALARM INSTALLER <i>ELECTRICIANS LOCAL 7</i> | 12/29/2019 | \$43.41 | \$11.00 | \$12.60 | \$0.00 | \$67.01 |
| For apprentice rates see "Apprentice- ELECTRICIAN" | | | | | | |
| FIRE ALARM REPAIR / MAINTENANCE / COMMISSIONING <i>ELECTRICIANS LOCAL 7</i> | 12/29/2019 | \$43.41 | \$11.00 | \$12.60 | \$0.00 | \$67.01 |
| For apprentice rates see "Apprentice- TELECOMMUNICATIONS TECHNICIAN" | | | | | | |
| FIREMAN <i>OPERATING ENGINEERS LOCAL 98</i> | 12/01/2019 | \$34.87 | \$11.94 | \$14.35 | \$0.00 | \$61.16 |

Apprentice - OPERATING ENGINEERS - Local 98 Class 3

Effective Date - 12/01/2019

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 60 | \$20.92 | \$11.94 | \$14.35 | \$0.00 | \$47.21 |
| 2 | 70 | \$24.41 | \$11.94 | \$14.35 | \$0.00 | \$50.70 |
| 3 | 80 | \$27.90 | \$11.94 | \$14.35 | \$0.00 | \$54.19 |
| 4 | 90 | \$31.38 | \$11.94 | \$14.35 | \$0.00 | \$57.67 |

Notes:

Steps 1-2 are 1000 hrs.; Steps 3-4 are 2000 hrs.

Apprentice to Journeyworker Ratio:1:6

| | | | | | | |
|--|------------|---------|--------|---------|--------|---------|
| FLAGGER & SIGNALER <i>LABORERS - ZONE 2</i> | 12/01/2019 | \$23.50 | \$8.10 | \$15.38 | \$0.00 | \$46.98 |
| | 06/01/2020 | \$23.50 | \$8.60 | \$15.77 | \$0.00 | \$47.87 |
| | 12/01/2020 | \$24.50 | \$8.60 | \$15.77 | \$0.00 | \$48.87 |
| | 06/01/2021 | \$24.50 | \$8.60 | \$15.77 | \$0.00 | \$48.87 |
| | 12/01/2021 | \$24.50 | \$8.60 | \$15.77 | \$0.00 | \$48.87 |
| For apprentice rates see "Apprentice- LABORER" | | | | | | |
| FLOORCOVERER <i>FLOORCOVERERS LOCAL 2168 ZONE III</i> | 09/01/2019 | \$37.44 | \$7.84 | \$16.87 | \$0.00 | \$62.15 |

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - FLOORCOVERER - Local 2168 Zone III

Effective Date - 09/01/2019

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 50 | \$18.72 | \$7.84 | \$1.32 | \$0.00 | \$27.88 |
| 2 | 55 | \$20.59 | \$7.84 | \$1.32 | \$0.00 | \$29.75 |
| 3 | 60 | \$22.46 | \$7.84 | \$12.91 | \$0.00 | \$43.21 |
| 4 | 65 | \$24.34 | \$7.84 | \$12.91 | \$0.00 | \$45.09 |
| 5 | 70 | \$26.21 | \$7.84 | \$14.23 | \$0.00 | \$48.28 |
| 6 | 75 | \$28.08 | \$7.84 | \$14.23 | \$0.00 | \$50.15 |
| 7 | 80 | \$29.95 | \$7.84 | \$15.55 | \$0.00 | \$53.34 |
| 8 | 85 | \$31.82 | \$7.84 | \$15.55 | \$0.00 | \$55.21 |

Notes: Steps are 750 hrs.
 % After 09/1/17; 45/45/55/55/70/70/80/80 (1500hr Steps)
 Step 1&2 \$26.01/ 3&4 \$31.03/ 5&6 \$48.28/ 7&8 \$53.34

Apprentice to Journeyworker Ratio:1:1

| | | | | | | |
|---|------------|---------|---------|---------|--------|---------|
| FORK LIFT <i>OPERATING ENGINEERS LOCAL 98</i> | 12/01/2019 | \$35.09 | \$11.94 | \$14.35 | \$0.00 | \$61.38 |
| For apprentice rates see "Apprentice- OPERATING ENGINEERS" | | | | | | |
| GENERATORS/LIGHTING PLANTS <i>OPERATING ENGINEERS LOCAL 98</i> | 12/01/2019 | \$31.64 | \$11.94 | \$14.35 | \$0.00 | \$57.93 |
| For apprentice rates see "Apprentice- OPERATING ENGINEERS" | | | | | | |
| GLAZIER (GLASS PLANK/AIR BARRIER/INTERIOR SYSTEMS) <i>GLAZIERS LOCAL 1333</i> | 06/01/2019 | \$38.18 | \$10.60 | \$9.90 | \$0.00 | \$58.68 |
| | 06/01/2020 | \$39.18 | \$10.80 | \$10.45 | \$0.00 | \$60.43 |

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - GLAZIER - Local 1333

Effective Date - 06/01/2019

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 50 | \$19.09 | \$10.60 | \$1.80 | \$0.00 | \$31.49 |
| 2 | 56 | \$21.48 | \$10.60 | \$1.80 | \$0.00 | \$33.88 |
| 3 | 63 | \$23.86 | \$10.60 | \$2.40 | \$0.00 | \$36.86 |
| 4 | 69 | \$26.25 | \$10.60 | \$2.40 | \$0.00 | \$39.25 |
| 5 | 75 | \$28.64 | \$10.60 | \$2.90 | \$0.00 | \$42.14 |
| 6 | 81 | \$31.02 | \$10.60 | \$2.90 | \$0.00 | \$44.52 |
| 7 | 88 | \$33.41 | \$10.60 | \$9.90 | \$0.00 | \$53.91 |
| 8 | 94 | \$35.79 | \$10.60 | \$9.90 | \$0.00 | \$56.29 |

Effective Date - 06/01/2020

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 50 | \$19.59 | \$10.80 | \$1.80 | \$0.00 | \$32.19 |
| 2 | 56 | \$22.04 | \$10.80 | \$1.80 | \$0.00 | \$34.64 |
| 3 | 63 | \$24.49 | \$10.80 | \$2.45 | \$0.00 | \$37.74 |
| 4 | 69 | \$26.94 | \$10.80 | \$2.45 | \$0.00 | \$40.19 |
| 5 | 75 | \$29.39 | \$10.80 | \$3.15 | \$0.00 | \$43.34 |
| 6 | 81 | \$31.83 | \$10.80 | \$3.15 | \$0.00 | \$45.78 |
| 7 | 88 | \$34.28 | \$10.80 | \$10.45 | \$0.00 | \$55.53 |
| 8 | 94 | \$36.73 | \$10.80 | \$10.45 | \$0.00 | \$57.98 |

Notes:

Apprentice to Journeyworker Ratio:1:3

| | | | | | | |
|--|------------|---------|---------|---------|--------|---------|
| GRADER/TRENCHING MACHINE/DERRICK OPERATING ENGINEERS LOCAL 98 | 12/01/2019 | \$35.40 | \$11.94 | \$14.35 | \$0.00 | \$61.69 |
|--|------------|---------|---------|---------|--------|---------|

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

| | | | | | | |
|--|------------|---------|---------|---------|--------|---------|
| HVAC (DUCTWORK) SHEETMETAL WORKERS LOCAL 63 | 01/01/2020 | \$36.99 | \$10.64 | \$16.22 | \$1.77 | \$65.62 |
|--|------------|---------|---------|---------|--------|---------|

For apprentice rates see "Apprentice- SHEET METAL WORKER"

| | | | | | | |
|--|------------|---------|---------|---------|--------|---------|
| HVAC (ELECTRICAL CONTROLS) ELECTRICIANS LOCAL 7 | 12/29/2019 | \$43.41 | \$11.00 | \$12.60 | \$0.00 | \$67.01 |
|--|------------|---------|---------|---------|--------|---------|

For apprentice rates see "Apprentice- ELECTRICIAN"

| | | | | | | |
|---|------------|---------|---------|---------|--------|---------|
| HVAC (TESTING AND BALANCING - AIR) SHEETMETAL WORKERS LOCAL 63 | 01/01/2020 | \$36.99 | \$10.64 | \$16.22 | \$1.77 | \$65.62 |
|---|------------|---------|---------|---------|--------|---------|

For apprentice rates see "Apprentice- SHEET METAL WORKER"

| | | | | | | |
|--|------------|---------|--------|---------|--------|---------|
| HVAC (TESTING AND BALANCING - WATER) PLUMBERS LOCAL 4 | 03/01/2020 | \$46.16 | \$9.80 | \$15.46 | \$0.00 | \$71.42 |
| | 09/01/2020 | \$47.16 | \$9.80 | \$15.46 | \$0.00 | \$72.42 |
| | 03/01/2021 | \$48.16 | \$9.80 | \$15.46 | \$0.00 | \$73.42 |
| | 09/01/2021 | \$49.16 | \$9.80 | \$15.46 | \$0.00 | \$74.42 |
| | 03/01/2022 | \$50.16 | \$9.80 | \$15.46 | \$0.00 | \$75.42 |

For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"

| Classification | Effective Date | Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|-----------------------------------|----------------|-----------|--------|---------|---------------------------|------------|
| HVAC MECHANIC PLUMBERS LOCAL 4 | 03/01/2020 | \$46.16 | \$9.80 | \$15.46 | \$0.00 | \$71.42 |
| | 09/01/2020 | \$47.16 | \$9.80 | \$15.46 | \$0.00 | \$72.42 |
| | 03/01/2021 | \$48.16 | \$9.80 | \$15.46 | \$0.00 | \$73.42 |
| | 09/01/2021 | \$49.16 | \$9.80 | \$15.46 | \$0.00 | \$74.42 |
| | 03/01/2022 | \$50.16 | \$9.80 | \$15.46 | \$0.00 | \$75.42 |

For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"

| | | | | | | |
|---------------------------------------|------------|---------|--------|---------|--------|---------|
| HYDRAULIC DRILLS LABORERS - ZONE 2 | 12/01/2019 | \$34.81 | \$8.10 | \$15.38 | \$0.00 | \$58.29 |
| | 06/01/2020 | \$34.81 | \$8.60 | \$15.77 | \$0.00 | \$59.18 |
| | 12/01/2020 | \$35.70 | \$8.60 | \$15.77 | \$0.00 | \$60.07 |
| | 06/01/2021 | \$36.62 | \$8.60 | \$15.77 | \$0.00 | \$60.99 |
| | 12/01/2021 | \$37.53 | \$8.60 | \$15.77 | \$0.00 | \$61.90 |

For apprentice rates see "Apprentice- LABORER"

| | | | | | | |
|--|------------|---------|---------|---------|--------|---------|
| INSULATOR (PIPES & TANKS) HEAT & FROST INSULATORS LOCAL 6 (SPRINGFIELD) | 09/01/2019 | \$38.75 | \$12.80 | \$16.40 | \$0.00 | \$67.95 |
|--|------------|---------|---------|---------|--------|---------|

Apprentice - ASBESTOS INSULATOR (Pipes & Tanks) - Local 6 Springfield

Effective Date - 09/01/2019

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 50 | \$19.38 | \$12.80 | \$11.90 | \$0.00 | \$44.08 |
| 2 | 60 | \$23.25 | \$12.80 | \$12.80 | \$0.00 | \$48.85 |
| 3 | 70 | \$27.13 | \$12.80 | \$13.70 | \$0.00 | \$53.63 |
| 4 | 80 | \$31.00 | \$12.80 | \$14.60 | \$0.00 | \$58.40 |

Notes:

Steps are 1 year

Apprentice to Journeyworker Ratio:1:4

| | | | | | | |
|---|------------|---------|--------|---------|--------|---------|
| IRONWORKER/WELDER IRONWORKERS LOCAL 7 (WORCESTER AREA) | 03/16/2019 | \$46.36 | \$8.00 | \$23.50 | \$0.00 | \$77.86 |
|---|------------|---------|--------|---------|--------|---------|

Apprentice - IRONWORKER - Local 7 Worcester

Effective Date - 03/16/2019

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 60 | \$27.82 | \$8.00 | \$23.50 | \$0.00 | \$59.32 |
| 2 | 70 | \$32.45 | \$8.00 | \$23.50 | \$0.00 | \$63.95 |
| 3 | 75 | \$34.77 | \$8.00 | \$23.50 | \$0.00 | \$66.27 |
| 4 | 80 | \$37.09 | \$8.00 | \$23.50 | \$0.00 | \$68.59 |
| 5 | 85 | \$39.41 | \$8.00 | \$23.50 | \$0.00 | \$70.91 |
| 6 | 90 | \$41.72 | \$8.00 | \$23.50 | \$0.00 | \$73.22 |

Notes:

Structural 1:6; Ornamental 1:4

Apprentice to Journeyworker Ratio:

| Classification | Effective Date | Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|--|----------------|-----------|--------|---------|---------------------------|------------|
| JACKHAMMER & PAVING BREAKER OPERATOR <i>LABORERS - ZONE 2</i> | 12/01/2019 | \$34.31 | \$8.10 | \$15.38 | \$0.00 | \$57.79 |
| | 06/01/2020 | \$34.31 | \$8.60 | \$15.77 | \$0.00 | \$58.68 |
| | 12/01/2020 | \$35.20 | \$8.60 | \$15.77 | \$0.00 | \$59.57 |
| | 06/01/2021 | \$36.12 | \$8.60 | \$15.77 | \$0.00 | \$60.49 |
| | 12/01/2021 | \$37.03 | \$8.60 | \$15.77 | \$0.00 | \$61.40 |

For apprentice rates see "Apprentice- LABORER"

| | | | | | | |
|-------------------------------------|------------|---------|--------|---------|--------|---------|
| LABORER <i>LABORERS - ZONE 2</i> | 12/01/2019 | \$34.06 | \$8.10 | \$15.38 | \$0.00 | \$57.54 |
| | 06/01/2020 | \$34.06 | \$8.60 | \$15.77 | \$0.00 | \$58.43 |
| | 12/01/2020 | \$34.95 | \$8.60 | \$15.77 | \$0.00 | \$59.32 |
| | 06/01/2021 | \$35.87 | \$8.60 | \$15.77 | \$0.00 | \$60.24 |
| | 12/01/2021 | \$36.78 | \$8.60 | \$15.77 | \$0.00 | \$61.15 |

Apprentice - LABORER - Zone 2

Effective Date - 12/01/2019

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 60 | \$20.44 | \$8.10 | \$15.38 | \$0.00 | \$43.92 |
| 2 | 70 | \$23.84 | \$8.10 | \$15.38 | \$0.00 | \$47.32 |
| 3 | 80 | \$27.25 | \$8.10 | \$15.38 | \$0.00 | \$50.73 |
| 4 | 90 | \$30.65 | \$8.10 | \$15.38 | \$0.00 | \$54.13 |

Effective Date - 06/01/2020

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 60 | \$20.44 | \$8.60 | \$15.77 | \$0.00 | \$44.81 |
| 2 | 70 | \$23.84 | \$8.60 | \$15.77 | \$0.00 | \$48.21 |
| 3 | 80 | \$27.25 | \$8.60 | \$15.77 | \$0.00 | \$51.62 |
| 4 | 90 | \$30.65 | \$8.60 | \$15.77 | \$0.00 | \$55.02 |

Notes:

Apprentice to Journeyworker Ratio:1:5

| | | | | | | |
|---|------------|---------|--------|---------|--------|---------|
| LABORER: CARPENTER TENDER <i>LABORERS - ZONE 2</i> | 12/01/2019 | \$34.06 | \$8.10 | \$15.38 | \$0.00 | \$57.54 |
| | 06/01/2020 | \$34.06 | \$8.60 | \$15.77 | \$0.00 | \$58.43 |
| | 12/01/2020 | \$34.95 | \$8.60 | \$15.77 | \$0.00 | \$59.32 |
| | 06/01/2021 | \$35.87 | \$8.60 | \$15.77 | \$0.00 | \$60.24 |
| | 12/01/2021 | \$36.78 | \$8.60 | \$15.77 | \$0.00 | \$61.15 |

For apprentice rates see "Apprentice- LABORER"

| | | | | | | |
|---|------------|---------|--------|---------|--------|---------|
| LABORER: CEMENT FINISHER TENDER <i>LABORERS - ZONE 2</i> | 12/01/2019 | \$34.06 | \$8.10 | \$15.38 | \$0.00 | \$57.54 |
| | 06/01/2020 | \$34.06 | \$8.60 | \$15.77 | \$0.00 | \$58.43 |
| | 12/01/2020 | \$34.95 | \$8.60 | \$15.77 | \$0.00 | \$59.32 |
| | 06/01/2021 | \$35.87 | \$8.60 | \$15.77 | \$0.00 | \$60.24 |
| | 12/01/2021 | \$36.78 | \$8.60 | \$15.77 | \$0.00 | \$61.15 |

For apprentice rates see "Apprentice- LABORER"

| | | | | | | |
|---|------------|---------|--------|---------|--------|---------|
| LABORER: HAZARDOUS WASTE/ASBESTOS REMOVER <i>LABORERS - ZONE 2</i> | 12/01/2019 | \$34.15 | \$8.10 | \$15.44 | \$0.00 | \$57.69 |
| | 06/01/2020 | \$34.15 | \$8.60 | \$15.83 | \$0.00 | \$58.58 |

For apprentice rates see "Apprentice- LABORER"

| Classification | Effective Date | Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|--|----------------|-----------|---------|---------|---------------------------|------------|
| LABORER: MASON TENDER <i>LABORERS - ZONE 2</i> | 12/01/2019 | \$34.31 | \$8.10 | \$15.38 | \$0.00 | \$57.79 |
| | 06/01/2020 | \$34.31 | \$8.60 | \$15.77 | \$0.00 | \$58.68 |
| | 12/01/2020 | \$35.20 | \$8.60 | \$15.77 | \$0.00 | \$59.57 |
| | 06/01/2021 | \$36.12 | \$8.60 | \$15.77 | \$0.00 | \$60.49 |
| | 12/01/2021 | \$37.03 | \$8.60 | \$15.77 | \$0.00 | \$61.40 |
| For apprentice rates see "Apprentice- LABORER" | | | | | | |
| LABORER: MULTI-TRADE TENDER <i>LABORERS - ZONE 2</i> | 12/01/2019 | \$34.06 | \$8.10 | \$15.38 | \$0.00 | \$57.54 |
| | 06/01/2020 | \$34.06 | \$8.60 | \$15.77 | \$0.00 | \$58.43 |
| | 12/01/2020 | \$34.95 | \$8.60 | \$15.77 | \$0.00 | \$59.32 |
| | 06/01/2021 | \$35.87 | \$8.60 | \$15.77 | \$0.00 | \$60.24 |
| | 12/01/2021 | \$36.78 | \$8.60 | \$15.77 | \$0.00 | \$61.15 |
| For apprentice rates see "Apprentice- LABORER" | | | | | | |
| LABORER: TREE REMOVER <i>LABORERS - ZONE 2</i> | 12/01/2019 | \$34.06 | \$8.10 | \$15.38 | \$0.00 | \$57.54 |
| | 06/01/2020 | \$34.06 | \$8.60 | \$15.77 | \$0.00 | \$58.43 |
| | 12/01/2020 | \$34.95 | \$8.60 | \$15.77 | \$0.00 | \$59.32 |
| | 06/01/2021 | \$35.87 | \$8.60 | \$15.77 | \$0.00 | \$60.24 |
| | 12/01/2021 | \$36.78 | \$8.60 | \$15.77 | \$0.00 | \$61.15 |
| This classification applies to the removal of standing trees, and the trimming and removal of branches and limbs when related to public works construction or site clearance incidental to construction . For apprentice rates see "Apprentice- LABORER" | | | | | | |
| LASER BEAM OPERATOR <i>LABORERS - ZONE 2</i> | 12/01/2019 | \$34.31 | \$8.10 | \$15.38 | \$0.00 | \$57.79 |
| | 06/01/2020 | \$34.31 | \$8.60 | \$15.77 | \$0.00 | \$58.68 |
| | 12/01/2020 | \$35.20 | \$8.60 | \$15.77 | \$0.00 | \$59.57 |
| | 06/01/2021 | \$36.12 | \$8.60 | \$15.77 | \$0.00 | \$60.49 |
| | 12/01/2021 | \$37.03 | \$8.60 | \$15.77 | \$0.00 | \$61.40 |
| For apprentice rates see "Apprentice- LABORER" | | | | | | |
| MARBLE & TILE FINISHERS <i>BRICKLAYERS LOCAL 3 (SPR/PITT) - MARBLE & TILE</i> | 02/01/2020 | \$35.17 | \$10.75 | \$19.37 | \$0.00 | \$65.29 |
| | 08/01/2020 | \$36.17 | \$10.75 | \$19.49 | \$0.00 | \$66.41 |
| | 02/01/2021 | \$36.67 | \$10.75 | \$19.49 | \$0.00 | \$66.91 |
| | 08/01/2021 | \$37.67 | \$10.75 | \$19.62 | \$0.00 | \$68.04 |
| | 02/01/2022 | \$38.12 | \$10.75 | \$19.62 | \$0.00 | \$68.49 |

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - MARBLE-TILE FINISHER-Local 3 Marble/Tile (Spr/Pitt)

Effective Date - 02/01/2020

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 50 | \$17.59 | \$10.75 | \$19.37 | \$0.00 | \$47.71 |
| 2 | 60 | \$21.10 | \$10.75 | \$19.37 | \$0.00 | \$51.22 |
| 3 | 70 | \$24.62 | \$10.75 | \$19.37 | \$0.00 | \$54.74 |
| 4 | 80 | \$28.14 | \$10.75 | \$19.37 | \$0.00 | \$58.26 |
| 5 | 90 | \$31.65 | \$10.75 | \$19.37 | \$0.00 | \$61.77 |

Effective Date - 08/01/2020

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 50 | \$18.09 | \$10.75 | \$19.49 | \$0.00 | \$48.33 |
| 2 | 60 | \$21.70 | \$10.75 | \$19.49 | \$0.00 | \$51.94 |
| 3 | 70 | \$25.32 | \$10.75 | \$19.49 | \$0.00 | \$55.56 |
| 4 | 80 | \$28.94 | \$10.75 | \$19.49 | \$0.00 | \$59.18 |
| 5 | 90 | \$32.55 | \$10.75 | \$19.49 | \$0.00 | \$62.79 |

Notes:

Apprentice to Journeyworker Ratio:1:5

MARBLE MASON/TILE LAYER(SP/PT)SeeBrick
BRICKLAYERS LOCAL 3 (SPR/PITT) - MARBLE & TILE

See "BRICK/STONE/ARTIFICIAL MASONRY(INCL.MASONRY WATERPROOFING)

MECH. SWEEPER OPERATOR (ON CONST. SITES) 12/01/2019 \$35.40 \$11.94 \$14.35 \$0.00 \$61.69
OPERATING ENGINEERS LOCAL 98

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

MECHANIC/WELDER/BOOM TRUCK 12/01/2019 \$34.87 \$11.94 \$14.35 \$0.00 \$61.16
OPERATING ENGINEERS LOCAL 98

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

MILLWRIGHT (Zone 3) 04/01/2019 \$37.11 \$9.90 \$18.50 \$0.00 \$65.51
MILLWRIGHTS LOCAL 1121 - Zone 3

Apprentice - MILLWRIGHT - Local 1121 Zone 3

Effective Date - 04/01/2019

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 55 | \$20.41 | \$9.90 | \$5.31 | \$0.00 | \$35.62 |
| 2 | 65 | \$24.12 | \$9.90 | \$15.13 | \$0.00 | \$49.15 |
| 3 | 75 | \$27.83 | \$9.90 | \$16.10 | \$0.00 | \$53.83 |
| 4 | 85 | \$31.54 | \$9.90 | \$17.06 | \$0.00 | \$58.50 |

Notes:

Steps are 2,000 hours

Apprentice to Journeyworker Ratio:1:5

| Classification | Effective Date | Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|--|----------------|-----------|---------|---------|---------------------------|------------|
| MORTAR MIXER <i>LABORERS - ZONE 2</i> | 12/01/2019 | \$34.31 | \$8.10 | \$15.38 | \$0.00 | \$57.79 |
| | 06/01/2020 | \$34.31 | \$8.60 | \$15.77 | \$0.00 | \$58.68 |
| | 12/01/2020 | \$35.20 | \$8.60 | \$15.77 | \$0.00 | \$59.57 |
| | 06/01/2021 | \$36.12 | \$8.60 | \$15.77 | \$0.00 | \$60.49 |
| | 12/01/2021 | \$37.03 | \$8.60 | \$15.77 | \$0.00 | \$61.40 |
| For apprentice rates see "Apprentice- LABORER" | | | | | | |
| OILER <i>OPERATING ENGINEERS LOCAL 98</i> | 12/01/2019 | \$30.56 | \$11.94 | \$14.35 | \$0.00 | \$56.85 |
| For apprentice rates see "Apprentice- OPERATING ENGINEERS" | | | | | | |
| OTHER POWER DRIVEN EQUIPMENT - CLASS VI <i>OPERATING ENGINEERS LOCAL 98</i> | 12/01/2019 | \$28.58 | \$11.94 | \$14.35 | \$0.00 | \$54.87 |
| For apprentice rates see "Apprentice- OPERATING ENGINEERS" | | | | | | |
| PAINTER (BRIDGES/TANKS) <i>PAINTERS LOCAL 35 - ZONE 3</i> | 01/01/2020 | \$50.96 | \$8.20 | \$22.10 | \$0.00 | \$81.26 |
| | 07/01/2020 | \$52.06 | \$8.20 | \$22.10 | \$0.00 | \$82.36 |
| | 01/01/2021 | \$53.16 | \$8.20 | \$22.10 | \$0.00 | \$83.46 |
| For apprentice rates see "Apprentice - PAINTER - BRUSH NEW" | | | | | | |
| PAINTER (SPRAY OR SANDBLAST, NEW) * * If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used. <i>PAINTERS LOCAL 35 - ZONE 3</i> | 01/01/2020 | \$34.33 | \$8.20 | \$18.20 | \$0.00 | \$60.73 |
| | 07/01/2020 | \$35.43 | \$8.20 | \$18.20 | \$0.00 | \$61.83 |
| | 01/01/2021 | \$36.53 | \$8.20 | \$18.20 | \$0.00 | \$62.93 |
| For apprentice rates see "Apprentice - PAINTER - BRUSH NEW" | | | | | | |
| PAINTER (SPRAY OR SANDBLAST, REPAINT) <i>PAINTERS LOCAL 35 - ZONE 3</i> | 01/01/2020 | \$31.65 | \$8.20 | \$18.20 | \$0.00 | \$58.05 |
| | 07/01/2020 | \$32.75 | \$8.20 | \$18.20 | \$0.00 | \$59.15 |
| | 01/01/2021 | \$33.85 | \$8.20 | \$18.20 | \$0.00 | \$60.25 |
| For apprentice rates see "Apprentice - PAINTER - BRUSH NEW" | | | | | | |
| PAINTER (TRAFFIC MARKINGS) <i>LABORERS - ZONE 2</i> | 12/01/2019 | \$34.06 | \$8.10 | \$15.38 | \$0.00 | \$57.54 |
| | 06/01/2020 | \$34.06 | \$8.60 | \$15.77 | \$0.00 | \$58.43 |
| | 12/01/2020 | \$34.95 | \$8.60 | \$15.77 | \$0.00 | \$59.32 |
| | 06/01/2021 | \$35.87 | \$8.60 | \$15.77 | \$0.00 | \$60.24 |
| | 12/01/2021 | \$36.78 | \$8.60 | \$15.77 | \$0.00 | \$61.15 |
| For Apprentice rates see "Apprentice- LABORER" | | | | | | |
| PAINTER / TAPER (BRUSH, NEW) * * If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used. <i>PAINTERS LOCAL 35 - ZONE 3</i> | 01/01/2020 | \$32.93 | \$8.20 | \$18.20 | \$0.00 | \$59.33 |
| | 07/01/2020 | \$34.03 | \$8.20 | \$18.20 | \$0.00 | \$60.43 |
| | 01/01/2021 | \$35.13 | \$8.20 | \$18.20 | \$0.00 | \$61.53 |

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - PAINTER - Local 35 Zone 3 - BRUSH NEW

Effective Date - 01/01/2020

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 50 | \$16.47 | \$8.20 | \$0.00 | \$0.00 | \$24.67 |
| 2 | 55 | \$18.11 | \$8.20 | \$3.80 | \$0.00 | \$30.11 |
| 3 | 60 | \$19.76 | \$8.20 | \$4.14 | \$0.00 | \$32.10 |
| 4 | 65 | \$21.40 | \$8.20 | \$4.49 | \$0.00 | \$34.09 |
| 5 | 70 | \$23.05 | \$8.20 | \$16.13 | \$0.00 | \$47.38 |
| 6 | 75 | \$24.70 | \$8.20 | \$16.48 | \$0.00 | \$49.38 |
| 7 | 80 | \$26.34 | \$8.20 | \$16.82 | \$0.00 | \$51.36 |
| 8 | 90 | \$29.64 | \$8.20 | \$17.51 | \$0.00 | \$55.35 |

Effective Date - 07/01/2020

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 50 | \$17.02 | \$8.20 | \$0.00 | \$0.00 | \$25.22 |
| 2 | 55 | \$18.72 | \$8.20 | \$3.80 | \$0.00 | \$30.72 |
| 3 | 60 | \$20.42 | \$8.20 | \$4.14 | \$0.00 | \$32.76 |
| 4 | 65 | \$22.12 | \$8.20 | \$4.49 | \$0.00 | \$34.81 |
| 5 | 70 | \$23.82 | \$8.20 | \$16.13 | \$0.00 | \$48.15 |
| 6 | 75 | \$25.52 | \$8.20 | \$16.48 | \$0.00 | \$50.20 |
| 7 | 80 | \$27.22 | \$8.20 | \$16.82 | \$0.00 | \$52.24 |
| 8 | 90 | \$30.63 | \$8.20 | \$17.51 | \$0.00 | \$56.34 |

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

| | | | | | | |
|---|------------|---------|--------|---------|--------|---------|
| PAINTER / TAPER (BRUSH, REPAINT) <i>PAINTERS LOCAL 35 - ZONE 3</i> | 01/01/2020 | \$30.25 | \$8.20 | \$18.20 | \$0.00 | \$56.65 |
| | 07/01/2020 | \$31.35 | \$8.20 | \$18.20 | \$0.00 | \$57.75 |
| | 01/01/2021 | \$32.45 | \$8.20 | \$18.20 | \$0.00 | \$58.85 |

For apprentice rates see "Apprentice - PAINTER - BRUSH NEW"

| | | | | | | |
|--|------------|---------|---------|---------|--------|---------|
| PANEL & PICKUP TRUCKS DRIVER <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i> | 12/01/2019 | \$34.08 | \$12.41 | \$13.72 | \$0.00 | \$60.21 |
| | 06/01/2020 | \$34.98 | \$12.41 | \$13.72 | \$0.00 | \$61.11 |
| | 08/01/2020 | \$34.98 | \$12.91 | \$13.72 | \$0.00 | \$61.61 |
| | 12/01/2020 | \$34.98 | \$12.91 | \$14.82 | \$0.00 | \$62.71 |
| | 06/01/2021 | \$35.78 | \$12.91 | \$14.82 | \$0.00 | \$63.51 |
| | 08/01/2021 | \$35.78 | \$13.41 | \$14.82 | \$0.00 | \$64.01 |
| | 12/01/2021 | \$35.78 | \$13.41 | \$16.01 | \$0.00 | \$65.20 |

| | | | | | | |
|---|------------|---------|--------|---------|--------|---------|
| PIER AND DOCK CONSTRUCTOR (UNDERPINNING AND DECK) <i>PILE DRIVER LOCAL 56 (ZONE 3)</i> | 08/01/2019 | \$43.79 | \$9.90 | \$21.15 | \$0.00 | \$74.84 |
|---|------------|---------|--------|---------|--------|---------|

For apprentice rates see "Apprentice- PILE DRIVER"

| | | | | | | |
|---|------------|---------|--------|---------|--------|---------|
| PILE DRIVER <i>PILE DRIVER LOCAL 56 (ZONE 3)</i> | 08/01/2019 | \$43.79 | \$9.90 | \$21.15 | \$0.00 | \$74.84 |
|---|------------|---------|--------|---------|--------|---------|

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - PILE DRIVER - Local 56 Zone 3

Effective Date - 08/01/2019

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | \$0.00 |

Notes: Apprentice wages shall be no less than the following Steps;
 (Same as set in Zone 1)
 1\$54.34/2\$58.99/3\$63.65/4\$65.98/5\$68.31/6\$68.31/7\$72.96/8\$72.96

Apprentice to Journeyworker Ratio:1:5

| | | | | | | |
|--------------------------------|------------|---------|--------|---------|--------|---------|
| PIPELAYER LABORERS - ZONE 2 | 12/01/2019 | \$34.31 | \$8.10 | \$15.38 | \$0.00 | \$57.79 |
| | 06/01/2020 | \$34.31 | \$8.60 | \$15.77 | \$0.00 | \$58.68 |
| | 12/01/2020 | \$35.20 | \$8.60 | \$15.77 | \$0.00 | \$59.57 |
| | 06/01/2021 | \$36.12 | \$8.60 | \$15.77 | \$0.00 | \$60.49 |
| | 12/01/2021 | \$37.03 | \$8.60 | \$15.77 | \$0.00 | \$61.40 |

For apprentice rates see "Apprentice- LABORER"

| | | | | | | |
|--|------------|---------|--------|---------|--------|---------|
| PLUMBER & PIPEFITTER PLUMBERS LOCAL 4 | 03/01/2020 | \$46.16 | \$9.80 | \$15.46 | \$0.00 | \$71.42 |
| | 09/01/2020 | \$47.16 | \$9.80 | \$15.46 | \$0.00 | \$72.42 |
| | 03/01/2021 | \$48.16 | \$9.80 | \$15.46 | \$0.00 | \$73.42 |
| | 09/01/2021 | \$49.16 | \$9.80 | \$15.46 | \$0.00 | \$74.42 |
| | 03/01/2022 | \$50.16 | \$9.80 | \$15.46 | \$0.00 | \$75.42 |

Apprentice - PLUMBER/PIPEFITTER - Local 4

Effective Date - 03/01/2020

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 40 | \$18.46 | \$9.80 | \$0.00 | \$0.00 | \$28.26 |
| 2 | 50 | \$23.08 | \$9.80 | \$0.00 | \$0.00 | \$32.88 |
| 3 | 60 | \$27.70 | \$9.80 | \$0.00 | \$0.00 | \$37.50 |
| 4 | 70 | \$32.31 | \$9.80 | \$5.75 | \$0.00 | \$47.86 |
| 5 | 80 | \$36.93 | \$9.80 | \$5.75 | \$0.00 | \$52.48 |

Effective Date - 09/01/2020

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 40 | \$18.86 | \$9.80 | \$0.00 | \$0.00 | \$28.66 |
| 2 | 50 | \$23.58 | \$9.80 | \$0.00 | \$0.00 | \$33.38 |
| 3 | 60 | \$28.30 | \$9.80 | \$0.00 | \$0.00 | \$38.10 |
| 4 | 70 | \$33.01 | \$9.80 | \$5.75 | \$0.00 | \$48.56 |
| 5 | 80 | \$37.73 | \$9.80 | \$5.75 | \$0.00 | \$53.28 |

Notes:
 Steps - 2000 hrs; Step 4 w/lic 75%, Step 5 w/lic 85%
 Step 4 w/lic \$50.17, Step 5 w/lic \$54.79

Apprentice to Journeyworker Ratio:1:3

| Classification | Effective Date | Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|---|-----------------------|------------------|---------------|----------------|--------------------------------------|-------------------|
| PNEUMATIC CONTROLS (TEMP.) <i>PLUMBERS LOCAL 4</i> | 03/01/2020 | \$46.16 | \$9.80 | \$15.46 | \$0.00 | \$71.42 |
| | 09/01/2020 | \$47.16 | \$9.80 | \$15.46 | \$0.00 | \$72.42 |
| | 03/01/2021 | \$48.16 | \$9.80 | \$15.46 | \$0.00 | \$73.42 |
| | 09/01/2021 | \$49.16 | \$9.80 | \$15.46 | \$0.00 | \$74.42 |
| | 03/01/2022 | \$50.16 | \$9.80 | \$15.46 | \$0.00 | \$75.42 |
| For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER" | | | | | | |
| PNEUMATIC DRILL/TOOL OPERATOR <i>LABORERS - ZONE 2</i> | 12/01/2019 | \$34.31 | \$8.10 | \$15.38 | \$0.00 | \$57.79 |
| | 06/01/2020 | \$34.31 | \$8.60 | \$15.77 | \$0.00 | \$58.68 |
| | 12/01/2020 | \$35.20 | \$8.60 | \$15.77 | \$0.00 | \$59.57 |
| | 06/01/2021 | \$36.12 | \$8.60 | \$15.77 | \$0.00 | \$60.49 |
| | 12/01/2021 | \$37.03 | \$8.60 | \$15.77 | \$0.00 | \$61.40 |
| For apprentice rates see "Apprentice- LABORER" | | | | | | |
| POWDERMAN & BLASTER <i>LABORERS - ZONE 2</i> | 12/01/2019 | \$35.06 | \$8.10 | \$15.38 | \$0.00 | \$58.54 |
| | 06/01/2020 | \$35.06 | \$8.60 | \$15.77 | \$0.00 | \$59.43 |
| | 12/01/2020 | \$35.95 | \$8.60 | \$15.77 | \$0.00 | \$60.32 |
| | 06/01/2021 | \$36.87 | \$8.60 | \$15.77 | \$0.00 | \$61.24 |
| | 12/01/2021 | \$37.78 | \$8.60 | \$15.77 | \$0.00 | \$62.15 |
| For apprentice rates see "Apprentice- LABORER" | | | | | | |
| PUMP OPERATOR (CONCRETE) <i>OPERATING ENGINEERS LOCAL 98</i> | 12/01/2019 | \$35.40 | \$11.94 | \$14.35 | \$0.00 | \$61.69 |
| For apprentice rates see "Apprentice- OPERATING ENGINEERS" | | | | | | |
| PUMP OPERATOR (DEWATERING, OTHER) <i>OPERATING ENGINEERS LOCAL 98</i> | 12/01/2019 | \$34.87 | \$11.94 | \$14.35 | \$0.00 | \$61.16 |
| For apprentice rates see "Apprentice- OPERATING ENGINEERS" | | | | | | |
| READY-MIX CONCRETE DRIVER <i>TEAMSTERS 170 -J.G.MacLellan (Lunenburg)</i> | 01/01/2020 | \$24.64 | \$9.65 | \$8.00 | \$0.00 | \$42.29 |
| | 01/01/2021 | \$24.64 | \$10.01 | \$8.00 | \$0.00 | \$42.65 |
| | 02/02/2021 | \$24.84 | \$10.01 | \$8.00 | \$0.00 | \$42.85 |
| | 01/01/2022 | \$24.84 | \$10.37 | \$8.00 | \$0.00 | \$43.21 |
| | 02/02/2022 | \$25.04 | \$10.37 | \$8.00 | \$0.00 | \$43.41 |
| | 01/01/2023 | \$25.04 | \$10.77 | \$8.00 | \$0.00 | \$43.81 |
| | 02/02/2023 | \$25.29 | \$10.77 | \$8.00 | \$0.00 | \$44.06 |
| | 01/01/2024 | \$25.29 | \$11.17 | \$0.00 | \$0.00 | \$36.46 |
| RIDE-ON MOTORIZED BUGGY OPERATOR <i>LABORERS - ZONE 2</i> | 12/01/2019 | \$34.31 | \$8.10 | \$15.38 | \$0.00 | \$57.79 |
| | 06/01/2020 | \$34.31 | \$8.60 | \$15.77 | \$0.00 | \$58.68 |
| | 12/01/2020 | \$35.20 | \$8.60 | \$15.77 | \$0.00 | \$59.57 |
| | 06/01/2021 | \$36.12 | \$8.60 | \$15.77 | \$0.00 | \$60.49 |
| | 12/01/2021 | \$37.03 | \$8.60 | \$15.77 | \$0.00 | \$61.40 |
| For apprentice rates see "Apprentice- LABORER" | | | | | | |
| ROLLER OPERATOR <i>OPERATING ENGINEERS LOCAL 98</i> | 12/01/2019 | \$34.26 | \$11.94 | \$14.35 | \$0.00 | \$60.55 |
| For apprentice rates see "Apprentice- OPERATING ENGINEERS" | | | | | | |
| ROOFER (Coal tar pitch) <i>ROOFERS LOCAL 248</i> | 07/16/2019 | \$32.66 | \$10.05 | \$16.20 | \$0.00 | \$58.91 |
| For apprentice rates see "Apprentice- ROOFER" | | | | | | |
| ROOFER (Inc.Roofers Waterproofing &Roofers Damproofg) <i>ROOFERS LOCAL 248</i> | 07/16/2019 | \$32.16 | \$10.05 | \$15.70 | \$0.00 | \$57.91 |

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - ROOFER - Local 248

Effective Date - 07/16/2019

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 60 | \$19.30 | \$10.05 | \$0.00 | \$0.00 | \$29.35 |
| 2 | 65 | \$20.90 | \$10.05 | \$15.70 | \$0.00 | \$46.65 |
| 3 | 70 | \$22.51 | \$10.05 | \$15.70 | \$0.00 | \$48.26 |
| 4 | 75 | \$24.12 | \$10.05 | \$15.70 | \$0.00 | \$49.87 |
| 5 | 80 | \$25.73 | \$10.05 | \$15.70 | \$0.00 | \$51.48 |
| 6 | 85 | \$27.34 | \$10.05 | \$15.70 | \$0.00 | \$53.09 |
| 7 | 90 | \$28.94 | \$10.05 | \$15.70 | \$0.00 | \$54.69 |
| 8 | 95 | \$30.55 | \$10.05 | \$15.70 | \$0.00 | \$56.30 |

Notes:
Steps are 750 hrs.Roofer(Tear Off)1:1; Same as above

Apprentice to Journeyworker Ratio:1:3

| | | | | | | |
|---|------------|---------|---------|---------|--------|---------|
| ROOFER SLATE / TILE / PRECAST CONCRETE ROOFERS LOCAL 248 For apprentice rates see "Apprentice- ROOFER" | 07/16/2019 | \$32.66 | \$10.05 | \$16.20 | \$0.00 | \$58.91 |
| SCRAPER OPERATING ENGINEERS LOCAL 98 For apprentice rates see "Apprentice- OPERATING ENGINEERS" | 12/01/2019 | \$34.87 | \$11.94 | \$14.35 | \$0.00 | \$61.16 |
| SELF-POWERED ROLLERS AND COMPACTORS (TAMPERS) OPERATING ENGINEERS LOCAL 98 For apprentice rates see "Apprentice- OPERATING ENGINEERS" | 12/01/2019 | \$34.26 | \$11.94 | \$14.35 | \$0.00 | \$60.55 |
| SELF-PROPELLED POWER BROOM OPERATING ENGINEERS LOCAL 98 For apprentice rates see "Apprentice- OPERATING ENGINEERS" | 12/01/2019 | \$31.64 | \$11.94 | \$14.35 | \$0.00 | \$57.93 |
| SHEETMETAL WORKER SHEETMETAL WORKERS LOCAL 63 | 01/01/2020 | \$36.99 | \$10.64 | \$16.22 | \$1.77 | \$65.62 |

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - SHEET METAL WORKER - Local 63

Effective Date - 01/01/2020

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 45 | \$16.65 | \$6.21 | \$4.67 | \$0.00 | \$27.53 |
| 2 | 50 | \$18.50 | \$6.55 | \$5.19 | \$0.00 | \$30.24 |
| 3 | 55 | \$20.34 | \$6.88 | \$9.33 | \$1.08 | \$37.63 |
| 4 | 60 | \$22.19 | \$7.22 | \$9.33 | \$1.14 | \$39.88 |
| 5 | 65 | \$24.04 | \$7.55 | \$9.33 | \$1.20 | \$42.12 |
| 6 | 70 | \$25.89 | \$7.88 | \$9.33 | \$1.27 | \$44.37 |
| 7 | 75 | \$27.74 | \$8.22 | \$9.33 | \$1.33 | \$46.62 |
| 8 | 80 | \$29.59 | \$9.30 | \$15.18 | \$1.59 | \$55.66 |
| 9 | 85 | \$31.44 | \$9.64 | \$15.18 | \$1.66 | \$57.92 |
| 10 | 90 | \$33.29 | \$9.98 | \$15.18 | \$1.72 | \$60.17 |

Notes:

Apprentice to Journeyworker Ratio:1:3

| | | | | | | |
|--|------------|---------|---------|---------|--------|---------|
| SPECIALIZED EARTH MOVING EQUIP < 35 TONS <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i> | 12/01/2019 | \$34.54 | \$12.41 | \$13.72 | \$0.00 | \$60.67 |
| | 06/01/2020 | \$35.44 | \$12.41 | \$13.72 | \$0.00 | \$61.57 |
| | 08/01/2020 | \$35.44 | \$12.91 | \$13.72 | \$0.00 | \$62.07 |
| | 12/01/2020 | \$35.44 | \$12.91 | \$14.82 | \$0.00 | \$63.17 |
| | 06/01/2021 | \$36.24 | \$12.91 | \$14.82 | \$0.00 | \$63.97 |
| | 08/01/2021 | \$36.24 | \$13.41 | \$14.82 | \$0.00 | \$64.47 |
| | 12/01/2021 | \$36.24 | \$13.41 | \$16.01 | \$0.00 | \$65.66 |
| SPECIALIZED EARTH MOVING EQUIP > 35 TONS <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i> | 12/01/2019 | \$34.83 | \$12.41 | \$13.72 | \$0.00 | \$60.96 |
| | 06/01/2020 | \$35.73 | \$12.41 | \$13.72 | \$0.00 | \$61.86 |
| | 08/01/2020 | \$35.73 | \$12.91 | \$13.72 | \$0.00 | \$62.36 |
| | 12/01/2020 | \$35.73 | \$12.91 | \$14.82 | \$0.00 | \$63.46 |
| | 06/01/2021 | \$36.53 | \$12.91 | \$14.82 | \$0.00 | \$64.26 |
| | 08/01/2021 | \$36.53 | \$13.41 | \$14.82 | \$0.00 | \$64.76 |
| | 12/01/2021 | \$36.53 | \$13.41 | \$16.01 | \$0.00 | \$65.95 |
| SPRINKLER FITTER <i>SPRINKLER FITTERS LOCAL 669</i> | 01/01/2019 | \$41.51 | \$10.02 | \$13.08 | \$0.00 | \$64.61 |

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - SPRINKLER FITTER - Local 669

Effective Date - 01/01/2019

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 45 | \$18.68 | \$7.75 | \$0.00 | \$0.00 | \$26.43 |
| 2 | 50 | \$20.76 | \$7.75 | \$0.00 | \$0.00 | \$28.51 |
| 3 | 55 | \$22.83 | \$10.02 | \$7.25 | \$0.00 | \$40.10 |
| 4 | 60 | \$24.91 | \$10.02 | \$7.25 | \$0.00 | \$42.18 |
| 5 | 65 | \$26.98 | \$10.02 | \$7.50 | \$0.00 | \$44.50 |
| 6 | 70 | \$29.06 | \$10.02 | \$7.50 | \$0.00 | \$46.58 |
| 7 | 75 | \$31.13 | \$10.02 | \$7.50 | \$0.00 | \$48.65 |
| 8 | 80 | \$33.21 | \$10.02 | \$7.50 | \$0.00 | \$50.73 |
| 9 | 85 | \$35.28 | \$10.02 | \$7.50 | \$0.00 | \$52.80 |
| 10 | 90 | \$37.36 | \$10.02 | \$7.50 | \$0.00 | \$54.88 |

Notes:

Apprentice to Journeyworker Ratio:1:1

| | | | | | | |
|--|------------|---------|---------|---------|--------|---------|
| TELECOMMUNICATION TECHNICIAN ELECTRICIANS LOCAL 7 | 12/29/2019 | \$43.41 | \$11.00 | \$12.60 | \$0.00 | \$67.01 |
|--|------------|---------|---------|---------|--------|---------|

Apprentice - TELECOMMUNICATION TECHNICIAN - Local 7

Effective Date - 12/29/2019

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 40 | \$17.36 | \$6.00 | \$0.52 | \$0.00 | \$23.88 |
| 2 | 45 | \$19.53 | \$6.00 | \$0.59 | \$0.00 | \$26.12 |
| 3 | 50 | \$21.71 | \$11.00 | \$6.95 | \$0.00 | \$39.66 |
| 4 | 55 | \$23.88 | \$11.00 | \$7.02 | \$0.00 | \$41.90 |
| 5 | 65 | \$28.22 | \$11.00 | \$8.15 | \$0.00 | \$47.37 |
| 6 | 70 | \$30.39 | \$11.00 | \$9.24 | \$0.00 | \$50.63 |

Notes:
Steps are 800 hours

Apprentice to Journeyworker Ratio:1:1

| | | | | | | |
|--|------------|---------|---------|---------|--------|---------|
| TERRAZZO FINISHERS BRICKLAYERS LOCAL 3 (SPR/PITT) - MARBLE & TILE | 02/01/2020 | \$53.34 | \$10.75 | \$21.94 | \$0.00 | \$86.03 |
| | 08/01/2020 | \$54.69 | \$10.75 | \$22.09 | \$0.00 | \$87.53 |
| | 02/01/2021 | \$55.33 | \$10.75 | \$22.09 | \$0.00 | \$88.17 |
| | 08/01/2021 | \$56.73 | \$10.75 | \$22.25 | \$0.00 | \$89.73 |
| | 02/01/2022 | \$57.32 | \$10.75 | \$22.25 | \$0.00 | \$90.32 |

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - TERRAZZO FINISHER-Local 3 Marble/Tile (Spr/Ptt)

Effective Date - 02/01/2020

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 50 | \$26.67 | \$10.75 | \$21.94 | \$0.00 | \$59.36 |
| 2 | 60 | \$32.00 | \$10.75 | \$21.94 | \$0.00 | \$64.69 |
| 3 | 70 | \$37.34 | \$10.75 | \$21.94 | \$0.00 | \$70.03 |
| 4 | 80 | \$42.67 | \$10.75 | \$21.94 | \$0.00 | \$75.36 |
| 5 | 90 | \$48.01 | \$10.75 | \$21.94 | \$0.00 | \$80.70 |

Effective Date - 08/01/2020

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 50 | \$27.35 | \$10.75 | \$22.09 | \$0.00 | \$60.19 |
| 2 | 60 | \$32.81 | \$10.75 | \$22.09 | \$0.00 | \$65.65 |
| 3 | 70 | \$38.28 | \$10.75 | \$22.09 | \$0.00 | \$71.12 |
| 4 | 80 | \$43.75 | \$10.75 | \$22.09 | \$0.00 | \$76.59 |
| 5 | 90 | \$49.22 | \$10.75 | \$22.09 | \$0.00 | \$82.06 |

Notes:

Apprentice to Journeyworker Ratio:1:5

| | | | | | | |
|--|------------|---------|---------|---------|--------|---------|
| TERRAZZO MECHANIC | 02/01/2020 | \$54.42 | \$10.75 | \$21.93 | \$0.00 | \$87.10 |
| BRICKLAYERS LOCAL 3 (SPR/PITT) - MARBLE & TILE | 08/01/2020 | \$55.77 | \$10.75 | \$22.08 | \$0.00 | \$88.60 |
| | 02/01/2021 | \$56.41 | \$10.75 | \$22.08 | \$0.00 | \$89.24 |
| | 08/01/2021 | \$57.81 | \$10.75 | \$22.24 | \$0.00 | \$90.80 |
| | 02/01/2022 | \$58.38 | \$10.75 | \$22.24 | \$0.00 | \$91.37 |

Classification

Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

Apprentice - TERRAZZO MECH - Local 3 Marble/Tile (Spr/Pitt)

Effective Date - 02/01/2020

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 50 | \$27.21 | \$10.75 | \$21.93 | \$0.00 | \$59.89 |
| 2 | 60 | \$32.65 | \$10.75 | \$21.93 | \$0.00 | \$65.33 |
| 3 | 70 | \$38.09 | \$10.75 | \$21.93 | \$0.00 | \$70.77 |
| 4 | 80 | \$43.54 | \$10.75 | \$21.93 | \$0.00 | \$76.22 |
| 5 | 90 | \$48.98 | \$10.75 | \$21.93 | \$0.00 | \$81.66 |

Effective Date - 08/01/2020

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|---------|---------|---------------------------|------------|
| 1 | 50 | \$27.89 | \$10.75 | \$22.08 | \$0.00 | \$60.72 |
| 2 | 60 | \$33.46 | \$10.75 | \$22.08 | \$0.00 | \$66.29 |
| 3 | 70 | \$39.04 | \$10.75 | \$22.08 | \$0.00 | \$71.87 |
| 4 | 80 | \$44.62 | \$10.75 | \$22.08 | \$0.00 | \$77.45 |
| 5 | 90 | \$50.19 | \$10.75 | \$22.08 | \$0.00 | \$83.02 |

Notes:

Apprentice to Journeyworker Ratio:1:5

| | | | | | | |
|---|------------|---------|--------|---------|--------|---------|
| TEST BORING DRILLER <i>LABORERS - FOUNDATION AND MARINE</i> | 12/01/2019 | \$40.50 | \$8.10 | \$16.80 | \$0.00 | \$65.40 |
| | 06/01/2020 | \$40.55 | \$8.60 | \$17.24 | \$0.00 | \$66.39 |
| | 12/01/2020 | \$41.53 | \$8.60 | \$17.24 | \$0.00 | \$67.37 |
| | 06/01/2021 | \$42.55 | \$8.60 | \$17.24 | \$0.00 | \$68.39 |
| | 12/01/2021 | \$43.56 | \$8.60 | \$17.24 | \$0.00 | \$69.40 |

For apprentice rates see "Apprentice- LABORER"

| | | | | | | |
|--|------------|---------|--------|---------|--------|---------|
| TEST BORING DRILLER HELPER <i>LABORERS - FOUNDATION AND MARINE</i> | 12/01/2019 | \$39.22 | \$8.10 | \$16.80 | \$0.00 | \$64.12 |
| | 06/01/2020 | \$39.27 | \$8.60 | \$17.24 | \$0.00 | \$65.11 |
| | 12/01/2020 | \$40.25 | \$8.60 | \$17.24 | \$0.00 | \$66.09 |
| | 06/01/2021 | \$41.27 | \$8.60 | \$17.24 | \$0.00 | \$67.11 |
| | 12/01/2021 | \$42.28 | \$8.60 | \$17.24 | \$0.00 | \$68.12 |

For apprentice rates see "Apprentice- LABORER"

| | | | | | | |
|---|------------|---------|--------|---------|--------|---------|
| TEST BORING LABORER <i>LABORERS - FOUNDATION AND MARINE</i> | 12/01/2019 | \$39.10 | \$8.10 | \$16.80 | \$0.00 | \$64.00 |
| | 06/01/2020 | \$39.15 | \$8.60 | \$17.24 | \$0.00 | \$64.99 |
| | 12/01/2020 | \$40.13 | \$8.60 | \$17.24 | \$0.00 | \$65.97 |
| | 06/01/2021 | \$41.15 | \$8.60 | \$17.24 | \$0.00 | \$66.99 |
| | 12/01/2021 | \$42.16 | \$8.60 | \$17.24 | \$0.00 | \$68.00 |

For apprentice rates see "Apprentice- LABORER"

| | | | | | | |
|--|------------|---------|---------|---------|--------|---------|
| TRACTORS <i>OPERATING ENGINEERS LOCAL 98</i> | 12/01/2019 | \$34.26 | \$11.94 | \$14.35 | \$0.00 | \$60.55 |
|--|------------|---------|---------|---------|--------|---------|

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

| Classification | Effective Date | Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|---|----------------|-----------|---------|---------|---------------------------|------------|
| TRAILERS FOR EARTH MOVING EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i> | 12/01/2019 | \$35.12 | \$12.41 | \$13.72 | \$0.00 | \$61.25 |
| | 06/01/2020 | \$36.02 | \$12.41 | \$13.72 | \$0.00 | \$62.15 |
| | 08/01/2020 | \$36.02 | \$12.91 | \$13.72 | \$0.00 | \$62.65 |
| | 12/01/2020 | \$36.02 | \$12.91 | \$14.82 | \$0.00 | \$63.75 |
| | 06/01/2021 | \$36.82 | \$12.91 | \$14.82 | \$0.00 | \$64.55 |
| | 08/01/2021 | \$36.82 | \$13.41 | \$14.82 | \$0.00 | \$65.05 |
| | 12/01/2021 | \$36.82 | \$13.41 | \$16.01 | \$0.00 | \$66.24 |
| TUNNEL WORK - COMPRESSED AIR <i>LABORERS (COMPRESSED AIR)</i> | 12/01/2019 | \$51.38 | \$8.10 | \$17.20 | \$0.00 | \$76.68 |
| | 06/01/2020 | \$51.38 | \$8.60 | \$17.69 | \$0.00 | \$77.67 |
| | 12/01/2020 | \$52.36 | \$8.60 | \$17.69 | \$0.00 | \$78.65 |
| | 06/01/2021 | \$53.38 | \$8.60 | \$17.69 | \$0.00 | \$79.67 |
| | 12/01/2021 | \$54.39 | \$8.60 | \$17.69 | \$0.00 | \$80.68 |
| For apprentice rates see "Apprentice- LABORER" | | | | | | |
| TUNNEL WORK - COMPRESSED AIR (HAZ. WASTE) <i>LABORERS (COMPRESSED AIR)</i> | 12/01/2019 | \$53.38 | \$8.10 | \$17.20 | \$0.00 | \$78.68 |
| | 06/01/2020 | \$53.38 | \$8.60 | \$17.69 | \$0.00 | \$79.67 |
| | 12/01/2020 | \$54.36 | \$8.60 | \$17.69 | \$0.00 | \$80.65 |
| | 06/01/2021 | \$55.38 | \$8.60 | \$17.69 | \$0.00 | \$81.67 |
| | 12/01/2021 | \$56.39 | \$8.60 | \$17.69 | \$0.00 | \$82.68 |
| For apprentice rates see "Apprentice- LABORER" | | | | | | |
| TUNNEL WORK - FREE AIR <i>LABORERS (FREE AIR TUNNEL)</i> | 12/01/2019 | \$43.45 | \$8.10 | \$17.20 | \$0.00 | \$68.75 |
| | 06/01/2020 | \$43.45 | \$8.60 | \$17.69 | \$0.00 | \$69.74 |
| | 12/01/2020 | \$44.43 | \$8.60 | \$17.69 | \$0.00 | \$70.72 |
| | 06/01/2021 | \$45.45 | \$8.60 | \$17.69 | \$0.00 | \$71.74 |
| | 12/01/2021 | \$46.46 | \$8.60 | \$17.69 | \$0.00 | \$72.75 |
| For apprentice rates see "Apprentice- LABORER" | | | | | | |
| TUNNEL WORK - FREE AIR (HAZ. WASTE) <i>LABORERS (FREE AIR TUNNEL)</i> | 12/01/2019 | \$45.45 | \$8.10 | \$17.20 | \$0.00 | \$70.75 |
| | 06/01/2020 | \$45.45 | \$8.60 | \$17.69 | \$0.00 | \$71.74 |
| | 12/01/2020 | \$46.43 | \$8.60 | \$17.69 | \$0.00 | \$72.72 |
| | 06/01/2021 | \$47.45 | \$8.60 | \$17.69 | \$0.00 | \$73.74 |
| | 12/01/2021 | \$48.46 | \$8.60 | \$17.69 | \$0.00 | \$74.75 |
| For apprentice rates see "Apprentice- LABORER" | | | | | | |
| VAC-HAUL <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i> | 12/01/2019 | \$34.54 | \$12.41 | \$13.72 | \$0.00 | \$60.67 |
| | 06/01/2020 | \$35.44 | \$12.41 | \$13.72 | \$0.00 | \$61.57 |
| | 08/01/2020 | \$35.44 | \$12.91 | \$13.72 | \$0.00 | \$62.07 |
| | 12/01/2020 | \$35.44 | \$12.91 | \$14.82 | \$0.00 | \$63.17 |
| | 06/01/2021 | \$36.24 | \$12.91 | \$14.82 | \$0.00 | \$63.97 |
| | 08/01/2021 | \$36.24 | \$13.41 | \$14.82 | \$0.00 | \$64.47 |
| | 12/01/2021 | \$36.24 | \$13.41 | \$16.01 | \$0.00 | \$65.66 |
| WAGON DRILL OPERATOR <i>LABORERS - ZONE 2</i> | 12/01/2019 | \$34.31 | \$8.10 | \$15.38 | \$0.00 | \$57.79 |
| | 06/01/2020 | \$34.31 | \$8.60 | \$15.77 | \$0.00 | \$58.68 |
| | 12/01/2020 | \$35.20 | \$8.60 | \$15.77 | \$0.00 | \$59.57 |
| | 06/01/2021 | \$36.12 | \$8.60 | \$15.77 | \$0.00 | \$60.49 |
| | 12/01/2021 | \$37.03 | \$8.60 | \$15.77 | \$0.00 | \$61.40 |
| For apprentice rates see "Apprentice- LABORER" | | | | | | |

| Classification | Effective Date | Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|--|----------------|-----------|--------|---------|---------------------------|------------|
| WATER METER INSTALLER <i>PLUMBERS LOCAL 4</i> | 03/01/2020 | \$46.16 | \$9.80 | \$15.46 | \$0.00 | \$71.42 |
| | 09/01/2020 | \$47.16 | \$9.80 | \$15.46 | \$0.00 | \$72.42 |
| | 03/01/2021 | \$48.16 | \$9.80 | \$15.46 | \$0.00 | \$73.42 |
| | 09/01/2021 | \$49.16 | \$9.80 | \$15.46 | \$0.00 | \$74.42 |
| | 03/01/2022 | \$50.16 | \$9.80 | \$15.46 | \$0.00 | \$75.42 |
| For apprentice rates see "Apprentice- PLUMBER/PIPEFITTER" or "PLUMBER/GASFITTER" | | | | | | |
| Outside Electrical - West | | | | | | |
| EQUIPMENT OPERATOR <i>OUTSIDE ELECTRICAL WORKERS - WEST LOCAL 42</i> | 09/01/2019 | \$44.67 | \$8.00 | \$12.55 | \$0.00 | \$65.22 |
| For apprentice rates see "Apprentice- LINEMAN" | | | | | | |
| GROUNDMAN <i>OUTSIDE ELECTRICAL WORKERS - WEST LOCAL 42</i> | 09/01/2019 | \$30.58 | \$8.00 | \$5.48 | \$0.00 | \$44.06 |
| For apprentice rates see "Apprentice- LINEMAN" | | | | | | |
| GROUNDMAN / TRUCK DRIVER <i>OUTSIDE ELECTRICAL WORKERS - WEST LOCAL 42</i> | 09/01/2019 | \$39.97 | \$8.00 | \$10.96 | \$0.00 | \$58.93 |
| For apprentice rates see "Apprentice- LINEMAN" | | | | | | |
| HEAVY EQUIPMENT OPERATOR <i>OUTSIDE ELECTRICAL WORKERS - WEST LOCAL 42</i> | 09/01/2019 | \$47.01 | \$8.00 | \$13.22 | \$0.00 | \$68.23 |
| For apprentice rates see "Apprentice- LINEMAN" | | | | | | |
| JOURNEYMAN LINEMAN <i>OUTSIDE ELECTRICAL WORKERS - WEST LOCAL 42</i> | 09/01/2019 | \$51.71 | \$8.00 | \$15.55 | \$0.00 | \$75.26 |

Apprentice - LINEMAN (Outside Electrical) - West Local 42

Effective Date - 09/01/2019

| Step | percent | Apprentice Base Wage | Health | Pension | Supplemental Unemployment | Total Rate |
|------|---------|----------------------|--------|---------|---------------------------|------------|
| 1 | 60 | \$31.03 | \$8.00 | \$3.43 | \$0.00 | \$42.46 |
| 2 | 65 | \$33.61 | \$8.00 | \$3.51 | \$0.00 | \$45.12 |
| 3 | 70 | \$36.20 | \$8.00 | \$3.59 | \$0.00 | \$47.79 |
| 4 | 75 | \$38.78 | \$8.00 | \$5.16 | \$0.00 | \$51.94 |
| 5 | 80 | \$41.37 | \$8.00 | \$5.24 | \$0.00 | \$54.61 |
| 6 | 85 | \$43.95 | \$8.00 | \$5.32 | \$0.00 | \$57.27 |
| 7 | 90 | \$46.54 | \$8.00 | \$7.40 | \$0.00 | \$61.94 |

Notes:

Apprentice to Journeyworker Ratio:1:2

| | | | | | | |
|--|------------|---------|--------|---------|--------|---------|
| TELEDATA CABLE SPLICER <i>OUTSIDE ELECTRICAL WORKERS - WEST LOCAL 42</i> | 02/04/2019 | \$30.73 | \$4.70 | \$3.17 | \$0.00 | \$38.60 |
| TELEDATA LINEMAN/EQUIPMENT OPERATOR <i>OUTSIDE ELECTRICAL WORKERS - WEST LOCAL 42</i> | 02/04/2019 | \$28.93 | \$4.70 | \$3.14 | \$0.00 | \$36.77 |
| TELEDATA WIREMAN/INSTALLER/TECHNICIAN <i>OUTSIDE ELECTRICAL WORKERS - WEST LOCAL 42</i> | 02/04/2019 | \$28.93 | \$4.70 | \$3.14 | \$0.00 | \$36.77 |
| TRACTOR-TRAILER DRIVER <i>OUTSIDE ELECTRICAL WORKERS - WEST LOCAL 42</i> | 09/01/2019 | \$44.67 | \$8.00 | \$12.55 | \$0.00 | \$65.22 |

Additional Apprentices Information:

Minimum wage rates for apprentices employed on public works projects are listed above as a percentage of the pre-determined hourly wage rate established by the Commissioner under the provisions of the M.G.L. c. 149, ss. 26-27D. Apprentices ratios are established by the Division of Apprenticeship Training pursuant to M.G.L. c. 23, ss. 11E-11L.

All apprentices must be registered with the Division of Apprenticeship Training in accordance with M.G.L. c. 23, ss. 11E-11L.

All steps are six months (1000 hours.)

Ratios are expressed in allowable number of apprentices to journeymen or fraction thereof, unless otherwise specified.

** Multiple ratios are listed in the comment field.

*** APP to JM; 1:1, 2:2, 2:3, 3:4, 4:4, 4:5, 4:6, 5:7, 6:7, 6:8, 6:9, 7:10, 8:10, 8:11, 8:12, 9:13, 10:13, 10:14, etc.

**** APP to JM; 1:1, 1:2, 2:3, 2:4, 3:5, 4:6, 4:7, 5:8, 6:9, 6:10, 7:11, 8:12, 8:13, 9:14, 10:15, 10:16, etc.

Section XII
Federal Prevailing Wage Rates

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"General Decision Number: MA20200007 01/03/2020

Superseded General Decision Number: MA20190007

State: Massachusetts

Construction Type: Highway

County: Franklin County in Massachusetts.

HIGHWAY CONSTRUCTION PROJECTS

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.80 for calendar year 2020 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.80 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2020. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number Publication Date
0 01/03/2020

CARP0108-014 09/04/2017

| | Rates | Fringes |
|----------------|----------|---------|
| CARPENTER..... | \$ 35.56 | 23.76 |

ENGI0098-006 12/01/2016

Rates Fringes

Power equipment operators:

| | | |
|------------------------------|----------|---------|
| (1) | | |
| Backhoe/Excavator/Trackhoe.. | \$ 33.68 | 23.96+A |
| (1) Loader..... | \$ 33.68 | 23.96+A |
| (4) Roller..... | \$ 32.54 | 23.96+A |
| Crane..... | \$ 37.18 | 23.96+A |

A. Paid Holidays: New year's Day, Washington's Birthday, Memorial Day, Independence Day, Labor Day, Columbus Day, Veterans Day, Thanksgiving Day and Christmas Day

* IRON0007-025 03/16/2019

Rates Fringes

| | | |
|--|----------|-------|
| IRONWORKER (REINFORCING AND STRUCTURAL)..... | \$ 34.20 | 31.20 |
|--|----------|-------|

LABO0596-002 06/04/2018

Rates Fringes

LABORER

| | | |
|---|----------|-------|
| Asphalt, Includes Raker, Shoveler, Spreader, and Distributor..... | \$ 31.25 | 22.19 |
| Common or General..... | \$ 31.00 | 22.19 |
| Guardrail Installation..... | \$ 31.25 | 22.19 |
| Landscape..... | \$ 31.00 | 22.19 |

SUMA2014-003 01/11/2017

Rates Fringes

| | | |
|-----------------------------------|----------|------|
| PAINTER: Spray (Linestriping).... | \$ 38.85 | 0.00 |
|-----------------------------------|----------|------|

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other

health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates

the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

"

"General Decision Number: MA20200010 03/13/2020

Superseded General Decision Number: MA20190010

State: Massachusetts

Construction Types: Heavy (Heavy and Marine)

Counties: Berkshire, Franklin, Hampden and Hampshire Counties in Massachusetts.

HEAVY CONSTRUCTION PROJECTS; AND MARINE CONSTRUCTION PROJECTS

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.80 for calendar year 2020 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.80 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2020. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

| Modification Number | Publication Date |
|---------------------|------------------|
| 0 | 01/03/2020 |
| 1 | 03/13/2020 |

BOIL0029-001 01/01/2017

| | Rates | Fringes |
|------------------|----------|---------|
| BOILERMAKER..... | \$ 42.42 | 24.92 |

BRMA0001-005 02/01/2019

SPRINGFIELD CHAPTER

Rates Fringes

BRICKLAYER

BRICKLAYERS; CEMENT
MASONS; STONE MASONS;
MARBLE, TILE & TERRAZO.....\$ 41.96 29.80

BRMA0001-007 02/01/2019

SPRINGFIELD/PITTSFIELD CHAPTER
BERKSHIRE COUNTY

Rates Fringes

BRICKLAYER

BRICKLAYERS; CEMENT
MASONS; STONE MASONS;
MARBLE, TILE & TERRAZZO.....\$ 41.96 29.80

CARP0056-004 08/01/2018

Rates Fringes

DIVER TENDER.....\$ 46.07 32.25
DIVER.....\$ 64.50 32.25

CARP0056-009 08/01/2018

Rates Fringes

PILEDRIVERMAN.....\$ 46.07 32.25

CARP0108-008 09/04/2017

BERKSHIRE

Rates Fringes

CARPENTER.....\$ 35.56 23.76

CARP0108-010 09/04/2017

HAMPDEN; HAMPSHIRE; AND FRANKLIN (Remainder of County)

Rates Fringes

CARPENTER.....\$ 35.56 23.76

CARP0336-005 09/01/2019

FRANKLIN COUNTY (Erving, Orange, North Orange, and Warwick)

Rates Fringes

CARPENTER.....\$ 41.90 29.00

* CARP1121-004 01/06/2020

 Rates Fringes

MILLWRIGHT.....\$ 36.71 31.15

* ELEC0007-002 12/29/2019

HAMPDEN (Except Chester & Holyoke); HAMPSHIRE (Belchertown, Ware)

 Rates Fringes

ELECTRICIAN.....\$ 43.41 24.20

* ELEC0007-003 12/29/2019

BERKSHIRE; FRANKLIN; HAMPDEN (Chester, Holyoke); HAMPSHIRE (Except Belchertown, Ware)

 Rates Fringes

ELECTRICIAN.....\$ 43.41 24.20

ENGI0098-007 12/01/2016

 Rates Fringes

Power equipment operators:

| | | |
|---------------|-----------|---------|
| Group 1..... | \$ 33.68 | 23.96+A |
| Group 2..... | \$ 33.37 | 23.96+A |
| Group 3..... | \$ 33.15 | 23.96+A |
| Group 4..... | \$ 32.54 | 23.96+A |
| Group 5..... | \$ 29.92 | 23.96+A |
| Group 6..... | \$ 28.80 | 23.96+A |
| Group 7..... | \$ 26.86 | 23.96+A |
| Group 8..... | \$ 305.95 | 23.96+A |
| Group 9..... | \$ 230.69 | 23.96+A |
| Group 10..... | \$ 35.17 | 23.96+A |
| Group 11..... | \$ 38.18 | 23.96+A |
| Group 12..... | \$ 39.68 | 23.96+A |
| Group 13..... | \$ 40.68 | 23.96+A |
| Group 14..... | \$ 41.68 | 23.96+A |
| Group 15..... | \$ 43.18 | 23.96+A |

HAZARDOUS WASTE PREMIUM \$2.00

FOOTNOTE FOR POWER EQUIPMENT OPERATORS:
Group 8 and Group 9 are per day wages.

A. Paid Holidays: New year's Day, Washington's Birthday, Memorial Day, Independence Day, Labor Day, Columbus Day, Veterans Day, Thanksgiving Day and Christmas Day

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

Group 1: Shovels; crawlers and truck cranes including all tower; self-propelled hydraulic cranes 10 tons and over; draglines; clam shells; cableways; shaft hoists; mucking machines derricks; backhoes; bulldozers; gradalls; elevating graders; pile drivers; concrete pavers; trenching machines; front end loaders- 5 1/2 cu yds and over; dual drum paver; automatic grader-excavator(C.M.I. or equal); scrapers towing pan or wagon; tandem dozers or push cats(2 units in tandem); shotcrete machine; tunnel boring machine; combination backhoe/loader 3/4 cu yd hoe or over; jet engine dryer; tree shredder; post hole digger; post hole hammer; post extractor; truck mounted concrete pump with boom; roto-mill; Grader; Horizontal Drilling Machine; John Henry Rock Drill and similar equipment.

Group 2: Rotary drill with mounted compressor; compressor house (3 to 6 compressors); rock and earth boring machines (excluding McCarthy and similar drills); front end loaders 4 cu yds to 5 1/2 cu yds); forklifts-7 ft lift and over 3 ton capacity; scraper 21 yds and over (struck load); sonic hammer console; reclaimers road planer/milling machine; cal tracks; ballast regulators; rail anchor machines; switch tampers, asphalt pavers; mechanic; welder and transfer machine.

Group 3: Combination backhoe/loader up to 3/4 cu yd; scrapers up to 21 cu yd (struck load, self propelled or tractor drawn); tireman; front end loaders up to 4 yds; well drillers; engineer or fireman on high pressure boiler; self-loading batch plant; well point operators electric pumps used in well point system; pumps, 16 inches and over (total discharge); compressor, one or two 900 cu ft and over; powered grease truck; tunnel locomotives and dingys; grout pumps; hydraulic jacks; boom truck; hydraulic cranes-up to 10 ton.

Group 4: Asphalt rollers; self-powered rollers and compactors; tractor without blade drawing sheepsfoot roller; rubber tire roller; vibratory roller or other type of compactors including machines for pulverizing and aerating soil; york rake.

Group 5: Hoists; conveyors; power pavement breakers; self-powered concrete pavement finishing machines; two bag mixers with skip; McCarthy and similar drills; batch plants (not self loading); bulk cement plants; self-propelled material spreaders; three or more 10 KW light plants; 30 KW or more generators; power broom.

Group 6: Compressor (one or two) 315 cu ft to 900 cu ft; pumps 4 inches to 16 inches (total discharge).

Group 7: Compressors up to 315 cu ft; small mixers with skip; pumps up to 4 inches; power heaters; oiler; A-frame trucks; forklifts-up to 7 ft. lift and up to 3 ton

- capacity; hydro broom; stud welder.
- Group 8: Truck crane crews
- Group 9: Oiler
- Group 10: Master Mechanic
- Group 11: Boom lengths over 150 feet including jib
- Group 12: Boom lengths over 200 feet including jib
- Group 13: Boom lengths over 250 feet including jib
- Group 14: Boom lengths over 300 feet including jib
- Group 15: Boom lengths over 350 feet including jib

 IRON0007-014 03/16/2019

BERKSHIRE (Becket, East Otis, Hinsdale, Monterey, New Marlboro,
 North Otis, Otis, Peru, Sandisfield, Savoy, Sheffield,
 Washington, Windsor); FRANKLIN; HAMPDEN; HAMPSHIRE

| | Rates | Fringes |
|-----------------|----------|---------|
| IRONWORKER..... | \$ 34.20 | 31.20 |

 IRON0012-003 07/01/2018

BERKSHIRE (Lee)

| | Rates | Fringes |
|-----------------|----------|---------|
| IRONWORKER..... | \$ 31.00 | 24.43 |

 IRON0012-004 07/01/2018

BERKSHIRE (Remainder of County)

| | Rates | Fringes |
|--|----------|---------|
| Ironworkers: | | |
| Sheeter..... | \$ 31.25 | 24.43 |
| Structural, Ornamental, Reinforcing, Fence Erector, Machinery Mover, Rigger, Rodman, Stone Derrickman..... | \$ 31.00 | 24.43 |

 LABO0022-002 06/01/2018

FRANKLIN (Orange, Warwick)

| | Rates | Fringes |
|--------------|----------|---------|
| Laborers: | | |
| GROUP 1..... | \$ 33.25 | 22.92 |
| GROUP 2..... | \$ 33.50 | 22.92 |
| GROUP 3..... | \$ 34.00 | 22.92 |

| | | |
|--------------|----------|-------|
| GROUP 4..... | \$ 34.25 | 22.92 |
| GROUP 5..... | \$ 34.00 | 22.92 |
| GROUP 6..... | \$ 34.25 | 22.92 |

LABORERS CLASSIFICATIONS

GROUP 1: Laborers; carpenter tenders; cement finisher tenders, plasterer tenders

GROUP 2: Asphalt raker; fence and guard rail erector; laser beam operator; mason tender; pipelayer; pneumatic drill operator; pneumatic tool operator; wagon drill operator; jackhammer operator, pavement breaker, carbide core drilling machine, chain saw operator, barco type jumping tampers, concrete pump, motorized mortar miner, ride-on motorized buggy

GROUP 3: Air track operator; block paver; rammer; curb setter, hydraulic and similar self-powered drills

GROUP 4: Blaster; powderman

GROUP 5: Precast floor and roof, plank erector

GROUP 6: Asbestos Abatement, Toxic and Hazardous waste laborers

LABO0473-005 06/01/2018

FRANKLIN (Except Orange and Warrick); HAMPDEN and HAMPSHIRE COUNTIES (with the exception of Chesterfield, Cummington, Goshen, Middlefield, Plainfield, and Worthington)

Rates Fringes

Laborers:

| | | |
|--------------|----------|-------|
| Group 1..... | \$ 31.00 | 20.18 |
| Group 2..... | \$ 31.25 | 20.18 |
| Group 3..... | \$ 31.75 | 20.18 |
| Group 4..... | \$ 32.00 | 20.18 |
| Group 5..... | \$ 21.50 | 20.18 |
| Group 6..... | \$ 31.00 | 20.18 |

LABORERS CLASSIFICATIONS

Group 1: Carpenter tenders, cement finisher tenders, laborers, wrecking laborers

Group 2: Asphalt rakers, fence and guard rail erectors, laser beam operator, mason tender, pipelayer, pneumatic drill operator, pneumatic tool operator, wagon drill operator

Group 3: Air track operator, block pavers, rammers, curb setters

Group 4: Blasters, powdermen

Group 5: Flaggers

Group 6: Asbestos abatement, toxic and Hazardous waste laborers

LABO0473-006 06/01/2018

BERKSHIRE; HAMPSHIRE COUNTIES (the towns of Chesterfield, Cummington, Goshen, Middlefield, Plainfield, and Worthington only)

Rates Fringes

Laborers:

| | | |
|--------------|----------|-------|
| Group 1..... | \$ 27.58 | 22.29 |
| Group 2..... | \$ 27.83 | 22.29 |
| Group 3..... | \$ 28.33 | 22.29 |
| Group 4..... | \$ 28.58 | 22.29 |
| Group 5..... | \$ 21.50 | 22.29 |
| Group 6..... | \$ 28.58 | 22.29 |

LABORERS CLASSIFICATIONS

Group 1: Carpenter tenders, cement finisher tenders, laborers, wrecking laborers

Group 2: Asphalt rakers, fence and guard rail erectors, laser beam operator, mason tender, pipelayer, pneumatic drill operator, pneumatic tool operator, wagon drill operator

Group 3: Air track operator, block pavers, rammers, curb setters

Group 4: Blasters, powdermen

Group 5: Flaggers

Group 6: Asbestos abatement, toxic and Hazardous waste laborers

LABO1421-002 06/01/2018

Rates Fringes

Laborers:

| | | |
|--------------|----------|-------|
| Group 1..... | \$ 38.15 | 24.10 |
| Group 2..... | \$ 38.90 | 24.10 |
| Group 3..... | \$ 39.15 | 24.10 |
| Group 4..... | \$ 34.15 | 24.10 |
| Group 5..... | \$ 37.25 | 24.10 |
| Group 6..... | \$ 38.15 | 24.10 |

Group 1: Adzeman, Wrecking Laborer.

Group 2: Burners, Jackhammers.

Group 3: Small Backhoes, Loaders on tracks, Bobcat Type Loaders, Hydraulic ""Brock"" Type Hammer Operators, Concrete Cutting Saws.

Group 4: Yardman (Salvage Yard Only).

Group 5: Yardman, Burners, Sawyers.

Group 6: Asbestos, Lead Paint, Toxic and Hazardous Waste.

PAIN0035-010 07/01/2019

Rates Fringes

PAINTER

NEW CONSTRUCTION:

| | | |
|-----------------------|----------|-------|
| Brush, Taper..... | \$ 32.33 | 26.35 |
| Spray, Sandblast..... | \$ 34.03 | 27.00 |

REPAINT:

| | | |
|-----------------------|----------|-------|
| Bridge..... | \$ 50.66 | 27.00 |
| Brush, Taper..... | \$ 29.65 | 26.35 |
| Spray, Sandblast..... | \$ 31.35 | 27.00 |

* PLUM0004-003 03/01/2020

FRANKLIN (Orange)

Rates Fringes

| | | |
|------------------------------|----------|-------|
| Plumber and Steamfitter..... | \$ 45.41 | 26.56 |
|------------------------------|----------|-------|

PLUM0104-004 09/17/2019

BERKSHIRE (Becket, Otis, Sandisfield); FRANKLIN (Except Monroe, Rowe, and the Western part of Charlemont); HAMPDEN; HAMPSHIRE

Rates Fringes

| | | |
|-------------------------------|----------|-------|
| Plumbers and Pipefitters..... | \$ 41.21 | 25.90 |
|-------------------------------|----------|-------|

FOOTNOTE:

A. Two paid holidays, Independence Day and Labor Day, provided the employee has been employed seven days prior to the holiday by the same employer

PLUM0104-009 09/17/2019

BERKSHIRE (Except Otis, Becket, Sandisfield); FRANKLIN (Monroe, Rowe and the Western part of Charlemont)

Rates Fringes

Plumber and Steamfitter.....\$ 41.21 25.90+a

FOOTNOTE FOR PLUMBERS & STEAMFITTERS:

A. Paid holidays: Independence Day and Labor Day, provided the employee has been employed seven days prior to the holiday by the same employer.

TEAM0379-001 06/01/2019

Rates Fringes

Truck drivers:

| | | |
|--------------|----------|-------------|
| Group 1..... | \$ 34.08 | 25.1125+A+B |
| Group 2..... | \$ 34.25 | 25.1125+A+B |
| Group 3..... | \$ 34.32 | 25.1125+A+B |
| Group 4..... | \$ 34.44 | 25.1125+A+B |
| Group 5..... | \$ 34.54 | 25.1125+A+B |
| Group 6..... | \$ 34.83 | 25.1125+A+B |
| Group 7..... | \$ 35.12 | 25.1125+A+B |

POWER TRUCKS \$.25 DIFFERENTIAL BY AXLE

TUNNEL WORK (UNDERGROUND ONLY) \$.40 DIFFERENTIAL BY AXLE

HAZARDOUS MATERIALS (IN HOT ZONE ONLY) \$2.00 PREMIUM

TRUCK DRIVERS CLASSIFICATIONS

Group 1: Station wagons; panel trucks; and pickup trucks

Group 2: Two axle equipment; & forklift operator

Group 3: Three axle equipment and tireman

Group 4: Four and Five Axle equipment

Group 5: Specialized earth moving equipment under 35 tons other than conventional type trucks; low bed; vachual; mechanics, paving restoration equipment

Group 6: Specialized earth moving equipment over 35 tons

Group 7: Trailers for earth moving equipment (double hookup)

FOOTNOTES:

A. PAID HOLIDAYS: New Year's Day, Washington's Birthday, Memorial Day, Independence Day, Labor Day, Patriot's Day, Columbus Day, Veteran's Day, Thanksgiving Day and Christmas Day

B. PAID VACATION: Employees with 4 months to 1 year of service receive 1/2 day's pay per month; 1 week vacation for 1 - 5 years of service; 2 weeks vacation for 5 - 10 years of service; and 3 weeks vacation for more than 10 years of service

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate

(weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an

interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION"

SECTION XII
TECHNICAL SPECIFICATIONS

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ITEM M-001 SUMMARY OF WORK AND SPECIAL WORK REQUIREMENTS**CONTRACT DOCUMENTS**

001-1.1 This section of these specifications is a part of the Contract documents as defined in the FAA General Provisions. All applicable parts of the balance of the Contract Documents are equally as binding for this as for all other sections.

001-1.2 General. The special requirements set forth in this section of these specifications shall govern any aspect of the contract work where such requirements are deemed applicable by the Owner or the Engineer. The purpose of these requirements is to ensure that the contract work does not damage private property or create hazards to aircraft operations, and point out special coordination, the contractual responsibilities of the Contractor, and schedule conditions of which the Contractor should be aware. It shall be the Contractor's responsibility to conduct all work in strict accordance with the special requirements set forth herein and to fully cooperate with the Owner and the Engineer in every way necessary to fulfill the purposes of these requirements as set forth above.

001-1.3 Description of Work. The purpose of this project is a reconstruction of the pavement of Runway 1-19 and portions of Runway 14-32, Taxiways A and D. Work will include pavement reclamation for the majority of Runway 1-19, producing an 11" thick layer of P-154A base material that will be overlaid with 6" of new P-209 base course and 4" of new P-401 asphalt pavement. For other sections of Runway 1-19 (Add Alternate 1), Runway 14-32 and Taxiway A are to be milled, crack repaired and overlaid with 2" of new P-401 asphalt pavement. Storm drainage improvements, grading, topsoil, seed, new lighting, signage, and pavement markings, will also be provided for the Runway 1-19 and the aforementioned taxiways. Also included in the project are: temporary access road construction and installation of a new 8' x 6' reinforced concrete box culvert between Rte 122 and the southerly end of Runway 1-19; and tree clearing within the Right-of-Way (ROW) for Rte 2 off the South end of Runway 1-19.

Grooving the new runway pavement (Add Alternate 2) may be included in the work as well.

The work to be completed under this contract includes the furnishing of all labor, equipment, materials, tools, and incidentals necessary to complete all work in accordance with the provisions of the Contract; the Contract Plans, the Contract Specifications, Contract Addenda, environmental permit conditions and as may be directed by the Engineer. All materials to be constructed and installed on this project shall be new and unused, purchased solely for this project, not from contractor's stock or another project.

001-1.4 Work Areas. To minimize the disturbance to Airport operations the project has been broken into four (4) work areas. These work areas are shown and described on the Construction Safety and Phasing plans.

001-1.5 Work Area Requirements. The Contractor will be required to coordinate his construction activities on a daily basis with the Airport, and the Engineer while working within all work areas. If requested, the Contractor shall make any reasonably requested adjustment to their construction schedule and or construction sequence to avoid interference with Airport operations.

Prior to working in any work area the Contractor shall mark out runway safety areas and/or haul routes, and install low profile barricades and snow fence as indicated on the Contract Plans or as directed by the

Engineer. The Contractor shall also confirm that proper NOTAMS have been issued and all other safety precautions have been implemented.

The Contractor will also adhere to their approved Storm Water Pollution Prevention Plan (see Item M-002) and to the Construction Safety Phasing Plan (see Appendix A) of these documents and the Contractor's prepared Safety Plan Compliance Document (see Appendix B).

The Airport reserves the right to require the Contractor to install and maintain any protective measures in the interest of Airport safety.

001-1.6 Project Duration. Upon execution of the contract, the Owner will issue a written "Notice To Proceed" which will specify an effective date for the Contractor to begin work at the site. All work under this Contract must be completed within **one hundred and thirty one (131) calendar days** of the date specified in the "Notice To Proceed" for the Award of the Base Bid.

It is anticipated that work covered by this contract will be commence during the Summer 2020 construction season.

It shall be understood that it is the Contractor's responsibility to request a stoppage in contract time, if required. Further, it is understood that if it is determined to be in the best interest of the Owner and the Airport, the request for a contract time stoppage can and will be denied. During a contract time stoppage, no work may commence in any work areas until a request is made to resume work and contract time, with the exception of maintenance of erosion controls. If work is performed without an official restart of the contract time, it is agreed that the work performed is at the Contractor's expense and is not eligible for measurement of payment. It shall be understood that it is the Contractor's responsibility to request resumption in contract time.

It shall be clearly understood that the contract time is contractual and if the time is exceeded liquidated damages will be assessed, in accordance with Item M-001-1.13. Request for additional contract time will only be granted under the following:

- a. Additional work authorized by change order.
- b. Delays or postponements of critical path work per the approved construction schedule as requested by the Owner.
- c. Material delivery delays, which are documented and are beyond the Contractor's control. Material delivery delays, which are not documented, and not accounted for or identified in the Contractor's schedule, will not be considered for a valid justification to extend the contract time.

001-1.7 Sequence of Work. The Contractor shall follow the general sequencing as shown in the phasing plans. The Contractor may request a revision to the sequence of Construction for review and approval by the Owner and Engineer, provided that there is no additional cost to the Owner. The FAA requires 45 days prior notice for any revision to the construction phasing or sequence.

Key components requirements in sequencing the work includes but is not limited to:

- a. Notice to Proceed to be issued in the Summer of 2020.
- b. Work Area permit conditions and restrictions must be followed.
- c. Aircraft are able to access the active runway at all times unless otherwise noted on the plans.

001-1.8 Submittals. Upon receipt of the NOTICE OF AWARD of the contract, the Contractor shall submit all appropriate schedules, CQCP and safety plan SPCD, shop drawings, material certifications and equipment data sheets in accordance with relevant sections of these specifications. These submittals shall be

provided prior to the commencement of construction. Once approvals have been obtained, the Contractor shall order all necessary equipment and materials and shall notify the Engineer of their receipt.

It shall be the Contractor's responsibility to identify all long-lead material items and incorporate their delivery into the overall construction schedule. The Contractor is reminded to include sufficient time for material shop drawing review in this schedule.

No additional contract time will be provided for failure to identify long lead-time materials or failure to provide sufficient time for review of shop drawing submittals and other deliverables.

The Contractor will be required to utilize the project submittal form contained within the Supplemental General Provisions. Failure to use the submittal form will result in submittals be returned as incomplete.

The Notice To Proceed may not be issued until all shop drawings and key submittals have been received and approved.

001-1.9 Overall Work Schedule. The Contractor shall be required to submit a proposed schedule of how the work will be accomplished over the contract period including identifying workforce and equipment. This schedule shall be developed using project management software (Microsoft Project or equal). The schedule shall be split into separate work areas; each detailed identifying work with reference to item and specification numbers. The schedule shall identify critical path work. This overall schedule **shall be submitted at least 10 calendar days prior to the mandatory Pre-Construction Conference** at which time the Contractor will be required to review it with all parties. If so requested, the Contractor shall make modification to the schedule as to minimize disruption to Airport operations. The overall construction schedule is subject to the approval of the Airport and the Engineer. See Item M-001-1.28 MEETINGS for additional requirements.

If applicable, the FAA also requires 30 days prior notice prior to shutting down FAA NAVAID facilities.

The Notice to Proceed will not be issued until the Contractor's construction schedule has been received and approved.

The Contractor shall be required to update this overall schedule throughout the project and to provide updated copies to the Engineer for review on a weekly basis.

001-1.10 Weekly and Daily Schedules Required. To facilitate the specific requirements and intent of this section, the Contractor shall prepare and submit weekly, a schedule of operations for the following work week, in addition a 2-week "look-ahead" shall also be prepared for review and discussion. The schedule shall be given to the Engineer by the end of the workweek preceding the week covered by the schedule. The weekly schedules shall be subject to the approval of the Engineer, and shall include as a minimum, the following:

- a. Major work items to be accomplished.
- b. Subcontractors to be on site.
- c. Names of each Contractors and Subcontractors personnel to be on site.
- d. Type and quantity of equipment to be on site.
- e. Areas of the site where construction is scheduled.
- f. Any anticipated closing of facilities that will be required.
- g. Other information requested by the Owner or Engineer.

The Engineer may disallow work in areas not included in the current work schedule.

001-1.11 On-Site Supervision. The prime Contractor shall have a competent superintendent(s) on the work site at all times when any workers of the prime contractor and/or any subcontractors are on site. Any time that work is proceeding without a superintendent on site, by the prime contractor or any subcontractor, this constitutes a valid reason for immediate suspension of work by the Owner. No additional contract time or compensation will be considered for a suspension of work for failure to have a superintendent on the project work site. If the superintendent is not onsite during the work the Contractor will be assessed liquidated damages for each hour the superintendent is not onsite. For liquidated damages see 001-1.13.

The superintendent shall be fully authorized to act as the prime Contractor's agent on the project. The superintendent shall be capable of reading and thoroughly understanding the plans and specifications and shall receive and fulfill instructions from the Engineer or the Owner.

001-1.12 Contractor "On-Call" Names and Phone Numbers. The Contractor shall provide the Engineer and the Airport Manager with the name(s) and telephone number(s) of persons (two minimum) that can be contacted before or after work hours for emergency situations affecting the construction. During an emergency situation, a reasonable response time is required from the Contractor. The Contractor shall be "on call" at all times during the length of the construction period.

001-1.13 Liquidated Damages and Penalties. If the work remains incomplete after the times and dates specified in project plans for the completion of work; or the Contractor leaves an airport gate unattended; or the Contractor does not provide an onsite superintendent, the Contractor shall pay the Owner as liquidated damages and/or penalties per the schedule provided below. It shall be understood that the payment of liquidated damages and penalties are contractual and by signing the contract the Contractor has agreed to the conditions and amounts specified.

- a. **Total Contract Time.** The Contractor agrees to pay the Owner the sum of **three thousand dollars (\$3,000.00)** per day in liquidated damages for each and every calendar day that the work remains incomplete after the allocated total project calendar days stated in Item 001-1.6 above.
- b. **Contractor Access/Security Gate.** The Contractor agrees to pay the Owner the sum of **one hundred dollars (\$100.00)** per each event in penalties for every event that an Airport Security Gate is left unattended and/or unlocked. An unattended event is anytime a representative of the Engineer or the Airport notices that a Security Gate is not manned by a representative of the Contractor or locked by the Contractor. Unattended is further defined as a gate unattended for a maximum of one hour, at which point a new event occurs.
- c. **Contractor's Superintendent.** The Contractor agrees to pay the Owner the sum of **one hundred and eighty dollars (\$180.00)** per hour in penalties anytime the contractor's superintendent is not onsite during a work shift. Providing a foreman does not relieve the contractor from fulfilling the obligation of providing a full-time superintendent.
- d. **Work Area II (Base Bid or Add Alternate No. 1).** The Contractor agrees to pay the owner of **one thousand dollars (\$1000.00)** per hour for each and every consecutive hour that the work remains incomplete after the allocated consecutive hours for Work Area II as noted on the project construction and phasing plans.

The Contractor awarded this project will not be subjected to any additional liquidated damages or penalties other than those described in these specifications.

001-1.14 Additional Resident Engineer. The Owner has established a budget for the Resident Engineer based on the work hours made available to the Contractor. If the Contractor's work schedule exceeds the calendar days allowed for the project, the Contractor agrees to pay the Owner the additional cost for the

Resident Engineer in excess of the budgeted hours. The cost to the Contractor shall be based on the actual billing rate plus expenses and 15% profit in effect at the time the services were provided. For budgeting purposes, an hourly rate of \$100.00/hr. is recommended. It shall be understood that these charges are in addition to any other damage claims available to the Owner (Liquidated Damages, Breach of Contract, etc., as described within the contract documents).

001-1.15 Air Operations Areas. No equipment or stockpiles of materials will be allowed to penetrate the Runway approach surfaces, runway approach transitions and FAR Part 77 surfaces, unless granted permission from the Airport Manager.

Stockpiling of materials or other construction operations shall not be conducted in a manner to cause malfunction or interference of the airport traffic. The Contractor shall plan and execute work in such a manner that adequate access will be available for vehicular traffic at all times during the period of construction. No trucking or other heavy equipment will be allowed on the paved runways, and at no time shall the speed exceed the limits of the airport. It is expressly understood that the Owner will not be responsible for any deduction, interpretations, delays, or conclusions made by the Contractor as to the difficulties which will be encountered in this regard.

001-1.16 Uniformed Police Detail/Roadway Lane Closure. Police detail will be required on Rte 2 for traffic calming/control during tree clearing operations identified on the drawings. Police detail will be paid for under Item M-007 of these specifications. Prior to starting any tree clearing work, the Contractor shall prepare a traffic management plan and submit to the Engineer and Mass Highway for approval. The Engineer will assist the contractor in coordinating with Mass Highway for their review.

001-1.17 Staging and Laydown Area. The areas for the location for of the Contractor's and Engineer's Field Office and storing materials and servicing, repairing and parking construction equipment (Contractor's Staging and Laydown Areas) are located as shown on the plans. The Contractor may be required to clear and grub and prepare the staging and laydown areas and haul roads as necessary to support their activities. Clearing and grubbing and preparation are incidental to the contract. The Contractor is also responsible for maintaining a suitable surface as required for their needs; this is also incidental to the contract.

The Contractor will only be permitted to store equipment and materials in the Contractor's staging area. All equipment booms shall be lowered at the close of each day's work or when stored. No equipment or material shall be stored closer than 10 feet to the Airport's perimeter fence lines.

The Contractor (and his/her Subcontractors) shall provide all necessary temporary fence and gates to protect materials and equipment from pilferage. The Owner will not be responsible for any vandalized equipment or material stored on the Airport property.

Any area occupied by the Contractor shall be maintained in a clean and orderly condition satisfactory to the Engineer. Particular attention shall be given to the elimination of combustible rubbish or debris in the areas and none shall be left exposed overnight or at other periods of time the work is shut down.

At the completion of the contract, all Contractor's and Subcontractor's facilities will be removed promptly in a workmanlike manner and the areas restored to its original condition, or better; and left clean and free of all debris or surplus material.

The cost of restoration, including but not limited to; re-grading, loam, seed, mulch, and other restoration shall not be measured separately for payment, rather the restoration work shall be considered incidental to the various project items.

001-1.18 Access Routes. When public highways must be used for access routes, it will become the Contractor's responsibility to obtain the proper permits needed for this function and to obey all rules and regulations pertinent to the public highways.

Access routes on the Airport shall be as shown on the Contract Plans. The Contractor's vehicles and equipment shall only operate within the limits of the marked access route unless an alternate route is approved by the Engineer and/or Airport. It is recommended that the Contractor document the pre-construction conditions of the access routes, public streets, and airfield pavement areas (that will be traveled on) using photographs and/or video in order to establish the existing conditions prior to the start of work.

Contractor's vehicles will not be allowed access to portions of the Airport other than the work and staging areas.

All paved access routes shall be kept clean at all times to prevent the accumulation of dirt and mud and the generation of dust by sweeping, washing or other methods directed by the Engineer. Unpaved access routes, if any, shall be maintained by blading and filling when directed by the Engineer and dust shall be controlled at all times.

All access routes constructed or disturbed shall be restored to their original condition or better before the Contract will be considered complete. All restoration and dust control on haul roads shall be at the Contractor's expense.

All non-paved areas on the Airport disturbed by the Contractor's operations shall be scarified or otherwise loosened to a depth not less than 5 inches. Clods shall be broken and the top 3 inches of soil shall be worked into a satisfactory seedbed by disc harrowing, or by use of cultipackers, rollers, drags, harrows, or other appropriate means. This area shall then be seeded, fertilized, and mulched.

The cost of restoration of haul routes, and public streets, including but not limited to; re-grading, loam, seed, mulch, pavement repair and other restoration shall be considered incidental to the project.

001-1.19 Permits. The Contractor shall refer to, fully understand, and provide written acknowledgement of the permits shown in the appendices. The referenced permits and approvals including any attachments, plans, correspondence, applications and reports referenced therein are specifically incorporated into and made part of the permits, contract documents, plans and these specifications. The Contractor shall assume all responsibility for compliance to these permits. **Written acknowledgement of same shall be provided by the Contractor to the Engineer at least 7 calendar days prior to the mandatory pre-construction conference with the resource agencies and FAA.**

Unauthorized disturbance of wetlands is a violation of federal, state and local regulations. Authorization for wetland disturbance and restoration has been granted for this project for the temporary wetland impacts caused by construction activities as shown on the Plans. Besides the wetland impacts shown in the plans, no other wetland alterations are permitted herein. The limits of authorized wetland disturbance, requirements of the disturbance and procedures to restore the wetland disturbance are as described within the plans and these specifications. The contractor shall take precautions to comply with these requirements. The contractor shall be responsible for complying with any and all enforcement actions by local, state, or federal regulatory authorities pertaining to work described in the referenced permits for which the contractor is responsible for and shall pay all fines assessed against the Airport for unauthorized wetland disturbance and related expenses due to violations caused by the contractor and his/her personnel, subcontractors, and vendors.

The Contractor is required to understand and comply with the aforementioned wetland permits and approvals. Failure to comply with the referenced wetland permits and approvals may lead to fines and/or termination of contract.

001-1.20 Airport Operation and Safety Requirements. Normal airport operation will be conducted on the airfield during construction and the work shall be carried on in such a manner as not to interfere with the necessary operation of the Airport. The Contractor shall take all precautions necessary to ensure the safety of operating aircraft as well as his/her own equipment and personnel.

No construction operations shall be carried on within 50 feet from the edge of any active taxiway and aprons, or within 250 feet of the centerline of any active runway or within the limits of active runway approach zones unless the area of work requires it or prior approval has been obtained. When permission has been granted to work inside these limits, no equipment shall be left within the lines when not in use. During breaks in the daily work schedule, nights, weekends and the days when work is not permitted or is not progressing, the equipment shall be located outside of these restriction lines. All booms shall be lowered when the equipment is not in operation. No construction operations including an open flame, such as welding or burning, shall be carried on within 50 feet of any aircraft.

Each Contractor's motorized vehicle operating in an aircraft movement area shall be equipped with an amber flashing light and a 3-foot square flag consisting of international orange and white squares not less than one foot square displayed in full view above the vehicle.

In addition, all Contractors' vehicles shall have the company identification plainly visible on both sides of the vehicle. **Personal vehicles shall not be allowed on Airport property.**

The Contractor shall obey all instructions as to the operation and routes to be taken by equipment traveling on Airport property. Any signs, lights, signals, markings, traffic control, and other devices which may be required shall be provided and maintained by the Contractor during the course of the work, subject to the approval of the Engineer. No aircraft pavement or approach aid currently in service shall be left out of service overnight unless closed to all Airport operations.

The Contractor, as directed by the Engineer, shall be prepared to stake and permanently mark on the ground with a readily recognizable marking (orange snow fence) the restriction lines parallel to the taxiways and runways adjacent to the work and the approach zone limits so that workers can readily recognize the limitations.

001-1.21 Radio Escorts. Anytime the work requires the crossing of active movement areas or as needed as noted on the drawings, these areas shall be controlled by a full time radio equipped escort and escort vehicle provided by the Contractor. The radio escort shall maintain 2-way communication with local air traffic. All of the Contractor's escort vehicles shall be equipped with orange and white flag, amber flashing/rotating beacons, and company identification plainly visible on both sides of the vehicle.

001-1.22 Radio/Cell Phone Control. The Contractor shall have two-way radio and/or cell phone communication between each crew, Contractor's and Engineer's field office, superintendents, each subcontractor, flag persons, Resident Engineer and escort vehicles at all times. No FAA or other Airport frequency will be used for this purpose. These radios and/or cell phones shall be purchased, installed, maintained, and operated at the Contractor's expense.

In addition, the Contractor shall have with each working crew and all crossing guards at least one (1) person equipped with a FAA radio furnished by the Contractor to monitor two-way radio communication with the UNICOM/CTAF on the ground frequency of **122.8** MHZ. The individuals assigned to monitor the CTAF frequency shall be directed on the use of the radios and shall fully understand their responsibilities. These radios shall be capable of reliable two-way communication with aircraft from any location on the Airport.

The Contractor shall, before the start of construction, test his/her aviation radio with all appropriate agencies to demonstrate the capabilities and to demonstrate the performance of the operator and the

equipment. Radio control will be required whenever the Contractor is working in or adjacent to the aircraft operations areas, or when the Contractor wishes to cross any active pavement area. Radio control and Flag persons will be required whenever the Contractor's vehicle and equipment are on or crossing active runways, taxiways or aprons.

001-1.23 Radios to be Supplied to the Resident Engineer. The Contractor shall provide the following new/unused radios and number of radios for use by the Resident Engineer(s):

- a. One (1) - Two way radio set on the Contractor's frequency or cell phone programmed with Contractor's project manager and superintendent contact information.
- b. One (1) - Two way radio set on the FAA's frequency. The FAA radio shall be new, ICOM model IC-A4 or approved equal. The radio shall be programmed with the frequency of **122.8 MHZ**.

Each radio shall be supplied with two (2) rechargeable batteries, a quick battery charger, 12 volt vehicle adapter, belt holster, and ear piece. At the completion of the project the radio set on the Contractor's frequency shall be returned to the Contractor. The FAA radio with accessories shall also be returned to the Contractor.

001-1.24 Engineer's Field Equipment. The Contractor shall furnish and maintain during construction of the improvements embraced in this Contract, a suitable field office for the Engineer at the site of the work. The field office shall be for the exclusive use of the Engineer and the Engineer's subconsultants. The field office shall be in-place with all required equipment and approved by the Engineer within 3 days of the start of Construction.

The field office shall contain not less than 480 square feet of floor area and shall be set up to accommodate, an office and a conference room suitable for project meetings that will seat/accommodate ten (10) people.

The office shall be equipped with electric lights, heating, air conditioning facilities, telephone services, locks for doors, and window shades for all windows.

The office shall be equipped with the following furniture and equipment:

- 1 - Standard size flat top desk
- 1 - Lay down table at least 2 feet 8 inches wide and 6 feet long
- 1 - Drafting table at least 36 inches wide by 48 inches long
- 2 - Desk chair
- 10 - Folding chairs ; 2-conference tables (8 foot each)
- 1 - 2 drawer file cabinet - heavy duty fire rated, lockable w/keys
- 1 - Telephone (if cell phone does not work in office trailer)
- 1 - Cell phone (with wall and car charger)
- 1 - mobile Wi-Fi hotspot with unlimited service and data
- 1 - Bottled water cooler with water service
- 1 - High-speed internet service (wireless internet card 3G or better)
- 1 - Office copier /scanner/ fax of a type that can copy bound books and single sheets and that uses both 8-1/2 inch x 11 inch and 11 inch x 17 inch paper (with dedicated phone line)

1- "Dorm-sized" refrigerator for RE food storage

1 - Internal bulletin board-18" x 24"

The Contractor shall provide separate sanitary facilities near the Engineer's field office, for the sole use of the Resident Engineer/engineering staff.

The location of the field office shall be as shown on the plans and approved by the Owner and Engineer. The Contractor shall maintain the office during entire length of the project and remove it upon completion of the work.

The Contractor shall be responsible for all costs for: telephone/cell phone bills including long distance; heating/cooling; electric; High speed internet service; sanitary facilities; copy paper/ink, trash removal, weekly office floor sweeping/cleaning, and bottled water applicable to the Contract.

The Contractor shall be responsible for maintenance, repair, and loss of all equipment provided for the duration of the contract. At the completion of the Contract, all the equipment required for the Engineer's Field Office shall be retained by the Contractor.

001-1.25 Survey. The Engineer has provided survey control points and a benchmark on the contract plans. Prior to any layout, the Contractor shall survey the control points provided and confirm their accuracy to the Contractor's satisfaction. Any discrepancies found in the control points shall be promptly reported to the Engineer.

The Contractor shall employ the services of a licensed professional land surveyor registered in the Commonwealth of Massachusetts to establish field control, layout limits of work, survey property boundaries, right-of-ways and lay out all proposed work. The surveyor shall also provide quality control support to the Contractor by monitoring the work as it progresses. The contractor shall provide the Engineer with documentation representing the qualifications of the surveyor prior to proceeding with field layout.

The Contractor shall place particular emphasis upon delineating and clearly staking out all applicable limits of work, locations of staging areas and haul roads, property boundaries, and right-of-ways in the vicinity of the proposed work and so forth. The surveyor shall also layout the proposed fencing with stakes at all changes in direction and at intervals of 100 feet. The Contractor shall not commence with any construction activities which produce ground disturbance until all required layout and staking has been completed to the satisfaction of the Owner and Engineer. Layout work shall be conducted at a minimum of 3 work days in advance and at satisfactory distance from the construction operations.

The Contractor shall furnish assistance to the Engineer as requested to check the layout or otherwise control the work. Such assistance shall be understood to include the provision of suitable manpower to assist the Engineer in taping measurements, holding a survey rod for checking grades and the like. The Contractor's obligations for layout, final survey and furnishing assistance to the Engineer shall be deemed incidental to the completion of the various work items and no separate payment will be made for such layout, final survey and assistance.

001-1.26 Maintenance of the Construction Site. The Contractor shall keep the entire construction site, and all staging areas free of paper, boxes, and other debris, which could be blown onto the runways and taxiways. The Contractor's staging area shall be supplied with a dumpster with cover. All Airport pavements shall be kept clear and clean at all times.

The Contractor shall also be responsible for supplying any other equipment as may be necessary to clean all areas that are contaminated as a result of his/her operations to the complete satisfaction of the Engineer and the Owner.

Trucks loaded in the construction area shall have loads trimmed as necessary to assure that no particles, stones or debris will fall off and that no legal load limits are exceeded.

The Contractor shall be particularly careful not to track foreign material onto pavements outside of and within the Airport. The Contractor shall supply a vacuum sweeper on site as noted on the plans. The Contractor shall be responsible for removing foreign materials from vehicle tires prior to the vehicle leaving its work area.

001-1.27 Record Plans and Final Survey. The Contractor shall maintain at the site a set of plans on which shall be recorded accurately as the work progresses the actual "As-Built" dimensions and grades of all his/her work, indicating thereon all variations from the Contract Plans. This record of "As-Built" conditions shall include the work of all Subcontractors. Notations on mechanical and electrical plans shall include nameplate data for all installed equipment. These plans shall be kept current and available for review by the Engineer at all times.

Prior to final acceptance of the work, the Contractor shall have a final survey made by a Land Surveyor licensed in the Commonwealth of Massachusetts. The final survey shall consist of taking cross sections at the same stations as the design cross sections with elevations recorded at every location where a proposed grade was shown on the design cross section, at all changes in grade, at the top and toes of slopes, and at the limits of work. The survey shall include the distance from the construction baseline or centerline of each elevation, measured horizontally to the nearest tenth of a foot. The "As-Built" locations (station and offset from the construction baseline or centerline) and "As-Built" rim and invert elevations of all drainage structures and pipes and electrical structures will be included in the survey. The survey shall also include all utilities and fencing improvements. The elevation of all pavements and structures and pipes shall be measured to the nearest hundredth of a foot and elevation in turf area shall be measured to the nearest tenth of a foot and shall be based on NGVD MSL from the project benchmark. In addition to the above, the information included on the as-built plan shall also comply with the requirements of the environmental permits and approvals referenced herein. The as-built plan shall be signed and stamped by Registered Professional Land Surveyor and Civil Engineer of the Commonwealth.

All "As-Built" information from the final survey shall be shown on the Record Plans. In addition, a copy of the electronic survey information prepared in a standard surveyor's format that can be easily followed and checked shall be provided.

The Record Plans and the final survey information shall be submitted to the Engineer for review and shall be corrected by the Contractor as required. The Record Plans and final survey shall be completed and accepted by the Engineer before the time when the final payment shall be due and payable. The preparation of the Record Plans and the final survey shall be deemed incidental to the completion of the various work items and no separate payment will be made for such.

001-1.28 Meetings.

a. Mandatory Pre-Construction Conference. Prior to commencement of any site activities, a Mandatory Pre-Construction Conference will be held by the Airport Manager as the Sponsor's representative who will meet with the Engineer's Resident Engineer, the Engineer's Project Manager, the Contractor's Site Superintendent, the Contractor's Project Manager, FAA, MassDOT Aeronautics, and other representatives who are involved and or impacted by the project. The Pre-Construction Conference will be held to discuss the work in general, including administrative matters, accident prevention, and safety; to answer any questions of the Engineer or Contractor; to discuss the environmental impacts, to

introduce all parties and describe responsibilities, and to resolve any potential problems before the work commences.

In addition, the Contractor shall provide sufficient copies of their overall project schedule to distribute to all meeting participants. The overall project schedule shall be produced per Item 001-1.9 and 1.10

The Engineer will schedule the Pre-Construction Conference and notify all parties a minimum of seven (7) calendar days prior to the conference.

b. Weekly Project Meetings. The Engineer will host a weekly project meeting at the Airport's Terminal building or at a site agreeable to the Airport, Engineer, and Contractor. This meeting will be open to all representatives as listed above in the Pre-Construction Conference. It is a mandatory requirement that the Contractor's Site Superintendent and the Contractor's Project Manager attend.

001-1.29 Underground Utilities and Cables. The approximate locations of known utilities and underground cables are shown on the Contract Plans. Existing utility locations are based on record plans, and may not be accurate. It is the Contractor's responsibility to locate and verify all existing utilities within the vicinity of all excavations and trenches, regardless of whether or not the utility is shown on the Contract Plans. The Contractor shall provide a utility locating service to locate and verify utility locations. No separate measurement or payment will be made for the utility locating service, the cost of which shall be considered incidental to the various project items. **No excavation shall begin until the Contractor has exhausted every method available to him to locate and mark out existing utilities.** These methods shall include, but will not be limited to, opening manholes, handholes, and light bases to determine the orientation of existing circuits and using a utility locator device capable of locating both metallic and nonmetallic utilities (as manufactured by Radio Detector, Inc., Metrotech, Inc., or Biddle Instrument) to trace existing underground raceways, cables, and other utilities. Once existing utilities have been located and marked on the ground, the Contractor shall hand excavate all material in the vicinity of the known existing utility. Upon completion of the utility locating effort, the contractor shall submit an existing conditions plan of all located underground facilities to the Resident Engineer.

Prior to commencement of any excavation the Contractor shall coordinate all work on and near the underground utilities and cables with the agencies as noted on the plans.

- a. The Contractor shall use every precaution to prevent injury or damage to all underground structures, such as pipes, wires and conduits; to all paved surfaces and to all turfed areas. The Contractor shall be responsible for injury or damage of any character resulting from any act, neglect, misconduct in the manner or method of execution or non-execution of said work, and such responsibility shall not be released until the work to repair all damage has been completed and accepted. Whenever any such damage or injury is done, the Contractor shall restore, at his/her own expense, the above to a condition equal or better to that existing before such damage or injury is done.

The Contractor shall furnish and install all materials necessary to protect existing underground utilities and cables that are to remain and to make any temporary connections necessary to maintain operations of the underground utilities and cables that are to be relocated until the permanent relocation can be made.

The Contractor shall comply with the current version of the Dig Safe Law, effective Dec 17, 1998 or as revised. The Contractor is required to pre-mark the construction site and give notice of planned digging near utility, cable and fuel lines.

The Contractor shall immediately repair, at his/her own expense, any underground utilities and cables damaged by his/her operations including any damage done by driving his/her equipment over existing underground utilities and cables.

001-1.30 Water. Water for general use shall be the responsibility of the Contractor to obtain. If the Contractor elects to use hydrants on the airfield, the Contractor shall pay all water and meter charges, and coordinate the usage through the Orange Municipal Airport and Town of Orange Department of Public Works.

001-1.31 Acceptance Testing. All acceptance testing (quality assurance testing) of materials required by various sections of the specification will be performed by the Owner at no cost to the Contractor unless otherwise specified herein. However, the Contractor will pay for the cost of any retesting required due to materials not passing acceptance tests. The Contractor is responsible for quality control testing.

001-1.32 Project Photographs. The Contractor shall furnish photographs of the project. The photographs shall show the project site prior to construction, the work in progress, and the project site at the completion of work.

A minimum of fifty (50) color photographs shall be taken during each thirty (30)-day period of the Contract. A 12 mega-pixel or better digital camera shall be used to take the pictures.

At the completion of each thirty (30)-day period of the project the Contractor shall deliver to the Engineer two (2) color prints of each photo. Each view shall be clearly labeled with the date, project and identification of the view. The photos shall be placed in a bound album, in chronological order, such that the descriptions can be read without removing the photos. In addition, a compact disk of the photo's digital files shall be included within the album.

At the completion of the Project, the Contractor shall have a color aerial photograph taken of the airport. The photograph shall be suitable for use in photogrammetric mapping. The view shall be vertical and shall include the entire airport property. This photograph shall be taken with a mapping quality (cartographic) camera. The contractor shall submit certification that the camera has been calibrated within the last three (3) years in accordance with USGS mapping standards. Photos shall not be obscured by cloud cover. Photos are to be clear, in focus, with high resolution and sharpness. Color shall be correct; overly green or washed out photos will not be accepted. The Contractor shall submit to the Engineer contract prints of the photograph for approval prior to making the enlargements. Snow cover will not be permitted. The Contractor shall furnish six (6) color enlargements 40" x 40" at the scale of 1" = 200' and two 9" x 9" color contacts. Four of the enlargements shall be dry mounted on acid free gatorboard and shall be identified on the back of the gatorboard. In addition, a compact disk or memory stick of the aerial photos' digital files shall be submitted, clean without watermarks.

001-1.33 Barricades and Runway Closed Markers. This project will require the use of low profile barricades, runway surface closed markers, and lighted "X" markers for the closure of AOA pavements to accommodate the work. Barricades and runway closed markers as specified on the contract drawings and the specifications shall be provided and maintained by the Contractor at all times during the execution of the work. The costs for the labor, equipment, materials, tools, and incidentals for furnishing, installing, re-installing and maintaining the barricades shall be covered under their respective items in these specifications.

001-1.34 Safety Plan Compliance Document. The successful Contractor is required to prepare a Safety Plan Compliance Document (SPCD) to detail how they will proceed with the project in compliance with the Owner prepared Construction Safety and Phasing Plan (CSPP), as attached in the appendix of this specification. The SPCD shall outline specific information unique to the Contractors operation as it applies to the CSPP. The Contractors' prepared SPCD shall be submitted to the Owner and Engineer for review and approval prior to the issuance of the Notice to Proceed. The Contractor shall allow a minimum of 2 weeks for the Airport, Engineer, and FAA to review the SPCD. The approved SPCD will become a subset to the Owner prepared CSPP and shall include a certification statement by the contractor that indicates the

Contractor understands the operational safety requirements of the CSPP and the Contractor asserts that they will not deviate from the approved CSPP and SPCD unless written approval is granted from by the airport operator. Any construction practice proposed by the contractor that does not conform to the CSPP and SPCD may impact the airport's operational safety and will require a revision to the CSPP and SPCD and re-coordination with the airport operator and the FAA in advance.

001-1.35 Construction Safety and Operations Plan. Based on the construction safety and phasing plan requirements listed in the specification the Contractor shall submit to the Engineer and the Owner **at least 10 calendar days prior to the mandatory Pre-Construction Conference** a written safety and operations plan detailing the precautions he/she proposes for the control of vehicle traffic including flag persons, signs, barricades, escorts and any other measures he/she proposes. After review and comment on his/her operating procedures by the Engineer and the Owner, the Contractor shall follow them explicitly. The revocation of the closure of the work area by Owner for non-conformance shall not constitute a valid reason for extending the contract time or for any claim for additional compensation by the Contractor.

001-1.36 Shop Drawings, Certifications and Other Submittals. The Contractor shall submit shop drawings, certifications and other submittals as indicated within individual specification sections.

001-1.37 Airport Security. The Contractor shall ensure that all of their employees who will have unescorted airfield access at the airport have been checked for employment, security, and criminal history for the last ten (10) years. The contractor shall be prepared to provide written certification that these employees meet all security regulations as required by the Sponsor's security program.

During the course of the construction operations, the Contractor will be allowed to utilize airport access gates as entrance to the construction site. The gate and the associated access routes shall be designated as shown on the plans or as directed by the Engineer. The Contractor shall be required to keep the gates guarded or closed and locked during construction hours. The gates may be opened only for authorized vehicle traffic flow. At such times gates cannot be observed by contractor personnel, they shall be closed and securely locked. Refer to sub section 001-1.13(b) for monetary damages that can be imposed against the Contractor for not properly maintaining airport security.

All vehicles and equipment that access the airport must be authorized by the Owner or Engineer for use, and the drivers of such vehicle or equipment must be trained to operate on the airfield. Passengers in any authorized vehicles shall be the responsibility of the Contractor. No deviations from these security measures shall be allowed at any time. The Contractor shall be responsible for, and shall reimburse the airport for any fines or penalties assessed against the airport by the FAA for any act or omissions of contractor, subcontractor, or their employees or agents.

001-1.38 Safety Requirements.

- a. The Contractor must comply with all Federal, State, and Local safety laws and regulations, as applicable, to perform work under this Contract.
- b. If the Contractor uses or stores toxic or hazardous substances it is subject to M.G.L. c.111F §2, the "Right to Know" law and regulations promulgated by the Department of Public Health, 105 CMR 670, the Department of Environmental Protection, 310 CMR 33, and the Department of Labor and Workforce Development, 441 CMR 21; and must post a Workplace Notice obtainable from the Department of Labor and Workforce Development.
- c. This project is subject to compliance with Public Law 92-596 "Occupational Safety and Health Act of 1970" (OSHA), with respect to all rules and regulations pertaining to construction, U.S. Code Title 29, sections 651 et seq. including Volume 36, numbers 75 and 105, of the Federal Register as amended,

and as published by the U.S. Department of Labor. The Contractor shall provide copies of OSHA 10 hour certifications for all personnel working on the site.

- e. If this Project requires the containment or removal of asbestos or material containing asbestos, lead or waste containing lead based paint, the Contractor shall ensure that the person or company performing the asbestos or lead-related services is licensed pursuant to applicable State laws and regulations.
- f. The Contractor shall take all necessary precautions to prevent fires adjacent to the work and shall prevent the spread of fires to areas outside the limits of the work. The Contractor shall provide adequate facilities and equipment for extinguishing fires and shall safely dispose of combustible materials as directed by the Engineer.
- g. The Contractor's attention is directed to the project safety plans which are included with the contract documents. Compliance with the provisions of these plans shall be considered obligatory and binding upon the contractor. The cost of the Airport Safety Requirements shall be absorbed by the Contractor in the prices bid for the various items of work.
- h. The Contractor shall hold harmless the Owner, the Engineer, and their respective agents or representatives from any and all claims for damages, costs, expenses, judgments or decrees resulting from negligence on the part of the Contractor, Subcontractor, or their agent or employees in conducting the work as required by this Contract.

001-1.39 Access to Work. The Contractor shall provide the Owner, Engineer, FAA, MassDOT and other parties who represent the permit regulatory agencies with jurisdiction over any aspect of the proposed site activities with access to the work areas at all times and shall cooperate with the Owner whenever the Owner invites these visitors to the site. If requested, the Contractor shall attend any site inspections by the regulatory agencies to describe the status of proposed work and how the work conforms to the permits and approvals referenced herein.

001-1.40 Primary Airport Control Station (PACS) and Secondary Airport Control Station (SACS). The Contractor should be aware that there exists PACS and SACS survey monuments within the airport property. These points are hard set survey points for use during survey. It is the Contractor's responsibility to protect the PACS and SACS if they are within the project limits and to replace them if they become damaged through the Contractor negligence or construction activities.

001-1.41 Contract Quantities. The quantities listed in the Schedule of Prices in the Proposal are estimates only. Within the limits of available funds, the Contractor will be required to complete the work specified herein in accordance with the Contract and at the Contract unit prices, whether it involves quantities greater or less than those listed. For all work upon which unit prices are quoted the Contractor's compensation shall be computed upon the work actually performed, measured by the units of measurements specified, whether greater or less than the quantities shown on the Schedule of Prices in the Proposal. The unit and lump sum prices set against the several items cover all specified and implied incidental materials and services required of the Contractor to produce complete, fully integrated systems which function as intended under this Contract. The Contractor shall understand that the Owner may elect to reduce or completely eliminate the acquisition of some of the materials or work efforts proposed under the contract, and that the appropriate unit prices or proportionate lump sum prices will be withheld from the total contract price that was developed on the basis of estimated quantities for bidding purposes.

001-1.42 Property Line Survey. Not applicable.

001-1.43 Construction Warranty. See FAA General Provisions Section 90-10, *Construction Warranty*.

001-1.44 Badging. Not used

001-1.44 Temporary Gravel Road. The temporary gravel road shall be constructed as shown on the plans. This will include furnishing and installing all excavation, gravel, removal of gravel, site restoration, and all incidentals for construction and restoration. All costs for the gravel road will be considered incidental to the various other bid items.

METHOD OF MEASUREMENT

001-2.1 No separate measurement of payment will be made for the provisions of facilities or the compliance with requirements under this section of these specifications unless otherwise noted in this specification section. The provision of facilities and compliance with requirements covered by this section of these specifications shall be considered incidental to the various items of work specified hereinafter, and all costs in connection with such provisions and compliance shall be included in the various unit and lump sum prices bid for the work items specified under other sections of these specifications.

END OF ITEM M-001

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**ITEM M-002 DEVELOPMENT AND IMPLEMENTATION OF
STORM WATER POLLUTION AND PREVENTION PLAN****DESCRIPTION**

002-1.1 Stormwater Pollution Prevention Plan (S.W.P.P.P.). This item shall include the development and implementation of a construction site specific Storm Water Pollution Prevention Plan (SWPPP) and the filing of a USEPA Notice of Intent (NOI) for this project. The SWPPP and NOI shall be developed by a professional familiar with the requirements and shall be submitted to the Engineer for review and comment prior to be considered complete, and a minimum of seven (7) calendar days prior to the filing of the NOI. The filing of the NOI must occur a minimum of seven (7) calendar days prior to the start of construction, and the contractor shall supply the Engineer with a copy of the certified mail receipt as proof of filing prior to the start of work. Upon receipt of the actual permit, it shall be prominently displayed on site and a copy of the permit shall be submitted to the Engineer.

The Contractor shall employ or hire a person competent in the use of Current Best Management Practices for the prevention of construction runoff to oversee the installation and maintenance of the devices during construction. The person shall be required to perform, twice weekly or after storm events of 0.5 inches or greater, erosion control inspections and forward reports of such inspections to the Engineer on a weekly basis. Failure of the Contractor to undertake daily erosion control inspections or to forward the reports to the Engineer shall subject the Contractor to delays in processing of partial pay requisitions.

Since the Contractor has prepared, filed, and overseen the development and implementation of the SWPPP, the Contractor shall be signatory to the NOI and shall be legally and monetarily responsible for any and all actions taken due to failure to properly design, implement, or correct deficiencies. This shall include fines levied against the owner or operator of the airport.

Information and instructions for the development of the SWPPP are available on-line at <http://cfpub.epa.gov.npdes>. The airport shall make available any relevant information needed by the Contractor for the development of these documents.

Upon satisfactory completion of the project as determined by the Engineer and after the acceptance of permanent erosion control devices, the Contractor shall file with the USEPA the required Notice of Termination (NOT).

CONSTRUCTION METHODS

002-2.1 Stormwater Pollution Prevention Plan (S.W.P.P.P.). The Contractor is required to develop a Stormwater Pollution Prevention Plan for this project. In addition to the requirements previously noted in this Specification, the following shall also be followed:

- A. The Contractor shall identify Best Management Practices (BMPs) to be implemented during construction taking into consideration the BMP design to minimize the potential contamination of storm water as a result of contact with soil stockpiles, materials, equipment and vehicles.

- B. The Contractor shall identify locations where erosion is likely and where other construction related pollutants may be generated. The Contractor shall identify appropriate BMPs and implement them in these areas.
- C. The Contractor shall handle nuisance water such as storm water and surface runoff by directing runoff to specified catch basins at the construction site. Drain inlet protectors shall be installed by the Contractor at the down gradient end of all open excavations and as shown on the plans. The Contractor shall inspect the drain inlet protectors and replace damaged sections at no additional cost to the Airport.
- D. The Contractor shall maintain a daily log of active discharges and record this information on the stormwater pollution prevention work sheet that shall be contained in the SWPP Plan along with daily inspection information. The Contractor shall notify the Engineer and the Airport whenever discharges to the storm drainage system are made.

The Contractor shall designate three individuals to comprise the SWPP Plan team who will be responsible for SWPP inspections, maintenance and repair activities, and filling out the daily SWPP discharge log. Personnel selected for SWPP inspection and maintenance responsibilities shall have been previously trained in all the inspection and maintenance practices necessary for keeping the erosion and sediment controls used on site in good working order.

METHOD OF MEASUREMENT

002-3.1. The “Development and Implementation of S.W.P.P.P.” to be paid for shall be a lump sum cost, in accordance with the requirements set forth in this Specification and in accordance with the requirements as dictated by the UPEPA permit regulations. All erosion control measures required by the Contractor’s SWPPP will not be measured separately for payment but will be incidental to the cost of the SWPPP. Measurement and payment will be broken down into four 25% payments. Payment will be made at 25% of the lump sum when 25% of the work has been completed; 50% of the lump sum when 50% of the work has been completed; 75% of the lump sum when 75% of the work has been completed; and 100% when 100% percent has been completed.

BASIS OF PAYMENT

002-4.1. The “Development and Implementation of S.W.P.P.P.” shall include all work required to properly design and execute an erosion control program that will satisfy the requirements as dictated by the USEPA Permit Regulations. It shall include, but not be limited to, the design of the SWPPP and the filing of the NOI, the implementation and maintenance of the system, and the filing of the NOT upon satisfactory completion of the project and the installation of the permanent measures.

Payment will be made under:

| <u>ITEM</u> | <u>DESCRIPTION</u> | <u>UNIT</u> |
|-------------|--|-------------|
| M-002-1 | Development and Implementation of S.W.P.P.P. | Lump Sum |

END OF ITEM M-002

ITEM M-003 CLOSED RUNWAY MARKERS**DESCRIPTION**

003-1.1 This item shall consist of providing all materials, necessary labor, equipment, and incidentals required to provide, place, transport, fuel, and maintain lighted runway closed markers for use when Runway 1-19 and Runway 14-32 is closed; and furnish and install runway closed surface markers for use when Runway 1-19 and Runway 14-32 is closed, as necessary to meet safety and construction work phasing requirements as indicated on the construction drawings and as required by the Engineer.

Work shall include properly placing of Lighted X's, recovering the markers, and transporting them to the storage location on Airport property as designated by the Engineer.

MATERIAL REQUIREMENTS

003-2.1 Lighted Closed Runway Markers. The Contractor shall supply lighted X's for the duration of the project. These markers shall be placed at locations as shown in the construction drawings and as directed by the Engineer and the Airport. The lighted markers shall meet the requirements of FAA Advisory Circular 150/5345-55A, *Specification For L-893 Lighted Visual Aid To Indicate Temporary Runway Closure*.

The cost for transporting the markers to and from the required locations, installing, servicing, maintaining, fueling, oil, oil and air filters, moving and removing these lighted closure markers, and providing additional supply of fuel at the airport, shall be included in the unit cost of the markers.

003-2.2 Runway Closed Surface Markers. Runway closed surface markers shall be made of UV resistant polyester colored yellow with 6 inch black border. Marker shall meet FAA requirements.

003-2.3 Shop Drawings and Certifications. The contractor shall submit a shop drawing for the Lighted Xs and runway closed surface markers.

COORDINATION AND WORK REQUIREMENTS

003-3.1 Coordination. The Contractor shall continually coordinate with the Engineer to schedule work activities a minimum of 5 days in advance of any required runway closures. All approvals for runway closures or partial closures shall be subject to change at any time based upon operational needs of the airport and weather conditions. Construction or other contract work activities within designated aircraft operational areas (AOA's) will not be allowed until work has been coordinated and all runway closure procedures have been accomplished.

003-3.2 Placing Runway Markers. The Contractor shall be responsible for placing runway closed surface markers and Lighted X's as shown on the plans and insuring that the markers remain secured properly to the pavement or turf at all times. When necessary to accommodate work on the runway pavement the vicinity of the runway numerals, the markers may be placed in runway overrun areas along the extended runway centerline. Refer to the construction drawings for details showing runway closure marker and placement requirements.

The placing of the runway closed surface markers shall be installed over the runway identifier numerals. The markers shall be properly anchored down with yellow vinyl bags filled with sand in order to protect

the markers from propeller wash, jet blast, and winds. The Engineer or Owner will have final approval on location of markers.

003-3.3 Safety Considerations. The Contractor shall accomplish all work in accordance with FAA Advisory Circular AC 150/5370-2G, Operational Safety on Airports During Construction. The Contractor shall monitor the Airport Unicom radio frequency at all times when any work is being performed associated with runway markers. Refer also to Construction Safety Requirements of the Special Provisions in the contract documents.

003-3.5 On-Call Contractor Personnel. The Contractor shall provide, at all times while the Lighted X's are in place, qualified on-call personnel able to maintenance, fuel, and repair the Lighted X's; and be able to coordinate directly with the Owner to be able to access the Lighted X's if necessary during non-work hours.

METHOD OF MEASUREMENT

003-4.1 Furnish and Install Lighted X's. The quantity of "Furnish and Install Lighted X's" shall be measured per each unit for furnishing, transporting, placing, maintaining, relocating as required, fueling, replacing bulbs, providing additional supply of fuel, for all other efforts necessary to operate the Lighted X's for the duration of Work, subject to acceptance by the Engineer and Owner. No separate or additional measurements or payments will be made for any quantities of materials, labor, or equipment usage necessary for the completion of requirements.

003-4.2 Runway Closed Surface Marker. The quantity of "Runway Closed Surface Marker" shall be measured per each unit for furnishing, transporting, placing, maintaining, relocating, sand bags for anchoring, as required and for all other efforts necessary to maintain the surface markers for the duration of work, subject to acceptance by the Engineer and Owner. No separate or additional measurements or payments will be made for any quantities of materials, labor, or equipment usage necessary for the completion of requirements.

BASIS OF PAYMENT

003-5.1 Furnish and Install Lighted X's. Basis of payment for "Furnish and Install Lighted X's" will be for furnishing, placing, maintaining, relocating, and storing Lighted X's in accordance with this specification shall be made at the contract price per each unit, subject to acceptance by the Engineer and Owner. This price shall be full compensation for completing all requirements of the item as specified to the acceptance of the Engineer and Owner.

003-5.2 Runway Closed Surface Marker. Basis of payment for "Runway Closed Surface Marker" will be for furnishing, placing, maintaining, and relocating, in accordance with this specification shall be made at the contract price per each unit, subject to acceptance by the Engineer and Owner. This price shall be full compensation for completing all requirements of the item as specified to the acceptance of the Engineer and Owner.

Payment shall be made under:

| <u>ITEM</u> | <u>DESCRIPTION</u> | <u>UNIT</u> |
|-------------|---------------------------------|-------------|
| M-003-1 | Furnish and Install Lighted X's | Each |

M-003-2

Runway Closed Surface Marker

Each

MATERIAL REQUIREMENTS AND FEDERAL SPECIFICATIONS

AC 150/5370-2G

Operational Safety on Airports During Construction

AC 150/5345-55A

Specification For L-893 Lighted Visual Aid To Indicate Temporary Runway Closure

FAA Guide

Ground Vehicle Operations on Airports

END OF ITEM M-003

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ITEM M-004 BARRICADES AND SNOW FENCE**DESCRIPTION**

004-1.1 This item shall consist of providing and installing low profile barricades and snow fencing at the locations shown on the plans. This will include all materials, necessary labor, equipment, and incidentals required to provide, place, transport, and maintain the barricades and snow fencing during the length of the project.

MATERIAL REQUIREMENTS

004-2.1 Low profile barricades. Low profile barricades shall be composed of UV resistant high density polyethylene (HDPE) and meet the requirements of FAA Advisory Circular 150/5370-2G, or latest edition, "Operational Safety on Airports during Construction". Colors shall be safety orange and white with high intensity reflective sheeting; fitted for solar powered flashing hazard lights and flags. The barricades shall have the capacity to be interlocking.

004-2.2 Snow fence. Snow fence shall be 4' high, heavy duty HDPE, orange color, with 1" x 4" oval mesh openings, high visibility, and UV protected (2-year minimum).

004-2.3 Snow fence posts. Snow fence posts shall be 60" high, steel "T" posts, powder coated "green" color. They shall be spaced 10' max. center-to-center and driven 2' into the ground. The snow fence fabric shall be attached to the steel posts by installing 10" cable ties, 4 each per post (min.) or 9" black ball bungies, 4 each (min.) per post.

004-2.4 Shop drawings and certifications. The contractor shall submit a shop drawing for the low profile barricade, snow fence, fence posts and fence ties.

CONSTRUCTION METHODS

004-3.1 Placing of low profile, and snow fence. The Contractor shall be responsible for placing all barricades (low profile) at the locations shown on the plans prior to the start of work. All locations will be approved by the Engineer and the Owner prior to start of work. At that time barricades may have to be repositioned and relocated to better serve airport operations. Barricades placed shall be properly anchored to the pavement and/or turf at all times. Snow fence shall be laid out and approved by the Engineer and the Owner prior to installation.

004-3.2 Maintaining low profile, and snow fence. The Contractor shall be responsible for properly maintaining all barricades (low profile) to manufacturer's original specification. This would include replacement of portions of the barricade (example: lights, flags, reflective media, etc.); making sure barricades are properly secured and/or filled per manufacturer's recommendations. Any rips and/or tears in the snow fence fabric or damaged posts shall be repaired immediately by the contractor. The Engineer or Owner has a right to reject any placed barricades (low profile) and snow fence, and request a replacement, which have not been properly maintained. The replacement will be at no cost to the Owner.

004-3.4 Safety Considerations. The Contractor shall accomplish all work in accordance with FAA Advisory Circular AC 150/5370-2G, Operational Safety on Airports During Construction. The Contractor shall monitor the Airport Unicom radio frequency at all times when any work is being performed

associated with runway markers. Refer also to Construction Safety Requirements of the Special Provisions in the contract documents.

004-3.5 On-Call Contractor Personnel. The Contractor shall provide, at all times while the barricades are in place, qualified on-call personnel able to maintain the barricades (example: in case lights are not working; or the barricades have become misaligned); and be able to coordinate directly with the Owner and Air Traffic Control Tower to be able to access the barricades during non-work hours.

004-3.6 Snow Fence. Snow fence shall be used to delineate and enclose the project work area adjacent to Runway 1-19 as shown on the plans. Snow fence shall be removed and disposed and site restored to original condition at the end of project.

METHOD OF MEASUREMENT

004-4.1 Low profile barricade. The quantity of “Low Profile Barricade” will be measured per each for, transporting, placing, maintaining, relocating as required (regardless how many times they have been removed and relocated), and all other efforts necessary to maintain the barricades for the duration of Work, subject to acceptance by the Engineer and Owner. No separate or additional measurements or payments will be made for any quantities of materials, labor, or equipment usage necessary for the installation, placement, and maintaining of the barricade. Barricade per each is based on a barricade measuring 96 inches long.

004-4.2 Snow fence. The quantity of “Snow Fence” will be measured per linear foot for, transporting, placing, and maintaining and all other efforts necessary to maintain the snow fence for the duration of Work, subject to acceptance by the Engineer and Owner. No separate or additional measurements or payments will be made for any quantities of materials, labor, or equipment usage necessary for the installation, placement, and maintaining of the snow fence. Removal of the snow fence and site restoration at end of project shall not be measured separately for payment. Steel posts and connection ties shall be incidental to the item bid for snow fence.

BASIS OF PAYMENT

004-5.1 Low profile barricade. Basis of payment for “Low Profile Barricade” will be made at the contract unit price per each. This price shall be full compensation for furnishing and installing all materials, for preparing and placing these materials, and for all labor, equipment tools, and incidentals necessary to complete the item.

004-5.2 Snow Fence. Basis of payment for “Snow Fence” will be made at the contract unit price per linear foot. This price shall be full compensation for furnishing, installing, removal, and site restoration of all materials, for preparing and placing these materials, and for all labor, equipment tools, and incidentals necessary to complete the item.

Payment shall be made under:

| <u>ITEM</u> | <u>DESCRIPTION</u> | <u>UNIT</u> |
|-------------|-----------------------|-------------|
| M-004-1 | Low Profile Barricade | Each |
| M-004-2 | Snow Fence | Linear Foot |

MATERIAL REQUIREMENTS AND FEDERAL SPECIFICATIONS

AC 150/5370-2G

Operational Safety on Airports During Construction

FAA Guide

Ground Vehicle Operations on Airports

END OF ITEM M-004

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ITEM M-005 MILLING, SAW CUTTING, & SAW AND SEAL**DESCRIPTION**

005-1.1 This item shall consist of furnishing all labor, equipment and materials necessary to perform all operations in connection with the milling of existing pavement, initial saw cut prior to pavement removal/milling/reclaiming, sawcutting of existing pavement prior to placing final pavement course to create a neat and vertical face, and sawing and sealing of control joints in bituminous concrete pavement. All work will be done in strict conformance with these specifications and the details shown on the Contract Drawings.

All work will be done in strict conformance with these specifications and the details shown on the Contract Drawings. Depths of milling are variable, due to existing pavement thickness and proposed grades. Milling will be paid for per square yard regardless of depth.

The existing asphalt pavement shall be milled to a variable depth to facilitate an overlay. Final depth of milling shall be approved by the Engineer.

Sawing of bituminous pavement shall be defined as sawing the existing bituminous surface to a depth of the existing asphalt prior to removing the existing pavement via excavation, reclaiming, or milling.

Saw and seal is defined as sawing a completed vertical butt joint along asphalt joint between new and existing pavement, as well as filling saw kerf with asphalt crack sealer and as detailed on the Contract Drawings.

The sawcutting of the asphalt prior to placing the final lift of pavement will not be measured and paid for separately but considered incidental to Item P-401 – Asphalt Mix Pavement.

This item shall not include any sawed joints associated with pavement construction joints between paving phases for which payment is considered incidental to the specific item of work being performed.

MATERIALS

005-2.1 Joint Sealers. Joint sealing materials shall meet the requirements of ASTM D6690.

Each lot or batch of sealing compound 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, and the safe heating temperature and shall be accompanied by the manufacturer's certification stating that the compound meets the requirements of this specification.

005-2.2 Certification. Manufacturer's certificates that show these materials conform to the requirements of ASTM Specification D6690 also must be provided. The sampling and certification as required above shall be completed and approved by the Engineer before the start of the work.

CONSTRUCTION METHODS

005-3.1 General. It shall be the sole responsibility of the Contractor to ensure the completion of all milling operations within sufficient time remaining to overlay the pavements within the scheduled time. A vacuum sweeper will be required for all milling operations. All equipment shall be in first class working order, properly maintained, and subject to the approval of the Engineer.

The Contractor shall mill the existing pavement as required to conform to the contract grading plans and spot grade plans. Should the remaining pavement be unsuitable to provide an adequate base for the overlay, it shall be removed by further milling and replaced with asphalt mix pavement as directed by the Engineer.

005-3.2 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

005-3.3 Survey. Prior to milling the existing pavement surface, the Contractor shall survey existing grades on a 12.5-foot grid for the purposes of determining the mill depth required. The Contractor shall submit existing grades, along with proposed milling depths (on a 12.5-foot grid) to the Engineer for review and approval prior to starting the milling operation.

Existing pavement thicknesses are shown in the Geotechnical Report (see Appendices of these specifications).

After milling is completed, the Contractor shall re-survey milled pavement grades on the same 12.5-foot grid for the purposes of determining the required pavement overlay thickness. The post-milling grades shall also be submitted to the Engineer for review and approval prior to commencing with the pavement overlay. Any areas that were not milled to the appropriate depth shall be rectified by the Contractor to the satisfaction of the Engineer at no additional cost prior to overlay. The cost for all surveying necessary to complete the milling portion of construction shall be considered incidental to this specification section.

005-3.4 Transitions. Where the new bituminous concrete overlay abuts existing bituminous pavement, a neat straight line shall be cut with suitable power-driven equipment before commencing with pavement removal for the transition with a milling machine. It is the intention of this operation and the obligation of the Contractor to produce a uniform straight line and smooth transition at the joint between the new and existing pavement. Suitable line controls shall be established by the Contractor to guide the cutting operations.

005-3.5 Protection of Cut Edges. The Contractor shall protect the cut edges of the pavement from damage and edge breakdown resulting from construction operations. Any edge breakdown resulting from the Contractor's operations after the final cut is made shall be corrected at the Contractor's expense.

005-3.6 Sawing Bituminous Concrete (for pavement removal). Prior to removal of existing asphalt pavement (via excavation, reclaiming, or milling) a vertical saw cut shall be made along the perimeter of the proposed work area. The saw cut depth shall be the full depth of the existing asphalt pavement.

005-3.7 Sawing Bituminous Concrete (prior to final pavement course). Prior to placing the final pavement course a vertical saw cut shall be made immediately adjacent to the edge of the perimeter of the work to create a neat vertical face prior to placing bituminous concrete placement. After the sawcut the Contractor shall protect the cut edges of the pavement from damage and edge breakdown resulting

from construction operations. Any edge breakdown resulting from the Contractor's operations after the final cut is made shall be corrected at the Contractor's expense as directed by the Engineer. The sawcutting of the asphalt prior to placing the final lift of pavement will not be measured and paid for separately but considered incidental to Item P-401 – Asphalt Mix Pavement.

005-3.8 Saw and Seal Joints. Vertical butt joints shall be sawed in the new bituminous concrete where joints are constructed in the asphalt pavement as shown on the Contract Drawings or as directed by the Engineer.

The asphalt pavement shall have aged sufficiently to allow a clean cut to be made and to withstand eroding effects of the saw or other cutting device.

The sawed joints shall be sealed immediately with joint sealer after the cut has been made. Traffic shall not be allowed to knead together or damage the sawed joint. Each joint shall be thoroughly clean and dry prior to placement of the sealing compound. Any cleaning required shall be performed by blowing out all dirt, dust or deleterious matter that may have accumulated in the saw joints. Sufficient air pressure shall be provided to insure thorough cleaning.

005-3.9 Preparation of Sealer. Joint sealing material shall be prepared as specified by the manufacturer and approved by the Engineer.

005-3.10 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.

005-3.11 Installation of Sealer. All cracks and joints shall be sealed as specified herein, and the sealer shall be well bonded to the pavement. Unless otherwise directed, the joints shall be filled to 1/4 inch below the pavement surface, without formation of voids or entrapped air. More than one application of sealer may be necessary to fill cracks and joints to the required level.

When necessary to allow vehicle traffic to pass over sealer prior to curing, dry Portland cement shall be dusted over cracks to eliminate pick-up.

No crack sealing material shall be applied in wet cracks or where frost, snow, or ice is present.

005-3.12 Workmanship. All workmanship shall be of the highest quality, and excess of spilled sealer shall be removed from the pavement by approved methods and discarded. Any workmanship determined to be below the high standards of the particular craft involved will not be accepted, and will be corrected and/or replaced as required by the Engineer.

METHOD OF MEASUREMENT

005-4.1 Asphalt Pavement Milling. The quantity of “Asphalt Pavement Milling, 0” to 4”” will be measured based on the number of square yards of bituminous pavement milled, regardless of depth, to meet the line and grade as shown in the plans.

Milling that is required to remove a previous paving operation’s transition area will not be measured or paid for separately but will be considered incidental to the paving operation.

Any sawcutting required for transition work under will not be measured or paid for separately but will be considered incidental to the milling operation.

005-4.2 Sawing Bituminous Pavement. The quantity of “Sawing Bituminous Pavement” to be paid for shall be the number of linear feet of sawing, measured in place. Sawing to be measured for payment under this item will be limited to the initial sawcut prior to removing the existing pavement.

005-4.3 Saw and Seal. The quantity of “Saw and Seal” to be paid for shall be the number of linear feet measured in place, excluding saw and seal quantity included in other payment items. Saw and seal to be measured for payment under this item will be limited to vertical butt joints and longitudinal concrete joint at limits of work.

No measurement will be made for the sawcutting of construction joints between paving phases or the sawcutting of the asphalt of the work area perimeter prior to placing the final asphalt course. These items will be considered incidental to Item P-401 – Asphalt Mix Pavement.

BASIS OF PAYMENT

005-5.1 Bituminous Concrete Milling. Payment for “Asphalt Pavement Milling”, will be made at the contract unit price per square yard milled, which shall be full compensation for surveying, milling regardless of depth, cleaning for all materials, labor, equipment, delivery of millings to the Owner and incidentals necessary to complete the work.

005-5.2 Sawing Bituminous Pavement. Payment for “Sawing Bituminous Pavement” will be made at the contract unit price per linear foot for “Sawing Bituminous Pavement”, which shall be full compensation for sawcutting and cleaning; and for all materials, labor, equipment and incidentals necessary to complete the work.

005-5.3 Saw and Seal. Payment for “Saw and Seal” will be made at the contract unit price per linear foot for “Saw and Seal”, which shall be full compensation for sawcutting, cleaning, and sealing; and for all materials, labor, equipment and incidentals necessary to complete the work.

No separate payment will be made for the sawcutting of construction joints between paving phases or the sawcutting of the asphalt of the work area perimeter prior to placing the final asphalt course. The cost for this work will be incidental to the various project items.

Payment will be made under:

| <u>ITEM</u> | <u>DESCRIPTION</u> | <u>UNIT</u> |
|-------------|------------------------------------|-------------|
| M-005-1 | Asphalt Pavement Milling, 0” to 4” | Square Yard |
| M-005-2 | Sawing Asphalt Pavement | Linear Foot |
| M-005-3 | Saw and Seal | Linear Foot |

MATERIAL REQUIREMENTS

ASTM D6690 Standard Specification for Joint and Crack Sealants,
Hot Applied, for Concrete and Asphalt

END OF ITEM M-005

ITEM M-006 PAVEMENT CRACK REPAIRS**DESCRIPTION**

006-1.1 This work consists of crack repairs to asphalt pavement after milling for areas to receive an overlay. Crack repairs includes cleaning, filling, repairing and reconstructing cracked asphalt pavement, including the application of a stress relieving membrane over the cracks, as required, in accordance with these specifications and as directed by the Engineer. After the milling operation is completed and the remaining surface is swept clean, the crack widths will be assessed and the appropriate crack repair treatment will be applied for each crack.

Miscellaneous pavement repairs are further defined as follows:

- a. Type 1A Crack Repair (for cracks less than 5/8" wide) - Type 1A crack repair shall consist of applying hot pumped asphalt crack sealer filling prepared cracks on pavement to be overlaid.
- b. Type 1B Crack Repair (for cracks 5/8" to 1-1/2" wide) - Type 1B crack repair shall be prepared and filled using the same treatment as specified for Type 1A repair except the surface shall be primed and a 12-inch wide stress absorbing membrane shall be installed over the crack sealer.
- c. Type 1C Crack Repair (for cracks wider than 1-1/2") - Type 1C crack repair shall be consist of saw-cutting the existing pavement (after milling) on either side of the crack; removing existing pavement to full-depth; tack coat sawcut edges and between pavement layers (if more than one layer); repave trench with Mass-DOT hot bituminous concrete (5/8" "top Course" mix), placed in layers if depth is greater than 3".

MATERIALS

006-2.1 Stress Absorbing Membrane. Stress absorbing membrane shall conform to the following requirements:

| Property | Value | Test Method |
|---------------------------|-----------|---------------------------|
| Thickness (mils) | 75 | ASTM D1777 |
| Grab tensile (lbs)(MD) | 180 | ASTM D1682 |
| Grab tensile (lbs)(XMD) | 190 | ASTM D1682 |
| Elongation (%) (MD) | 85 | ASTM D1682 |
| Elongation (%) (XMD) | 75 | ASTM D1682 |
| Strip tensile (lbs/in) | 60 | ASTM D882 (modified) |
| Puncture resistance (lbs) | 215 | ASTM E154 |
| Puncture resistance (lbs) | 80 | CW 022 Corps of Engineers |
| Permanence Perms | 0.10 max. | ASTM E96 Method B |

| | | |
|---|---|----------------------|
| Pliability (1/4 inch mandrel) | No cracks in fabric or rubberized asphalt | ASTM D146 (modified) |
| Peel adhesion (lbs/in) in 180 degree angle without primer | 3 | PSTC |

Primer shall be compatible with membrane and shall be supplied by membrane manufacturer.

006-2.2 Joint sealants. Joint sealant materials shall meet the requirements of ASTM D6690. 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.

006-2.3 Tack Coat. Tack coat shall be as specified in Item P-603 Bituminous Tack Coat.

CONSTRUCTION METHODS

006-3.1 Weather Limitations. No crack repair material shall be applied in wet cracks or where frost, snow or ice is present. The pavement temperature shall be 50°F and rising at the time of application of the poured joint sealing material.

006-3.2 Time Limitations. The Contractor shall schedule operations so that all crack filling and pavement repairs will be performed within the schedule identified within the project documents.

006-3.3 Equipment. Equipment used in the performance of the work shall be as subject to the approval of the Engineer and maintained in first class working conditions at all times.

Air compressor shall be portable and capable of furnishing not less than 100 cubic feet of air per minute at not less than 90 pounds per square inch pressure at the nozzle. The compressor shall be equipped with traps that will maintain the compressed air free of oil and water.

Manually operated, gas powered, air-broom or self-propelled vacuum sweeper designed especially for use in cleaning highway pavements shall be used to remove debris, dirt and dust from routed cracks.

Hand tools shall consist of brooms, shovels, metal bars with chisel-shaped ends, and any other tools which may be satisfactorily used to accomplish the work.

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.

Equipment for blowing clean, drying and rejuvenating sidewall of cracks shall be a propane torch unit which operates at 3000-degrees F. and gas velocity 3000 feet per second.

006-3.4 Stress Absorbing Membrane. Membrane shall be installed after crack filling or as specified herein and shown on the detailed drawings. The pavement surface shall be thoroughly cleaned and dried and shall be primed in accordance with the manufacturer's instructions prior to placement of the membrane.

The primer will be placed on the surface at the rate specified by the manufacturer of the primer, it shall extend two inches wider than the membrane and will be allowed to dry until tack-free before applying the membrane. Sections, which are primed, shall be covered with membrane within the same day.

The membrane shall be installed in widths of 12 inches and shall be centered over the crack or perimeter of bituminous concrete patch within a one inch tolerance. Transverse cracks shall be sealed first in any area. The longitudinal cracks will be sealed after the transverse cracks. Laps will be permitted in both the transverse and longitudinal membrane with a minimum overlay of 3 inches.

The material shall be laid smooth, straight and wrinkle-free, with no uplifted edges. Any wrinkles over 3/8-inches in width shall be slit and folded down. After the membrane has been placed, it shall be pressed against the asphalt surface by means of a hand roller or other suitable equipment to ensure proper bonding. Special attention should be given to insure that the edges or corners of the strips are securely bonded to the surface. Any strips with loose edges or corners should be rebonded or replaced prior to placement of the overlay at the expense of the Contractor.

All membrane shall be surface dry before placement of the bituminous concrete patch or overlay.

006-3.5 Type 1A Crack Repair. Type 1A Crack Repair in areas to be overlaid or where directed by the Engineer shall be clean and dry before installing hot applied fiber reinforced crack sealer. All cracks shall be blown clean by high-pressure air. All loose material shall be removed from the cracks and from the pavement surfaces. The cracks shall be sterilized by use of propane torch to eliminate all vegetation, moisture and dirt.

Crack sealing material shall be heated and applied at a temperature specified by the manufacturer and approved by the Engineer. Sealer shall be delivered to the pavement surface through a pressure hose line and applicator shoe.

All cracks shall be sealed as specified herein, and the sealer shall be well bonded to the pavement. Unless otherwise directed, the cracks shall be completely filled flush with the pavement, not more than 1/8 inch below surface, without formation of voids or trapped air. More than one application of crack sealer may be necessary to fill cracks to required level. When an overband of material is required, it shall be placed over the crack as shown on the Drawings.

Excess or spilled sealer shall be removed from the pavement by approved methods and discarded.

006-3.6 Type 1B Crack Repair - With Stress Absorbing Membrane. Type 1B crack repair in areas to be overlaid shall be repaired using the same treatment as Type 1A except the surface shall be primed and a 12-inch stress absorbing membrane shall be installed over the cracks as specified in Paragraph 006-3.4. A 4" wide overband shall be applied.

006-3.7 Type 1C Crack Repair. Type 1C crack repair in areas to be overlaid shall be repaired by saw-cutting full depth of the existing pavement, 12" on each side of the crack for the full length of crack; remove the existing pavement for the full-depth of the sawcut area (create a trench type area); shim and compact the

existing subgrade with similar material (P-209); clean and tack the vertical edges of the sawcut pavement; place new MassDOT hot bituminous concrete in layers if the depth is greater than 3”; tack coat between layers; and saw and seal edges of crack.

006-3.8 Certifications. Manufacturer’s certificates of all materials used shall be required.

METHOD OF MEASUREMENT

006-4.1 Type 1A Crack Repair. The quantity of “Type 1A Crack Repair” crack repair will be measured by the linear foot of crack repair, of the type specified, measured in place, completed, ready for overlay and accepted by the Engineer.

006-4.2 Type 1B Crack Repair. The quantity of “Type 1B Crack Repair” crack repair will be measured by the linear foot of crack repair, of the type specified, measured in place, completed, ready for overlay and accepted by the Engineer.

006-4.3 Type 1C Crack Repair. The quantity of “Type 1C Crack Repair” crack repair will be measured by the linear foot of crack repair, of the type specified, measured in place, completed, ready for overlay and accepted by the Engineer.

BASIS OF PAYMENT

006-5.1 Type 1A Crack Repair. Payment will be made at the contract unit price per linear foot for Crack Repair Type 1A. This price shall be full compensation for all cleaning and preparation, crack sealer, primer, and for all materials, labor, equipment and incidentals necessary to complete the work.

006-5.2 Type 1B Crack Repair. Payment will be made at the contract unit price per linear foot for Crack Repair Type 1B. This price shall be full compensation for all cleaning and preparation, crack sealer, primer, stress absorbing membrane, rolling, and for all materials, labor, equipment and incidentals necessary to complete the work.

006-5.3 Type 1C Crack Repair. Payment will be made at the contract unit price per linear foot for Crack Repair Type 1C. This price shall be full compensation for all saw-cutting, removal of existing pavement, shim and compaction of the exiting subgrade, tack coat, furnishing, placing and compacting MassDOT hot-bituminous pavement, saw and seal of edges, and for all materials, labor, equipment and incidentals necessary to complete the work.

Payment will be made under:

| <u>ITEM</u> | <u>DESCRIPTION</u> | <u>UNIT</u> |
|-------------|------------------------|-------------|
| M-006-1 | Crack Repair - Type 1A | Linear Foot |
| M-006-2 | Crack Repair - Type 1B | Linear Foot |
| M-006-3 | Crack Repair - Type 1C | Linear Foot |

M-006-4

MATERIAL REQUIREMENTS

| | |
|------------------------|---|
| ASTM D 3405 | Joint Sealants, Hot-Poured, for Concrete and Asphalt Pavements |
| ASTM D 3406 | Joint Sealants, Hot-Poured, Elastomeric-Type, for Portland Cement Concrete Pavements |
| ASTM D 3569 | Joint Sealant, Hot-Poured, Elastometric, Jet-Fuel-Resistant Type, for Portland Cement Concrete Pavements |
| ASTM D 3581 | Joint Sealant, Hot-Poured, Jet-Fuel-Resistant Type, for Portland Cement Concrete and Tar-Concrete Pavements |
| Fed. Spec. SS-S-200 | Sealing Compounds, Two Component, Elastomeric, Polymer Type, Jet-Fuel Resistant, Cold Applied |

END OF ITEM M-006

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ITEM M-007 TRAFFIC CONTROLS FOR CONSTRUCTION AND MAINTENANCE OPERATIONS**CONTRACT DOCUMENTS**

007-1.1 General. The special requirements set forth in this section of these specifications shall govern any aspect of the contract work where such requirements are deemed applicable by the Owner or the Engineer. The purpose of these requirements is to ensure that the contract work does not damage private property or create hazards to aircraft operations, and point out special coordination, the contractual responsibilities of the Contractor, and schedule conditions of which the Contractor should be aware. It shall be the Contractor's responsibility to conduct all work in strict accordance with the special requirements set forth herein and to fully cooperate with the Owner and the Engineer in every way necessary to fulfill the purposes of these requirements as set forth above.

007-1.2 Description of Work. Work under this Section consists of furnishing, installing and maintaining in proper operating condition various traffic control devices for the protection of the traveling public and working personnel during construction and maintenance operations. The design, application, and installation of all devices shall conform to MassDOT's "Standard Details and Drawings for the Development of Temporary Traffic Control Plans" and the "Manual on Uniform Traffic Control Devices" latest edition, Part VI, hereinafter referred to as MUTCD, and/or as directed.

The Contractor shall be responsible for the installation of adequate safety precautions for the protection of the traveling public and all project personnel.

007-1.3 Uniformed Police Detail. The Contractor shall provide uniformed officers, lane closure materials (drum barricades, signs), and appropriate MUTCD compliant signage at locations shown on the drawings. Uniformed Police Detail will be measured and paid for by an allowance.

All costs for the work associated to furnish and install the lane closure, setting up and breaking down the lane closure each day, coordination with the Town, and all other labor, equipment, materials, tools, and incidentals necessary for the lane closure shall be considered incidental to the other bid items.

007-1.4 Safety Signing for Traffic Management. Safety Signing for Traffic Management consists of furnishing, positioning, repositioning, covering and uncovering, maintaining and removing, as needed and/or as directed: regulatory, warning, and guide signs together with their supports. If additional supports are needed due to site conditions they will be considered incidental to the work.

Signs over 50 square feet (5 m²) will require approval of design calculations and shop drawings of the breakaway support system if the signs are installed at an unprotected location.

007-1.5 Reflectorized Drums. Reflectorized drum barricades shall conform to Subsection M9.30.9. Warning lights and shall conform to the MUTCD Type A. All drum barricades shall be maintained in a satisfactory manner including the removal of dirt and road film that causes a reduction in sheeting retroreflective efficiency.

MATERIALS

007-2.1 General. Devices required under this Section need not be new but must be in first class condition and acceptable to the Engineer. The condition of the work zone traffic control devices shall meet the quality standards set forth in the Quality Standards for Work Zone Traffic Control Devices compiled by the American Traffic Safety Services Association (ATSSA). Any devices that, in the judgment of the Engineer, are unsatisfactory in appearance and/or performance shall be removed and immediately replaced by acceptable devices.

007-2.2 Safety Signing for Traffic Management. Rigid signs shall be fabricated from plywood, aluminum or approved alternate substrate material. Plywood sign material shall be 5/8 inch Exterior MDO – General (one sided).

Aluminum sign material shall be Type A, 0.080 inch thick, as specified in Subsection 828.42. The entire sign face shall be retro-reflectorized. Reflective sheeting shall conform to M9.30.0. Rollup signs shall be fabricated from vinyl microprismatic retroreflective material.

Background sheeting for all construction warning signs shall be of a fluorescent orange color. The minimum spectral radiance factor, in accordance with Section 5.1 of ASTM E991, for the fluorescence shall be as follows:

New 110% minimum

Weathered 60% minimum

007-2.3 Safety Signing for Traffic Management. Signs which are damaged or are missing from their locations shall be replaced by the Contractor without additional compensation except as described in Section 7.1.4. All signs shall be maintained in a satisfactory manner including the removal of dirt or road film that causes a reduction in sign reflective efficiency. All signs shall be mounted in compliance with the requirements of the MUTCD. All signs not consistent with the use of the roadway shall be removed, completely covered, or turned away from traffic each day. In no case shall signs or their portable supports be left in the traveled way when the traffic management set-up has been removed. Rollup signs shall only be used for single work shift setups.

007-2.4 Reflectorized Drums. Reflectorized drums are to be used as channeling devices in highway work zones. The first five drums used for any taper or as designated on the Temporary Traffic Control Plan shall be equipped with flashing lights.

METHOD OF MEASUREMENT

007-3.1 Drum Barricades The quantity of “Drum Barricades” will be determined by measurement of the number of per each drum actually used and accepted by the RPR as complying with the plans and specifications. Regardless of the number of times that drum may be reused on the project, it will not be measured for payment more than once.

007-3.2 Temporary Lane Closure Signs. The quantity of “Temporary Lane Closure Signs” for lane closure will be measured by the square foot (SF) and the quantity will be only that which is actually used on the project. Regardless of the number of times that a sign may be reused on the project, it will not be measured for payment more than once.

007-3.3 Police Detail. The quantity of “Police Detail” will be measured and reimbursed as an allowance. The Contractor shall submit the actual billed invoices from the Massachusetts State Police Department to the contractor. The invoices submitted for payment shall not have any contractor cost markups of any kind.

The allowance for the police detail is **only** for the police detail required for the roadway lane closures along Route 2 during work in Work Areas I and II.

BASIS OF PAYMENT

007-4.1 Payment for “Drum Barricades” shall be made at the contract unit price per each. This price shall be full compensation for furnishing all materials all labor, equipment tools, and incidentals necessary to complete the item.

007-4.2 Payment for “Temporary Lane Closure Signs” shall be made at the contract unit price per each for each sign used. This price shall be full compensation for furnishing all materials, placing, and for all labor, equipment tools, and incidentals necessary to complete the item.

007-4.3 Payment will be made at the Contract unit price per allowance for “Police Detail”.

Payment will be made under:

| <u>ITEM</u> | <u>DESCRIPTION</u> | <u>UNIT</u> |
|-------------|------------------------------|-------------|
| M-007-1 | Drum Barricades | Each |
| M-007-2 | Temporary Lane Closure Signs | Square Foot |
| M-007-3 | Police Detail | Allowance |

END OF ITEM M-007

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ITEM M-008 REPLACE EXISTING CULVERT**DESCRIPTION**

008-1.1 The work under this section of these specifications shall include the removal and replacement of an existing culvert pipe with a new precast concrete box culvert. This will include, but not limited to, the removal of the existing culvert; miscellaneous demolition work; test pits; installation of new concrete box culvert; relocation of existing water line; installation of new roadway pavement box (asphalt, base and subbase materials); guard rail; fencing; erosion controls and dewatering as indicated on the plans.

This specification refers to the culvert plans CV1.1 through CV1.5.

MATERIALS

008-2.1 General. All materials are to be installed and furnished as noted on the culvert plans.

008-2.2 Sediment Log. The sediment log shall consist of a tubular sediment control device as manufactured by Filtrexx Northeast Systems or approved equal. Wood stakes shall have a minimum size of 1.5 in by 1.5 in and a minimum length of 36 in.

008-2.3 Materials used for Culvert Work. Unless otherwise noted, all work and materials shall comply with applicable sections of the Massachusetts Department of Transportation's (Massachusetts Highway Department) "Standard Specifications for Highways and Bridges", as amended.

| Item | Material Spec. or Proprietary Item Referenced | Sheet |
|--|--|--------------|
| E&S Perimeter Control-Sediment Log | 12" min. - no brand spec. | CV1.2 |
| E&S Dewatering Control | Dirtbag or Equal | CV1.2 |
| Temporary Cofferdam | Supersack or Equal | CV1.2 |
| Water Main | 12" dia. CL 52 Ductile Iron Pipe, with bends, tees, joint restraints, thrust blocks, taps, fittings, 12" tapping sleeves and valves, valve boxes - see specific references in Water Main Notes | CV1.3 |
| Precast Culvert and Headwalls | See Box culvert notes on this sheet for details and separate Word doc for guidance info | CV1.3 |
| Gravel/Sand Streambed Material | See gradation in notes on plan and details in sections within this specification section | CV1.3 |
| 12" Crushed Stone for Culvert Foundation | MassDOT M2.01.1 | CV1.3 |
| Bituminous damproofing | MassDOT SubSection 970 | CV1.3 |
| Geotextile Fabric for Separation | MassDOT M9.50.0 | CV1.3 |
| Bituminous concrete top course | MassDOT Subsection 450 - Superpave surface course - 12.5 (SSC-12.5) | CV1.3 |
| Bituminous concrete binder course | MassDOT Subsection 450 - Superpave base course - 37.5 (SBC-37.5) | CV1.3 |
| Dense-graded crushed stone | MassDOT M2.07.7 | CV1.3 |
| Gravel borrow, type b (for pavements) | MassDOT M1.03.0, TYPE B | CV1.3 |
| Pavement milling mulch for shoulders | MassDOT Section 739 | CV1.3 |
| Compacted gravel backfill | MassDOT M1.03.0, TYPE B | CV1.3 |

| | | |
|---|---|-------|
| Ordinary borrow | MassDOT M1.01.0 | CV1.3 |
| Steel W beam guardrail | MassDOT M8.07.0 and M8.07.1; MassDOT Std. Detail dwgs 400.1.0, 400.1.4, 400.1.5, 400.1.6, 400.2.1 | CV1.5 |
| 36-inch high chain link fence | MassDOT M8.09.0; MassDOT Std. detail 404.8.0 | CV1.5 |
| Posts | MassDOT Detail 400.1.4 | CV1.5 |
| Offset blocks | MassDOT 400.1.4 | CV1.5 |
| Guardrail treatment impact head/rounded end units | See Guardrail and fence notes 1 & 2 on CV1.5 | CV1.5 |
| Guardrail delineators | MasDOT Section 601 | CV1.5 |
| Riprap | MassDOT M2.02.3 | CV1.5 |
| Crushed stone | MassDOT M2.01.4 | CV1.5 |
| Nonwoven geotextile | Mirafi 140N or equal (MassDOT M9.50.0, Geotextile Fabric for Separation) | CV1.5 |

008-2.4 Gravel / Sand Streambed Material. The Gravel / Sand Streambed Material shall be of natural origin and consist of rounded to sub-rounded stones within a sand matrix, similar in appearance and texture to the existing stream bed material in the Project area. The material shall be substantially free of shale, products from crushing or blasting operations, organic materials, and debris. Stones greater than one inch in diameter shall be generally free of fractured faces or any dimensions that are larger than the maximum size stated in the Streambed Material gradation requirements. As may be approved by the Engineer, materials salvaged from the Project site that meet the requirements of this specification may be used if obtained from within the limit of work and as approved by the Engineer.

The Contractor shall submit a work plan to the Engineer describing the methodology and equipment that will be utilized to complete the placing of the streambed materials. The work plan shall also identify the Contractor's protection of all watercourses from water-borne sediment or other pollutants. No work shall commence in the streambed until the Engineer has reviewed and provided the Contractor with written acceptance of the work plan.

A separate stockpile shall be established at the Site for Gravel / Sand Streambed Material. The stockpile shall contain a minimum of 35 cubic yards, shall have a height of at least four feet, and shall be trimmed to uniform surfaces and slopes. The Engineer will use visual means to verify stockpile conformance regarding the general shape and texture of the material, and for determining reasonably close conformance with the specified gradation and the approved gradation submittals.

Gravel / Sand Streambed Material Gradation:

| Sieve Size Designation | Percentage Passing by Weight |
|------------------------|------------------------------|
| 3 inch | 100 |
| ½ inch | 50 – 85 |
| No. 20 | 25 – 60 |
| No. 100 | 5 – 30 |

Gravel / Sand Streambed Material shall be placed in accordance with the drawings and details shown in the contract documents. The surface on which streambed materials are to be placed shall be de-watered and free of objectionable material. Streambed material shall be loosely placed in a manner to minimize segregation, with final placement as approved by the Engineer.

A top surface shall be established which contains small mounds and minor depressions that results in an uneven surface. After placement, Gravel / Sand Streambed Material shall be thoroughly wetted prior to exposure to normal water flow conditions.

The Engineer and Owner's Representative will review the area to verify that the Gravel / Sand Streambed Material has been adequately placed in accordance with these specifications and the drawings and details shown in the contract documents. The Contractor shall receive written approval of the placed Gravel / Sand Streambed Material prior to the re-establishment of flow through the affected area.

008-2.5 Shop Drawings And Certifications. The Contractor shall submit manufacturer's Shop Drawings and Certification of Compliance for all components as shown on the culvert plans.

CONSTRUCTION METHODS

008-3.1 General. Construction for the culvert shall be in accordance with the culvert plans CV1.1 through CV1.5 of the contract documents.

008-3.2 Permits. The Contractor shall adhere to all Order of Conditions outlined in the appendices of these specifications.

008-3.3 Utility location. The approximate locations of known utilities are shown on the Contract Plans. Existing utility locations are based on record plans, and may not be accurate. It is the Contractor's responsibility to locate and verify all existing utilities within the vicinity of all excavations and trenches, regardless of whether or not the utility is shown on the Contract Plans. The Contractor shall perform test pits to determine location and depth of utilities.

008-3.4 Dewatering and Sedimentation Control. Dewatering and sedimentation control is required to lower and control ground water table levels and hydrostatic pressures to permit excavation, backfill, and construction for the culvert. See the culvert drawings CV1.1 to CV1.5 for requirements. The Contractor shall be responsible for providing all materials, equipment, labor, and services necessary for care of dewatering and sedimentation control. Excavation work shall not begin before the dewatering and sedimentation control are in place.

METHOD OF MEASUREMENT

008-4.1 Replace Existing Culvert. The quantity of "Replace Existing Culvert" will be measured per lump sum. This will include all work depicted on culvert sheets CV1.1 to CV1.5 of the plans and outlined in this specification section. Work included but not limited to removal of existing culvert, installation of new concrete box culvert, installation of guard rail, fencing, all excavation and backfilling, relocation of existing water line, erosion controls, dewatering, construction of new pavement box, and all incidentals to complete the culvert removal and incidentals.

BASIS OF PAYMENT

008-5.1 Replace Existing Culvert. The price for "Replace Existing Culvert" 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 Engineer in accordance with these specifications and plans CV1.1 to CV1.5.

Specification No. 101-023

ORE – Orange Municipal Airport

Payment will be made under:

| <u>ITEM</u> | <u>DESCRIPTION</u> | <u>UNIT</u> |
|-------------|--------------------------|-------------|
| M-008-1 | Replace Existing Culvert | Lump Sum |

END OF ITEM M-008

M-008-4

ITEM M-009 MISCELLANEOUS DEMOLITION**DESCRIPTION**

009-1.1. This work consists of removing and disposing, abandoning of various site items as indicated on the Plans or as directed by the Engineer. The Contractor shall legally dispose of all materials cleared, excavated or removed, regardless of type, character, composition or condition of such materials, off Airport property. The Contractor shall be responsible for obtaining all permits and paying all fees necessary for the disposal.

CONSTRUCTION METHODS

009-2.1 Abandon Existing Catch Basin. Abandoning existing catch basins shall consist of removing and disposing of the existing frame and grate, the capping (brick and mortar) of existing drain pipes entering and/or exiting the structure to be abandoned; capping of the existing drain pipes entering down stream drainage structures from the structure to be abandoned; and then backfilling with P-153, controlled low strength material, to the top of the existing grate. This includes abandoning of existing drain pipe between catch basin to be abandoned to the connecting downstream drainage structure.

009-2.2 Remove and Dispose of Existing Catch Basins. Existing catch basins encountered within the established lines, grades, or grading sections, as shown on the plans, 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. All concrete and masonry structures, regardless of materials, shall be completely removed, and the void shall be filled with selected excavated material placed in 6-inch layers and thoroughly compacted as directed by the Engineer, and in accordance with the requirements of Item P-152. 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 Engineer shall be notified prior to disturbing such structure. The disposition of existing structures so encountered shall be immediately determined by the Engineer in accordance with the provisions of the contract. Once catch basins have been removed the Contractor shall brick and mortar the remaining drain pipe openings or connect as shown on the plans.

009-2.3 Removal of Existing Drain Pipe. Existing drain pipe to be removed shall be excavated and completely removed and legally disposed of off Airport property. The excavated material may be reused for backfilling of the new concrete pipe if it meets the requirements of D-701. Where new pipe are not going to be placed in the same trench the remaining void shall be filled with selected excavated material placed in 6-inch layers and thoroughly compacted as directed by the Engineer, and in accordance with the requirements of Item P-152.

009-2.4 Removing and Disposing of Existing Runway and Taxiway Lights. A number of existing light fixtures and base plates, as identified on the plans, shall be removed and stacked and delivered to the Owner at a location to be designated by the Engineer. All other existing light fixtures, base plates, stakes, transformers, concrete bases, etc., shall be removed in their entirety and legally disposed of offsite. The removal of a light fixture will include the removal of the existing light fixture, stake or base can; detaching from existing associated wiring, conduits, grounding, ground rods, within a 1 foot circle

around the site of the base, and debris removed from the airfield. The void left from the removal shall be backfilled with material to match existing. In existing turf areas, the void shall be backfilled with existing excavated material or other approved material. All material shall be installed in lifts approved by the Engineer and shall be thoroughly compacted. Area shall be restored with topsoil and seed in accordance with Items T-901 and T-905.

009-2.5 Removal of Existing Cables. Where shown on the plans or directed by the Engineer the Contractor shall remove existing or abandoned cables, whether direct buried or in existing duct or conduit. If existing cable is not encountered during the trenching for the installation of new cable, for the runway and taxiway circuits, then it may be abandoned in place. The removed cable shall be legally disposed of by the Contractor off Airport property. All cable removed shall be owned by the Contractor. Contractor does not get paid for abandoning existing cable.

009-2.6 Remove and Dispose of Existing Airfield Signs. Existing airfield signs shall be removed and disposed at the locations shown in the drawings. Existing pavement, concrete, sign foundation, sign housing, sign panel, transformer and gravel shall be removed as necessary and disposed of off-site. The existing sign, steel base, concrete encasement, existing series circuit wire, ground wires, counterpoise wires, transformers, ground rods and raceways, will be removed in the vicinity of the existing airfield sign and foundation and disposed of off-site. Once the existing airfield sign, foundation and appurtenances are removed, the void shall be backfilled with material to match existing. In existing turf areas, the void shall be backfilled with existing excavated materials or other approved material. All material shall be installed in lifts approved by the Engineer and shall be thoroughly compacted. Area shall be restored with topsoil and seed in accordance with Items T-901 and T-905.

009-2.7 Existing Fence Removal. In order to gain access for the tree clearing work existing fence will have to be removed. The removal would consist of removing and disposing of the fence fabric, line and corner posts, and other miscellaneous hardware. Any holes left by the removal of the line and corner posts shall be backfilled and compacted with approved backfill material. If the Airport wants to have the fence fabric the Contractor shall neatly remove the fabric into a roll, bind and store it in a safe location for the Airport to retrieve.

009-2.8 Pavement Removal. Pavement removal shall consist of the removal and disposal of asphalt pavement as called for on the plans or directed by the Engineer. This item shall only be used to measure areas of full depth pavement removal which is not otherwise to be reclaimed in placed or milled. Existing asphalt pavement shall be removed and legally disposed of off-site. The existing asphalt pavement to be removed shall be sawcut to the full depth of the asphalt material around the perimeter of the area to be removed. Once the pavement area has been removed then the Contractor shall place topsoil and seed in accordance with T-901 and T-905. Grade topsoil to drain away from pavement

009-2.9 Removal of Pavement Markings. All paint as shown on the plans or as directed by the Engineer shall be removed from the surface of the existing pavement. Chemicals, high-pressure water, heater scarifier (asphaltic concrete only), cold milling, or sandblasting may be used. Any methods used shall not cause major damage to the pavement. Major damage is defined as changing the properties of the pavement or removing pavement over 1/8 inch deep. If chemicals are used, they shall comply with the State's environmental protection regulations. No material shall be deposited on the runway shoulders. All wastes shall become the property of the contractor and legally disposed of off-site. Covering over existing paint using black paint, other asphaltic compounds, or other types of coatings is not an acceptable form of removal.

METHOD OF MEASUREMENT

009-3.1 Abandon Existing Catch Basin. The quantity of “Abandon Existing Catch Basin” will be measured per each for each structure actually abandoned including all capping of drain pipes, removal and disposal of frames and grates, abandoning of existing drain pipe, backfill with controlled low strength material in accordance with the Plans and/or as directed by the Engineer regardless of the size or depth of structure.

009-3.2 Remove and Dispose of Existing Catch Basin. The quantity of “Remove and Dispose of Existing Catch Basin” will be measured for payment per each for each structure actually removed in accordance with the Plans and/or as directed by the Engineer regardless of the size or depth of structure. This will include the removal of castings, all excavation and backfill, plugging of existing drain pipes, shoring, dewatering, and restoring the surrounding area to the conditions existing prior to work.

009-3.3 Remove of Existing Drain Pipe. The quantity of “Remove Existing Drain Pipe” will be measured per linear foot removed and disposed. This will include all excavation, backfilling, removal and disposal of drain pipe, shoring, dewatering, and restoring the surrounding area to the conditions existing prior to work.

009-3.4 Remove Existing Runway/Taxiway Edge Light. The quantity of “Remove Existing Runway/Taxiway Edge Light” to be paid for under this item shall be the number of runway or taxiway lights, each, whether stake or base mounted, removed from the ground to be removed and salvaged or disposed of off-site, and includes removal of associated wiring, conduits, grounding, ground rods, concrete encasement of the base within a 1 foot circle around the site of the base, and debris removed from the airfield.

009-3.5 Remove Existing Cables. The quantity of “Remove Existing Cables” shall be measured on a linear foot basis for removal of all direct-buried cables and/or cables in conduit completed in accordance with the Plans or as directed by the Engineer and as herein specified including, but not limited to materials, equipment, tools, services and incidentals required for completing the task. There is no payment for abandoning existing cables.

009-3.6 Remove Existing Airfield Sign. The quantity of “Remove Existing Airfield Sign” to be paid for under this item shall be the number of signs and foundations removed from the ground and disposed of off-site, and includes removal of associated wiring, conduits, grounding, ground rods, concrete encasement of the base within a 1 foot circle around the site of the base, and debris removed from the airfield. This item also includes all excavation of all material (including pavement) and off-site disposal as necessary, backfilling the void left from the excavation, compaction and surface restoration.

009-3.7 Removal of Existing Fencing. The quantity of “Remove Existing Fence” will be measured for payment by the linear foot. Measurement will be along the top of the fence from center to center of end posts, excluding the length occupied by gate openings. This will include the removal of all fence fabric, posts and foundations, and miscellaneous hardware.

009-3.8 Pavement Removal. “Pavement Removal” will be measured for payment by the cubic yard. This price shall be full compensation for furnishing all materials, labor, equipment, tools, sawcutting and incidentals necessary to complete the item.**009-3.9 Pavement Marking Removal.** The quantity of “Pavement Marking Removal” will be measured for payment by the square foot.

BASIS OF PAYMENT

751-5.2 The accepted quantities of all items to be removed and disposed, and abandoned will be paid for at the contract unit price list in the Method of Measurement for each corresponding item. This price shall be full compensation for furnishing all materials and for all preparation, excavation, backfilling and placing of the materials; and for all labor equipment, tools and incidentals necessary to complete the structure.

Payment will be made under:

| <u>ITEM</u> | <u>DESCRIPTION</u> | <u>UNIT</u> |
|-------------|--|-------------|
| M-009-1 | Abandon Catch Basin | Each |
| M-009-2 | Remove and Dispose of Existing Catch Basin | Each |
| M-009-3 | Remove and Dispose of Existing Drain Pipe | Linear Foot |
| M-009-4 | Remove and Dispose of Existing Runway/Taxiway Edge Light Fixture | Each |
| M-009-5 | Remove and Dispose of Existing Electrical Cables | Linear Foot |
| M-009-6 | Remove and Dispose of Existing Airfield Sign | Each |
| M-009-7 | Remove and Dispose of Existing Fence | Linear Foot |
| M-009-8 | Pavement Removal | Cubic Yard |
| M-009-9 | Pavement Marking Removal | Square Foot |

END OF ITEM M-009

ITEM M-010 MISCELLANEOUS ELECTRICAL**DESCRIPTION**

010-1.1 This item shall consist of furnishing all labor, equipment and materials necessary to perform all the work required in this specification.

MATERIALS

010-2.1 Not Applicable

CONSTRUCTION METHODS

010-3.1 Verification of Existing Circuitry. Existing airfield electrical circuitry, as shown in the plans, was derived from record plans. Prior to commencing electrical work, the Contractor shall perform an existing electrical investigation to verify all existing airfield circuitry by opening manholes, meggering circuits and verifying cable tags, if available. The results of the existing electrical investigation shall be provided to the Engineer for review prior to commencing with electrical work. Provide an “existing conditions” plan to the Engineer, suitable for incorporation in the record set of plans.

010-3.2 Temporary Electrical Conditions. Portions of existing airfield circuits shall remain operational during construction. As a result, portions of existing lighting circuits will need to be kept operating during phases of the project. The Contractor shall incorporate temporary electrical conditions including temporary jumper cables and splices to facilitate this phasing, as approved and / or directed by the Engineer. All temporary electrical conditions shall be approved by the Engineer and Owner prior to use.

010-3.3 Removing and Reset Existing Runway Edge Light. Existing runway edge lights have to be removed in order to accommodate grading operations; and then re-installed after grading operations have been completed. For the runway edge lights to be removed and reset the Contractor shall take great care in removing and storing the light fixture and transformer. The Contractor shall take care to protect circuit cable ends and existing ground rod (if present) in order to reconnect the edge light after grading operations. Any damage which occurs to the light fixture, transformer, or cable during the removal process, during re-installation, or while stored waiting for re-installation, then the light fixture, transformer, and cable shall be replaced in kind, as approved by the Engineer, by the Contractor at the Contractor’s expense. The void left from the removal shall be backfilled with Engineer approved material to match existing. All material shall be installed in lifts approved by the Engineer and shall be thoroughly compacted to prevent any settlement. The reinstallation of the light fixture and transformer will consist of installing the light fixture in accordance with the details on the plans and Specification Section L-125, and reconnection to exiting circuit cables to the light fixture. If a ground rod is present reconnect to light fixture. If not install new ground rod and connect to light fixture.

METHOD OF MEASUREMENT

010-4.1 Verification of Existing Circuitry. The work involved in providing “Verification of Existing Circuitry” will be measured on a lump sum basis including labor, equipment, tools and all incidentals required for completing the task.

010-4.2 Temporary Electrical Conditions. The quantity of “Temporary Electrical Conditions” work completed shall be measured on a lump sum basis, completed in accordance with the phasing plans and as herein specified including all temporary electrical conditions, but not limited to materials, equipment, tools, services and incidentals required for temporary electrical conditions.

010-4.3 Remove and Reset Existing Runway Edge Light. The quantities of “Remove and Relocate Existing Runway Edge Light” to be paid for under this item shall be the number of runway edge lights removed and reset, each, whether stake or base mounted. The removal includes the removal and storage of existing light fixture and transformer, and protection of existing cable, and backfilling of void left from removal. The installation would include reinstalling the light fixture and transformer, connect to existing circuit cables and ground rod (install new ground rod if one is not present), ground wire connections, bonding, and all excavation required to place the relocated light fixture, all dewatering operations and stabilization, all backfill and compacting and all restoration of the site.

BASIS OF PAYMENT

010-5.1 Payment will be made at the contract lump sum price for providing “Verification of Existing” Circuitry”. This price shall be full compensation for furnishing all materials, labor, equipment, tools and all incidentals required for completing the task.

010-5.2 Payment will be made at the contract lump sum price for providing “Temporary Electrical Conditions”. This price shall be full compensation for all temporary electrical conditions including, but not limited to furnishing all materials, equipment, tools, labor, services and incidentals required to complete the item.

010-5.3 Payment for “Remove and Reset Existing Runway Edge Light” will be made at the contract unit price for each item removed and reset by the Contractor. This price shall be full compensation for all temporary electrical conditions including, but not limited to furnishing all materials, equipment, tools, labor, services and incidentals required to complete the item.

Payment will be made under:

| <u>ITEM</u> | <u>DESCRIPTION</u> | <u>UNIT</u> |
|-------------|---|-------------|
| M-010-1 | Verification of Existing Circuitry | Lump Sum |
| M-010-2 | Temporary Electrical Conditions | Lump Sum |
| M-010-3 | Remove and Reset Existing Runway Edge Light | Each |

END OF ITEM M-010

ITEM M-011 TEMPORARY AIR AND WATER POLLUTION, SOIL EROSION, AND SILTATION CONTROL**DESCRIPTION**

011-1. This item shall consist of temporary control measures as shown on the plans or as ordered by the Engineer 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.

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.

011-2 Compliance. The Contractor shall provide labor, materials and equipment necessary to complete the work of this Section, including, but not limited to erosion control and environmental protective measures described in this Section and indicated on the Plans, or as directed by the Engineer, for all areas within the limits of work designated on the plans. All work shall be in compliance with all local, state and federal wetlands and environmental regulations. The Contractor shall assume all responsibility for compliance with the permits (see Appendices of these specifications).

No additional compensation will be made for work required due to Contractor violations of the state and local laws or these permits.

MATERIALS

011-2.1 Inlet Protection. Catch basin inlet protections shall be Ultra-Filter Sock manufactured by Ultratech or approved equal.

011-2.2 Other. All other materials shall meet commercial grade standards and shall be approved by the ENGINEER before being incorporated into the project.

CONSTRUCTION REQUIREMENTS

011-3.1 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.

The Engineer shall be responsible for assuring compliance to the extent that construction practices, construction operations, and construction work are involved.

011-3.2 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 Engineer.

011-3.3 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 Engineer 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 Engineer.

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 Engineer. 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 Engineer, the work shall be performed by the Contractor and the cost shall be incidental to this item.

The Engineer 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.

011-3.4 Environmental Permit Requirements. The Contractor shall pay special attention to the Order of Conditions issued by the Town of Orange, MA. Conservation Commission. A copy of the Order of Conditions is attached to these specifications.

011-3.5 Maintenance. Areas of construction shall remain in a stable condition at the close of each construction day. Erosion controls shall be inspected at this time, and maintained or reinforced to meet the specifications given on the Plans and in the Order of Conditions.

All construction areas shall be restored to original condition or better upon completion of the project. All erosion control devices shall be inspected regularly. Any entrapped silt shall be removed to an area outside the wetland buffer zone and resource areas, and other devices shall be replaced as necessary.

Erosion control devices shall remain in place until all disturbed surfaces have been stabilized with a vegetative cover or until the Engineer has authorized their removal. No additional payment will be made for cleaning. Additional payment shall be made for replacement authorized by the Engineer.

The contractor shall observe and adhere to all limits of work, setback, and other boundary markings shown on the Plans or marked in the field. Care shall be taken not to remove or damage any such markings during the course of work. If at any time the Contractor is unsure as to the significance or location of any such marking, the Contractor shall consult the Engineer.

011-3.6 Removal. The sedimentation and erosion controls shall be completely removed from the project area at the completion of the project upon approval by the Engineer.

011-3.7 Authority Of The Engineer. The Engineer has the authority to direct the Contractor to provide immediate temporary water pollution control measures to minimize the contamination of adjacent streams or other watercourses, lakes, ponds, or other areas of water impoundment.

The Engineer shall determine the necessary locations for erosion control and the methods of erosion control based on site conditions.

Erosion and sedimentation controls requested by the Engineer, or the Town of Orange Conservation Commission shall be installed within 48 hours of the verbal or written request to the Contractor. In a situation deemed to be an emergency by the Engineer, installation shall take place immediately.

011-3.8 Spill Containment Plan.

A Arrangement of Materials

- (1) At least 1 day prior to the start of the construction, 2 polyethylene plastic sheets shall be placed atop one another on level, firm ground at the proposed equipment fueling location.
- (2) A continuous row of compost filter socks shall enclose the edge plastic sheeting to create an area within which fueling will occur. The plastic will be positioned on the compost filter socks as to contain the volume of any spillage within the enclosure.
 - (i) The compost filter socks shall be fastened to the ground with 1.5 in x 1.5 in stakes.
 - (ii) three (3) each of 50 lb. bags of “speedy-dry” or similar absorbent chemical and two (2) each 55 gal barrels with lids shall be stored adjacent to the fueling / herbicide mixing site on level, firm terrain, and shall be completely covered by a plastic sheet.

B Spill Prevention Procedures / Protocol

- (1) Storage of Fuel
 - (i) All fuel, chemicals and related equipment shall be brought to the site immediately prior to the start of construction and removed from the site as soon as possible after the conclusion of construction.

- (ii) Fuel for the vehicles and mechanical equipment and other chemicals may be transported to the site in storage tanks, which are to remain on the truck until they are to be used. Storage tanks shall be in good condition with no leakage. Fuel and chemical storage shall only occur in upland areas outside the buffer zone to any wetland resource area.
 - (iii) Fuel may also be stored in tight jugs, or screw-top stainless steel canisters, or 55 gal drums. Such containers shall be placed within a secured enclosure atop plastic sheeting and covered with plastic at all times.
 - (2) Equipment Fueling
 - (i) Refueling of equipment shall occur outside of any wetland resource area and the buffer zone thereto or performed in a manner to contain the volume of any spillage.
 - (3) Fuel Line and Equipment monitoring
 - (i) The Contractor shall check all fuel lines, hoses, and fuel tanks at hourly intervals for the presence of leaks, as long as the equipment is on-site.
 - (4) Spill Containment
 - (i) For all small fuel or chemical leaks, the Contractor shall completely capture the leakage with a 5 gal pail. Small leaks shall be further contained with “speedy-dry” or similar absorbent chemical.
 - (ii) In the event of fuel or chemical leaks or spills greater than 1 gal, the Contractor shall comply with the following procedure:
 - a. Immediately shut down the engine, shut off power, or cease use of the chemical.
 - b. Set an immediate temporary patch on all leaking fuel lines or hoses.
 - c. Completely contain the spill within the protected work area on plastic sheeting with “speedy-dry” or similar absorbent chemical.
 - d. If necessary, drain the engine and any leaking lines or hoses of fuel into the storage tank of 55 gal barrels. All faulty equipment may then be repaired.
 - e. Once the area is cleaned and the threat of spillage has ceased, the Contractor shall seek approval from the Engineer for approval to resume the removal using chemicals or fuel-powered equipment and vehicles.
 - (iii) Contractor shall have available on-site, all equipment or tools necessary to repair or patch any leaking fuel lines, hoses or tanks or chemical sprayers.
 - (iv) On-site Temporary Storage of Spilled Fuel and Chemicals and Contaminated Absorbent Materials.
 - a. For small spills contained within a 5 gal pail, fuel, or chemicals shall be emptied into a clean, dry 55 gal, or similar, barrel with a tight closure lid and sealed. This shall provide temporary storage until the barrel is removed from the site. Contaminated absorbent materials shall also be disposed of in a 55 gal barrel.
 - b. All sealed barrels containing fuel or chemicals temporarily stored on-site shall be placed upon level terrain upon double plastic sheeting and covered with additional plastic sheeting until removed from the site.
 - c. All sealed barrels containing fuel or chemicals shall be stored outside wetland resource areas and buffer zones pending disposal off-site.
 - d. Plastic sheeting, buckets, “speedy-dry” and other materials shall be replaced as used.
- C Responsive Actions / Procedures
 - (1) Responsive Action Protocol
 - (i) Contractor shall immediately act to clean spills in accordance with the Spill Containment Plan guidelines.
 - (2) Notification Protocol

- (i) In the event of a spill greater than 5 gal, the Contractor shall telephone the following parties within 30 minutes after securing the work area.
 - a. Town of Orange Fire Department
 - b. Airport Manager / Engineer
 - (ii) If required, the Department of Environmental Protection will be notified by the Contractor. It is the responsibility of the Contractor to follow all applicable local, state, and federal laws and regulations regarding the reporting of spills.
 - a. Upon notification of each of the above parties, the Contractor shall provide the following information:
 - 1. Identification of the site's location, nature of work being conducted, and the name(s) of the Contractor's personnel on-site.
 - 2. The estimated quantity, type and / or grade of fuel or chemicals which have leaked or spilled.
 - 3. Equipment being used on-site to contain fuel or chemical leakage.
 - 4. Equipment that is needed to prevent any further spillage.
 - (iii) Off-site Disposal of Contained Spills / Materials
 - a. The Contractor shall be responsible for removal from the site of all spilled fuel, chemicals and contaminated absorbent materials within sealed barrels. These materials shall be contained, handled, removed from the site, and disposed of off-site in accordance with State Law. Pending their removal off-site, any spilled fuel, chemicals and contaminated absorbent materials within sealed barrels shall be stored outside of any wetland resource area and the buffer zone thereto.
- D Removal of Materials
- (1) Contractor shall leave all mitigative devices and materials in place until the fuel powered equipment, fuel, chemicals and vehicles used for construction have been removed from the site.
 - (2) Contractor shall be responsible for the removal of all materials from the site and subsequent site clean-up.

METHOD OF MEASUREMENT

011-4.1 Temporary erosion and pollution control work required will be performed as scheduled or directed by the Engineer. Completed and accepted "Inlet Protection" will be measured by the number of inlets that are protected, per each, including maintenance throughout the life of the project. Payment for inlet protection will be made at 75% per each for installation and 25% per each for removal.

011-4.2 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

011-5.1 Payment shall be made at the contract unit price per each for "Inlet Protection". This price shall be full compensation for furnishing, installing, and removal all materials, for preparing and placing these materials, and for all labor, equipment tools, and incidentals necessary to complete the item.

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 Engineer will be paid for in accordance with Section 90, paragraph 90-05 *Payment for Extra Work*.

Payment will be made under:

| <u>ITEM</u> | <u>DESCRIPTION</u> | <u>UNIT</u> |
|-------------|--------------------|-------------|
| M-011-1 | Inlet Protection | 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.

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 M-011

ITEM M-012 TREE CLEARING**DESCRIPTION**

012-1.1 This item shall consist of mechanized tree clearing, seeding, and compost top dressing including the disposal of all materials, for all areas within the limits designated on the plans or as required by the Engineer. The intent of this work is to remove existing trees and keep underlying growth (shrubs, saplings, and brushy vegetation); and plant seed within the work limits shown on the plans.

012-1.2 Mechanized Equipment Clearing. In all clearing areas all stumps shall be cut as close to the ground as feasible and shall not be grubbed or removed to avoid disturbance to sensitive areas by heavy equipment. The felled trees will be removed from the site.

012-1.3 Staging and Laydown Areas; Access. The staging and laydown areas shall be as shown on the plans. The Contractor may elect to identify alternate staging laydown areas but must provide a plan depicting the areas and consult with the Engineer for review. This work will be within the vicinity of Route 2 and will require shoulder closures and police details. Refer to plans and specification section M-007 for details. Access to these areas are shown on the plans. Access from airside will require the removal and installation of chain link fence. Costs for removal and installation of fence are paid for under other items within these specifications.

012-1.4 Compliance. The Contractor shall provide labor, materials and equipment necessary to complete the work of this Section, including, but not limited to clearing and removal of vegetation by the methods described in this Section and indicated on the Plans, or as directed by the Engineer, for all areas within the limits of clearing designated on the plans. All work shall be in compliance with all local, state and federal wetlands and environmental regulations and permits. The Contractor shall assume all responsibility for compliance with the permits referenced within these specifications. The Contractor shall comply with all rules, regulations, laws, permits, and ordinances of the town of Orange and Commonwealth of Massachusetts and all other governing authorities having jurisdiction. All labor, materials, equipment, and services necessary to make the work comply with such requirements shall be provided without additional cost. Specific compliance to the permits referenced in these specifications shall be the responsibility of the Contractor.

012-1.5 Work Plan. Prior to any tree clearing and site restoration work the Contractor shall submit to the Engineer for review and approval a work plan that includes how the contractor will proceed with the work including measures to identify and protect the plants to remain. The Engineer will assist the contractor in coordinating the work plan approval with Mass Highway.

012-1.6 Northeast Showy Seed Mix. Northeast Showy Seed Mix shall conform to the relevant provisions of Section 765, of the Commonwealth of Massachusetts Standard Specifications for Highways and Bridges (latest edition) and the following:

The work shall consist of planting and establishing a stand of grass in the areas shown on the plans or as required by the Engineer. For the purposes of these specifications, the term “grass” shall apply to all the forbs, grasses, sedges, and rushes included in the materials.

All seeding shall be done by a company having proof of experience with native grass establishment. Prior to beginning work, the seeding Contractor shall furnish proof of qualifications to the Engineer for approval. Proof of qualifications includes, if requested, providing documentation (photos and contacts) to demonstrate knowledge and expertise with native seeding and proof of having completed successful native seeding projects.

Seeding shall be done at the completion of the tree clearing.

012-1.7 Compost Top Dressing. Work shall consist of furnishing and pneumatically applying compost as specified below. Compost shall be applied as a thin mulch blanket over prepared loam or prepared soil and shall be used in conjunction with seeding or planting unless specified otherwise. The intent of compost topdressing is to provide temporary soil stabilization and organic matter for plant growth.

For areas where compost is proposed with seeding, seed shall be broadcast and seeding shall occur in conjunction with compost topdressing, as specified under the relevant seeding item.

Contractor shall submit to the Engineer samples and certified test results 60 days prior to application of compost. Test will be for compost, not a soil test, as specified below. Vender certification that material delivered meets the test results shall be submitted if requested.

No materials shall be delivered until the required submittals have been approved by the Engineer. Delivered materials shall match the approved samples. Approval of test results does not constitute final acceptance. The Engineer will reject any material that does not meet the Specifications.

012-1.8 Restoration Planting. The work under this item shall conform to the applicable requirements of Section 771, PLANTING TREES, SHRUBS AND GROUND COVER, of the of the MassDOT Highway Division Standard Specifications, except as amended and supplemented as indicated on the drawings and as specified below.

For the above items the Contractor shall provide and install plant material of genus, species, variety, size and quantities in locations as directed. The work of this section includes, but is not limited to, the following:

- A. Purchasing and transporting plant material to construction sites
- B. Installation of plant material
- C. Plant and planting area care during establishment period
- D. Replacement of defective or dead plants at end of establishment period, as required.

The Landscape Contractor shall have five years continuous experience and expertise in management, handling and installation of plant material in large scale landscape construction projects. Site foreman shall have at least five years' experience and shall be on-site during all times of plant installation.

MATERIALS

012-2.1 Northeast Showy Seed Mix. Samples and Submittals

- 1) Certificate of Materials. 30 days prior to ordering, the Contractor shall submit to the Engineer the manufacturer or supplier's notarized Certificate of Materials. This document shall not be used as proof of purchase, proof of material delivered, or proof of material seeded, but simply to verify supplier availability of seed listed on the date certified. The species listed shall match those specified on the plans or herein, however, cultivars may vary due to availability. Substantial substitutions or changes in the mix from that specified on the plans or herein shall be approved by MassDOT Landscape Design Section.
- 2) Seed Tag Certification. All seed lots have a seed analysis tag as required by State and Federal law. The contractor shall submit seed tags for each bag of seed used on the project site or ensure that each tag is photo documented by the Engineer. Number of tags shall match number of bags sent by the supplier to

meet rate of Pure Live Seed specified on the plans. Tag must include: kind and variety of seed; lot number; origin of seed; net weight; % purity; germination; dormant seed; germination test date; inert matter; weed, noxious and other crop seed; and name and address of company responsible for the analysis. Seeding may be considered unacceptable for payment if no tags are submitted.

- 3) Certificate of Compliance. Prior to payment, contractor shall submit a bill of lading or a signed, dated and notarized Certificate of Compliance from the Supplier that serves as proof of purchase. This document shall include kind and variety of seed, lot number, net weight shipped, date of sale, invoice number under which seed was purchased, and name and address of Supplier or Manufacturer. All information must be included on the notarized form, including lot number and net weight shipped for specified job. This information shall match Seed Tag Certification and quantity of seed applied on the job. Seeding may be considered unacceptable for payment if information is incomplete.

- 4) Seed Sample. Contractor may be asked, prior to seeding, to submit a seed sample for testing. Quantities specified are Pure Live Seed (PLS). Greater quantities of ordered seed may be required to achieve actual specified seeding rates. Pure Live Seed is defined as the fraction of pure seed species within the mix that, by standard seed testing practices, will germinate. This is determined by multiplying the percent of seed purity by the percent of seed germination.

Seed mix shall be a custom blend as shown on the plans or shall be as specified below. Seed cultivars shall be those that are as regional to New England or the local ecotype as possible.

Any species substitutions shall be with a species having similar characteristics and native to New England. Substantial changes in the mix shall be approved by Herbaceous Species may be substituted with similar species native to Massachusetts if those specified are not available. Please check with the Engineer on grass substitutions.

Seed mix shall be as follows:

| | <u>Botanical Name</u> | <u>Common Name</u> | <u>% PLS By Weight</u> |
|-----------|--------------------------------|------------------------|------------------------|
| Grass | Schizachyrium scoparium | Little Blue Stem | 39.50% |
| | Bouteloua curtipendula 'Butte' | Sideoats Grama 'Butte' | 23.10% |
| | Elymus virginicus | Virginia Wild Rye | 14.00% |
| | | | 76.60% |
| Herb/Forb | Echinacea purpurea | Purple Coneflower | 3.50% |
| | Chamaecrista fasciculata | Partridge Pea | 3.00% |
| | Rudbeckia hirta | Black-eyed Susan | 3.00% |
| | Coreopsis lanceolata | Lance-leaf Coreopsis | 2.50% |
| | Penstemon digitalis | Beard-tongue | 2.10% |
| | Asclepias tuberosa | Butterfly Milkweed | 2.00% |
| | Liatris spicata | Spiked Gayfeather | 1.50% |
| | Rudbeckia triloba | Brown Eyed Susan | 1.00% |
| | Aster laevis | Smooth Aster | 1.00% |

| | | |
|--------------------------|-----------------------|---------|
| Zizia aurea | Golden Alexanders | 0.50% |
| Senna hebecarpa | Wild Senna | 0.50% |
| Tradescantia ohiensis | Ohio Spiderwort | 0.50% |
| Aster novae-angliae | New England Aster | 0.40% |
| Aster pilosus | Heath Aster | 0.40% |
| Monarda fistulosa | Wild Bergamot | 0.40% |
| Pycnanthemum tenuifolium | Slender Mountain Mint | 0.30% |
| Solidago nemoralis | Grey Goldenrod | 0.30% |
| Aster prenanthoides | Zig Zag Aster | 0.20% |
| Solidago juncea | Early Goldenrod | 0.20% |
| Baptisia tinctoria | Wild Indigo | 0.10% |
| | | <hr/> |
| | | 23.40% |
| | | <hr/> |
| | | 100.00% |

Seeding Rate:

Apply this mix at 20 lbs PLS/acre on areas of less than 3:1 slope and 25 lbs PLS on areas of greater than 3:1 slope. Add 30 lbs/acre of a cover crop. For a cover crop use either grain oats (1 Jan to 31 July) or grain rye (1 Aug to 31 Dec).

012-2.2 Fertilizer. No fertilizers shall be applied.

012-2.3 Water. Water, including hose and all other watering equipment required for the work, shall be furnished by the Contractor to the site at no additional cost. Water shall be suitable for irrigation and free from ingredients harmful to plant life. All plants injured or work damaged due to the lack of water or the use of too much water shall be the Contractor's responsibility to correct.

012-2.4 Compost Top Dressing. Compost Topdressing meeting the material and submittal requirements of Item 751.72, Compost Topdressing, of the Commonwealth of Massachusetts Standard Specifications for Highways and Bridges (latest edition), and specified as follows:

Compost testing shall be by a laboratory approved by the US Compost Council using the Testing Method for the Examination of Compost and Composting (TMECC) protocols.

- Organic matter content shall be minimum 30 percent (dry weight basis).
- Moisture content shall be 30-60 percent (wet weight basis).
- Bulk Density <1000 lb/cy
- pH shall be 5.5-7.5
- Conductivity shall be a maximum of 4 mmhos.
- Where soil is intended for vegetation (plants or grass), compost shall be tested for stability by CO2 method and shall produce a maximum of 8mg CO2-C per gram of organic material per day.

Particle size shall not exceed ¾ inch.

No kiln-dried wood, construction debris or ground palette is allowed.

The Engineer shall approve the Contractor's equipment for application.

012-1.8 Restoration Planting. Plant materials shall be an evenly distributed mix of the following shrub species, grown in #1 nursery containers. Shrubs shall be a minimum of 3 feet high. Plants shall be as follows:

175 each of *Amelanchier canadensis* (Shadblow)

175 each of *Aronia melanocarpa* (Black Chokeberry)

175 each of *Cornus racemosa* (Gray Dogwood)

175 each of *Cornus sericea* (Redosier Dogwood)

The Contractor shall furnish all plants as specified unless otherwise directed in writing by the Engineer. All plants shall be nursery grown, and shall comply with the American Standard for Nursery Stock," ANSI Z-60.1, latest edition, published by American Association of Nurserymen (AAN). All plants shall be legibly tagged with the botanical name. Species substitution or quantity adjustments must be approved by Engineer in writing.

Container-grown stock shall have been grown in the container long enough for the root system to have developed sufficiently to hold its soil together firmly. No plants shall be loose in the container. Container-grown plants shall not be pot bound, with spiraling roots or roots growing densely against the sides of the container. Each plant shall have plenty of fibrous roots, healthy buds, and shall be free of disease or insect pests, eggs or larvae. All plant parts shall show active green cambium when cut. They shall be densely foliated when in leaf.

CONSTRUCTION METHODS

012-3.1 General. The areas denoted on the plans to be cleared shall be staked on the ground by the Contractor and approved by the Engineer prior to start of clearing work.

012-3.2 Survey Layout. The Contractor shall employ the services of a licensed professional land surveyor registered in the Commonwealth of Massachusetts to establish field control, reestablish wetland flags within 100 feet of proposed work, identify limits of 100 foot buffer area within the limits of proposed work, and lay out all proposed clearing work limits. The Contractor shall provide the Engineer with documentation representing the qualifications of the surveyor prior to proceeding with field layout.

012-3.3 Disposal. All logs and slash removed by the clearing operation shall be disposed of outside the Airport's limits at the Contractor's responsibility except when otherwise directed by the Engineer. Brush may be chipped and sidecast up to 4" depth in the forested area. Compost may be applied directly over the woodchips and then seeded.

012-3.4 Mechanized Equipment Clearing. Prior to start of clearing the Engineer will work with the Contractor in identifying undergrowth vegetation (shrubs, saplings, and brushy vegetation) which is to remain. The goal is to leave the underlying vegetation, after clearing, as is practicable, in order for the area to regrow.

Trees unavoidably falling outside the specified clearing limits must be cut up, removed, and disposed of in a satisfactory manner away from airport property at an approved disposal site. To minimize collateral damage to trees beyond the prescribed clearing limits that are to remain, trees shall be felled toward the center of the area being cleared. The Contractor shall preserve and protect from injury all trees not to be removed, as well as any nearby structures. The trees, stumps, and brush shall be cut to the ground as possible with the original ground surface. The grubbing or grinding of stumps and roots will not be required.

012-3.5 Northeast Showy Seed Mix.

Seeding Season

Recommended seeding seasons shall be April 1 through May 15 and October 1 through December 1 for dormant seeding. ***Seeding that occurs outside of these periods, shall be increased by 50%.***

Surface Preparation

Ruts and depressions shall be filled with additional loam or compost and the soil shall be re-graded smooth to meet existing surrounding grades. *Seeding over Various Substrates*

Compost Topdressing: Compost Topdressing shall be applied as specified within this specification section. Seed should be broadcast at the same time as compost application to ensure a thin cover of compost over seed

Seeding Methods

No seeding or surface preparation work shall be done if soils are muddy or dry.

Broadcast Seeding: Seed shall be broadcast spread using a cyclone or whirlwind seeder or hand broadcast. Small or light-seeded species such as bluestem may be mixed with approved filler (e.g., sawdust, rice, kitty litter, or clean damp sand) to achieve an even distribution. Broadcast seeding shall be undertaken in two separate passes at ninety degrees to each other. One-half the seeding rate shall be applied in each direction.

After seeding and mulching, water seeded areas to moisten soil to a depth of at least 2 inches.

Seed and Grass Care

During Germination: Contractor shall care for seeded areas as determined necessary by the Engineer. Care may include irrigation and suppression of invasive plants as necessary for germination.

During Establishment: Following germination of seeded species, the contractor shall maintain the stand of grasses to ensure healthy growth. Work shall include irrigation if necessary, and monitoring for invasive plants.

Watering shall provide uniform coverage without eroding soil or grassed surfaces. Treatment of invasive plants shall be per the direction of MassDOT Landscape Architect.

The Contractor shall provide all labor, equipment, materials, and water required for establishment. Contractor shall water all seeded areas as necessary to a depth of 2 inches or greater.

Over-seeding

If there are areas of bare ground greater than 2-3 feet in diameter, these areas shall be over-seeded with the specified mix. Over-seeding application rates and methods shall be the same as those listed above. After seeding, areas shall be mulched 1 to 1.5 inches Compost Top Dressing and watered with a fine mist to moisten soil to a depth of at least 2 inches.

Soil that is compacted shall be raked or roughened prior to over-seeding. Following over-seeding, soil shall be lightly tamped to ensure seed to soil contact.

Over-seeding and mulch for over-seeding shall be incidental to this item.

Establishment

Native upland grasses and forbs will not look like turf grass. Many of the native grasses are bunch type grasses and will not form a uniform growth or have a sod-type appearance. However, seeded area shall show general uniform growth of the seeded species throughout the area. Areas with significant gaps of bare soil, generally greater than 2-3 feet in diameter, will require over-seeding.

A well-established stand of grasses at the end of one full growing season (June-September), as determined by the Engineer will be required for acceptance. At least 80-90 percent of the grass established shall be the

seeded species and any invasive or aggressive weeds (mugwort, ragweed, or knapweed) shall have been cut or otherwise managed.

Photo Documentation

Contractor shall submit photo documentation to the Engineer and Landscape Design Section. Each photo shall be date stamped. Photos shall be submitted after the following stages of construction:

- Soil preparation
- Seed and compost top dressing
- Germination

Grass establishment after one full growing season (growing season is June-September)

012-3.6 Compost Top Dressing. Application of compost material shall not begin until the Engineer has approved the site and soil conditions. The Contractor shall notify the Engineer when areas are ready for inspection and application of compost.

Compost topdressing shall be pneumatically applied (blown on) to a depth of one inch to one and half inches unless specified otherwise on the plans.

For areas where compost is proposed with seeding, seed shall be broadcast and shall occur in conjunction with compost topdressing.

012-3.7 Restoration Planting. Furnishing and planting of plant material shall include, but is not limited to, the following: preparation of planting areas, digging of the pits and plant beds; furnishing the plants as specified; plant installation; watering and maintenance.

Seasons for Planting

Spring (March 21 through June 1)

Fall: (Oct. 1 through Dec. 1)

Requests for exceptions to this schedule shall be submitted in writing to the Engineer for approval.

Plant Tagging and Approval

The Contractor shall be responsible for securing the material at the nursery. The Contractor shall locate, secure, tag, and ship plant material in a sufficiently timely manner to ensure minimal substitution and storage of plants. Material must receive preliminary approval at the nursery prior to being shipped and, in addition, may be subject to rejection on site if not meeting specifications. Cost of replacement of materials rejected by the Engineer at the site shall be borne by the Contractor

Plants shall either be shipped in conditions to adequately protect from damage, Plants shall be shipped in enclosed trucks or all surfaces, leaves and branches shall be wrapped to prevent damage and dessication.

Plant Delivery and Installation

Prior to ordering plants, the Contractor shall walk the site with the Engineer to field-locate planting areas. Plant locations may be marked by flags or other methods as approved by the Engineer. Plant spacing shall be 3-4 feet, staggered, unless otherwise directed. The Contractor shall locate all underground utilities within 10 feet of the proposed planting areas and notify the Engineer of any conflicts prior to digging.

The Contractor shall notify the Engineer 3 working days prior to the proposed arrival of plant material on the site. All plants shall be planted within 5 days of arrival on site or may be rejected by the Engineer. Plants

stored on site shall be kept in a secure location, shaded from direct sunlight at all times and shall not be stored on paved surfaces. Plants stored on site shall be watered daily.

Planting

Planting areas may be excavated as individual holes or areas. Excavation should not exceed container depth. Plants should be placed so that the root flare occurs at the soil surface and care should be taken to break pot-bound root balls and correct any spiraling roots

All areas of planting shall be surfaced with 1-2 inches of wood chips. This 1-2 inch depth of mulch cover should extend to at least 3 feet from plants. Note that areas outside planting areas may be covered with up to 4 inches of wood chips from brush-chipping operations. Finished condition of all areas shall be mulched with compost topsoil and seeded with native seed mix as specified.

Water plants immediately following planting as necessary to thoroughly moisten and settle backfill around roots.

Provide continued watering per approved procedures and schedule.

Establishment

When all plants have been installed, Contractor may request approval for conditional acceptance for installation. However, subsequent to completion of installation Contractor remains responsible for condition of site and plantings to final acceptance, and shall take measures as necessary to prevent and control encroachment of invasive plants. Any decline in the condition of new plantings shall require the Contractor to take immediate action to identify potential problems and undertake corrective measures. If required, the Contractor shall engage professional arborists and/or horticulturists to inspect plant materials and to identify problems and recommend corrective procedures. The Engineer shall be immediately advised of such actions. Inspection and recommendation reports shall be submitted to the Engineer.

No debris or brush may be left on the site unless specifically directed by the Engineer. The Contractor shall repair any damage to site as directed by the Engineer, at no additional cost.

Establishment Replacement

Plants installed in the fall shall be inspected for establishment the following spring, as soon as feasible to determine need and extent of replacements; inspection for plants installed in the spring shall occur at the end of the summer in adequate time to allow for replacement planting. At the time of inspection, if the plant materials and workmanship are acceptable to the Engineer, the Engineer shall issue a written certification of acceptance to the Contractor. In the event that plants fail, the contractor shall arrange for replacements. Certificate of acceptance, subject to one-year warranty, will be issued when replacement plants have been installed.

Planted areas shall be free of weeds and debris, and plantings shall be remulched as necessary.

METHOD OF MEASUREMENT

012-4.1 Mechanized Equipment Clearing. The quantities of “Mechanized Equipment Clearing” to be paid for shall be the actual number, measured, of acres to the nearest tenth, of land where vegetation has been cleared, complete and accepted by the RPR

012-4.2 Northeast Showy Seed Mix. The quantities of “Northeast Showy Seed Mix” to be paid for shall be the actual number, measured, of square yards placed where vegetation has been cleared, complete and accepted by the Engineer.

012-4.3 Compost Top Dressing. The quantities of “Compost Top Dressing” to be paid for shall be the actual number, measured, of square yards of compost placed pneumatically where vegetation has been cleared, complete and accepted by the Engineer.

012-4.4 Restoration Planting. The quantities of “Restoration Planting” to be paid for per each plant installed to include all work described by this specification for furnishing, installing, fertilizing, maintaining, and replacing all plants, as needed, and other work associated with this specification subject to acceptance by the Engineer and Owner. No separate or additional measurements or payments will be made for any quantities of materials, labor, equipment usage, guarantee, or warranties necessary for the completion of requirements. Payment shall be 75 percent of bid price at time of accepted installation, with final payment subject to establishment inspection and terms of warranty.

BASIS OF PAYMENT

012-5.1 Mechanized Equipment Clearing. Payment shall be made at the contract unit price per acre. This price shall be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the item.

012-5.2 Northeast Showy Seed Mix. Payment shall be made at the contract unit price per square yard. This price shall be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the item.

012-5.3 Compost Top Dressing. Payment shall be made at the contract unit price per square yard. This price shall be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the item.

012-5.4 Restoration Planting. Payment shall be made at the contract unit price per each. This price shall be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the item.

| <u>ITEM</u> | <u>DESCRIPTION</u> | <u>UNIT</u> |
|-------------|-------------------------------|-------------|
| M-012-1 | Mechanized Equipment Clearing | Acre |
| M-012-2 | Northeast Showy Seed Mix | Square Yard |
| M-012-3 | Compost Top Dressing | Square Yard |
| M-012-4 | Restoration Planting | Per Each |

END OF ITEM M-012

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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 paragraph 100-8.
- (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

Payment will be made under:

| <u>ITEM</u> | <u>DESCRIPTION</u> | <u>UNIT</u> |
|-------------|---|-------------|
| C-100-1 | Contractor Quality Control Program (CQCP) | 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

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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 (\bar{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 subplot 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 (\bar{X}) for all subplot test values within the lot by using the following formula:

$$\bar{X} = (x_1 + x_2 + x_3 + \dots + x_n) / n$$

Where: \bar{X} = Sample average of all subplot test values within a lot

x_1, x_2, \dots, x_n = Individual subplot test values

n = Number of subplot test values

- e. Find the sample standard deviation (S_n) by use of the following formula:

$$S_n = [(d_1^2 + d_2^2 + d_3^2 + \dots + d_n^2)/(n-1)]^{1/2}$$

Where: S_n = Sample standard deviation of the number of subplot test values in the set

d_1, d_2, \dots, d_n = Deviations of the individual subplot test values x_1, x_2, \dots from the average value \bar{X}

that is: $d_1 = (x_1 - \bar{X}), d_2 = (x_2 - \bar{X}) \dots d_n = (x_n - \bar{X})$

n = Number of subplot 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

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.

$$X = (x_1 + x_2 + x_3 + \dots + x_n) / n$$

$$X = (96.60 + 97.55 + 99.30 + 98.35) / 4$$

$$X = 97.95\% \text{ density}$$

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.

$$X = (x_1 + x_2 + x_3 + \dots + x_n) / n$$

$$X = (5.00 + 3.74 + 2.30 + 3.25) / 4$$

$$X = 3.57\%$$

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 $(\text{measurement} - \text{average}) / (\text{standard deviation})$ 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 $(\text{average} - \text{measurement}) / (\text{standard deviation})$ 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:

$$\text{Greater than } (97.95 + 1.463 \times 1.15) = 99.63\%$$

OR

$$\text{less than } (97.95 - 1.463 \times 1.15) = 96.27\%.$$

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 |

| 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 |
| 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 |
| 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 |

| 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 |
| 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 |

| 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 |
| 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 |

| 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 |
| 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 |
| 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

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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 which is not otherwise classified and paid for under one of the following items.

152-1.3 Unsuitable excavation. Unsuitable material shall be disposed in designated waste areas as shown on the plans. 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 on the embankment slope when approved by the RPR.

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 in accordance with Item P-151.

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 waste areas as shown on the plans. 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.

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 of the stated elevations for ground surfaces, or within 0.04 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 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 designated on the plans or 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 as shown on the plans.

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 as directed by the RPR. 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. Rock, shale, hardpan, loose rock, boulders, or other material unsatisfactory for safety areas, subgrades, roads, shoulders, or any areas intended for turf shall be excavated to a minimum depth of 12 inches 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 specified. Unsuitable materials shall be disposed off the airport. The cost is incidental to this item. This excavated material shall be paid for at the contract unit price per cubic yard. The excavated area shall be backfilled with suitable material obtained from the grading operations or borrow areas and compacted to specified densities. The necessary

backfill will constitute a part of the embankment. Where rock cuts are made, backfill with select material. 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.

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 as directed by the RPR. 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 below the top of subgrade or as indicated on the plans, and the material disposed of as directed by the RPR. 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. Not used

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 **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.

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 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 $\pm 2\%$ 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 contractor 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 contractor for every 2,000 square yards of compacted embankment for each lift which is required to be compacted, or other appropriate frequencies as determined by the RPR.

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.

All quality assurance testing shall be done by the RPR.

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 Contractor's laboratory shall perform all density tests in the RPR's presence and provide the test results upon completion to the RPR for acceptance. 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-compact 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.

All quality assurance testing shall be done by the RPR.

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 not be disposed of except at places and in the manner designated on the plans or by the RPR.

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.

Payment for compacted embankment will be made under embankment in-place and no payment will be made for excavation, borrow, or other items.

152-2.9 Proof rolling. Not used

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 D1557. 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 $\pm 2\%$ 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 $\frac{3}{4}$ inch (19.0 mm) sieve, follow the methods in ASTM D1557.

Tests for moisture content and compaction will be taken at a minimum of 2000 S.Y. of subgrade.

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 $\pm \frac{1}{2}$ 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 be 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. If, at the time of excavation or stripping, the topsoil cannot be placed in its final section of finished construction, the material shall be stockpiled at approved locations. Stockpiles shall be located as shown on the plans and the approved CSPP, and shall not be placed on areas that subsequently will require any excavation or embankment fill. If, in the judgment of the RPR, it is practical to place the salvaged topsoil at the time of excavation or stripping, the material shall be placed in its final position without stockpiling or further re-handling.

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.

METHOD OF MEASUREMENT

152-3.1 Unclassified excavation and embankment in place measurement for payment shall be by the cubic yard and shall be computed by the comparison of digital terrain model (DTM) surfaces for computation of neat line design quantities.

152-3.1 The quantity of unclassified and unsuitable 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.

152-3.2 The quantity of embankment in place shall be the number of cubic yards measured in its final position.

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.

152-4.2 For embankment in place, 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:

| <u>ITEM</u> | <u>DESCRIPTION</u> | <u>UNIT</u> |
|-------------|-------------------------|-------------|
| P-152-1 | Unclassified Excavation | Cubic Yard |
| P-152-2 | Embankment In-Place | 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/ft³ (600 kN-m/m³))

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/ft³ (2700 kN-m/m³))

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 abandoned drainage pipes and catch basins at the location 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 150 Type I or II. If for any reason, cement becomes partially set or contains lumps of caked cement, it shall be rejected. Cement salvaged from discarded or used bags shall not be used.

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.

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).

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. Not used

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.

No separate measurement for payment shall be made for controlled low strength material (CLSM). CLSM shall be considered necessary and incidental to the item for which it will be used.

BASIS OF PAYMENT

153-6.1 Payment.

No payment will be made separately or directly for controlled low strength material (CLSM). CLSM shall be considered necessary and incidental to the work of this Contract.

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

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ITEM P-207 IN-PLACE FULL DEPTH RECLAMATION (FDR) RECYCLED ASPHALT AGGREGATE BASE COURSE**DESCRIPTION**

207-1.1 This item consists of a recycled asphalt aggregate base course resulting from the in-place full depth reclamation (FDR) of the existing pavement section (asphalt wearing surface and aggregate base), plus mechanical stabilization with additional aggregate or chemical stabilization with cement, asphalt emulsion or fly ash when required.

MATERIALS

207-2.1 Aggregate. The FDR shall consist of materials produced by recycling (pulverizing and mixing) the existing asphalt pavement, aggregate base, subgrade, and any additional aggregate as necessary. Material larger than 2 inches in any dimension shall not be permitted in the recycle asphalt aggregate base course. The FDR shall meet the gradation in the table below.

FDR Gradation

| Sieve | Minimum Percentage by weight passing sieves |
|-----------------|---|
| 2 inch (51 mm) | 100 |
| No. 4 (4.75 mm) | 55 |
| No. 200 (75 µm) | 0-15 |

a. Deleterious substances. Materials for aggregate base shall be kept free from weeds, sticks, grass, roots and other foreign matter.

b. Uniformity. The materials shall be thoroughly recycled (pulverized and mixed) to ensure a uniform gradation.

207-2.2 Stabilization.

a. Mechanical stabilization. Not required.

b. Chemical Stabilization. Stabilizing agent is not required.

207-2.3 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.

207-2.4 Quality Control (QC) Sampling and testing. The Contractor shall take at least two FDR samples per day of production in the presence of the Resident Project Representative (RPR) to check the gradation. Sampling shall be per ASTM D75. Material shall meet the requirements in paragraph 207-2.1. Samples shall be taken from the in-place, un-compacted material at random sampling locations per ASTM D3665. In addition the RPR may take tests of in-place material for quality assurance purposes.

CONSTRUCTION METHODS

207-3.1 Milling. Milling is not required.

207-3.2 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 begin 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.

207-3.3 Recycling (Pulverization and mixing). The asphalt pavement, aggregate base and subgrade shall be recycled (pulverized and mixed) into a uniformly blended mixture to the depth indicated on the plans. All material over approximately 2 inches (50 mm) shall be removed by the Contractor. The mixture shall be brought to the desired moisture content.

The maximum lift thickness of the recycled aggregate base course material to be compacted shall be [11 inches .

207-3.4 Grading and compaction. Immediately upon completion of recycling (pulverization and mixing), the material shall be shaped and graded in accordance with the project plans. The recycled asphalt aggregate base course shall be compacted within the same day to an in-place density of 100% as determined by ASTM D1557. The moisture content of the material during compaction shall be within $\pm 2\%$ of the optimum moisture content as determined by ASTM D2216. The number, type and weight of rollers shall be sufficient to compact the material to the required density. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

207-3.5 Finishing. The surface of the aggregate base course shall be finished by blading or with automated equipment designed for this purpose. If the top layer is 1/2 inch (12 mm) or more below grade, the top layer shall be scarified to a depth of at least 3 inches (75mm), new material added, and the layer blended and re-compacted to bring it to grade. The addition of layers less than 3 inches (75mm) shall not be allowed.

207-3.6 Proof rolling. Not used

207-3.7 Weather limitations. When weather conditions detrimentally affect the construction process and/or quality of the materials, the Contractor shall stop construction. Cement or fly ash shall not be applied when wind conditions affect the distribution of the materials. When the aggregates contain frozen materials or when the underlying course is frozen or wet, the construction shall be stopped. Construction shall not be performed unless the atmospheric temperature is above 35°F (2°C) and rising or approved by the RPR. When the temperature falls below 35°F (2°C), protect all completed areas against detrimental effects of freezing by approved methods. Correct completed areas damaged by freezing, rainfall, or other weather conditions to meet specified requirements.

207-3.8 Maintenance. The asphalt aggregate base course shall be maintained in a satisfactory condition until the work is accepted by the RPR. Equipment used in the construction of an adjoining section may be routed over completed sections of asphalt aggregate base course, provided that no damage results and equipment is

routed over the full width of the completed asphalt aggregate base course. Any damage to the recycled asphalt aggregate base course shall be repaired by the Contractor at the Contractor's expense.

207-3.9 Surface tolerances. The finished surface shall be tested for smoothness and accuracy of grade. Any area failing smoothness or grade shall be scarified to a depth of at least 3 inches (75 mm), reshaped and re-compacted by the Contractor at the Contractor's expense.

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 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.

207-3.10 Acceptance sampling and testing for density. FDR base course shall be accepted for density and thickness on an area basis. One (1) test for density and thickness will be made for each [1200 square yds (1000 square meters)]. Sampling locations will be determined on a random basis in accordance with ASTM D3665.

a. Density. The Contractor's laboratory shall perform all density tests in the RPR's presence and provide the test results upon completion to the RPR. The RPR will perform quality assurance density testing once the contractor has met the density requirements of their testing.

Each area will be accepted for density when the field density is at least 100% of the maximum density of the FDR base course in accordance with ASTM D1557. 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]. If the specified density is not attained, the area represented by the failed test must be reworked and/or recompact 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. 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, and recompact to grade. The Contractor shall replace, at his expense, base material where depth tests have been taken.

METHOD OF MEASUREMENT

207-4.1 The quantity of FDR asphalt aggregate base course shall be measured by the number of square yards (m²) of material in compliance with the plans and specifications.

BASIS OF PAYMENT

207-5.1 Payment shall be made at the contract unit price per square yard (m²) for recycling the existing asphalt pavement, and aggregate base course spreading, compacting, and maintaining the recycled material to the compacted thickness as indicated on the drawings. This price shall be full compensation for furnishing all materials, for preparing and placing these materials, and for all labor, equipment tools and incidentals to complete the item.

Payment will be made under:

| <u>ITEM</u> | <u>DESCRIPTION</u> | <u>UNIT</u> |
|-------------|-------------------------------------|-------------|
| P-207-1 | Recycled Asphalt Aggregate Material | 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 | Unit Weight of Aggregate |
| ASTM C88 | Soundness of Aggregates by Use of Sodium or Magnesium Sulfate |
| ASTM C117 | Materials Finer than 75- μ m (No. 200) Sieve in Mineral Aggregate by Washing |
| ASTM C131 | Resistance to abrasion of Small Size Coarse Aggregate by Use of Los Angeles Machine |
| ASTM C136 | Sieve or Screen Analysis of Fine and Coarse Aggregate |
| 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 D75 | Sampling Aggregate |
| ASTM D558 | ASTM D558 Standard Test Methods for Moisture-Density (Unit Weight) Relations of Soil-Cement Mixtures |
| ASTM D698 | Moisture Density Relations of Soils and Aggregate using 5.5 lb Rammer and 12 in drop |
| ASTM D977 | Standard Specification for Emulsified Asphalt |
| ASTM D1556 | Test Method for Density and Unit Weight of Soil in Place by the Sand Cone Method |
| ASTM D1557 | Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort |
| ASTM D2216 | Test Methods for Laboratory Determination of Water (Moisture) Soil and Rock by Mass |
| ASTM D2419 | Test Method for Sand Equivalent Value of Soils and Fine Aggregate |
| ASTM D2487 | Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System) |

| | |
|---|---|
| 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 D4751 | Standard Test Methods for Determining Apparent Opening Size of a Geotextile |
| 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) |
| American Association of State Highway and Transportation Officials (AASHTO) | |
| M288 | Standard Specification for Geosynthetic Specification for Highway Applications |

END OF ITEM P-207

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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 stone, crushed gravel, or crushed slag and shall be free from coatings of clay, silt, organic material, clay lumps or balls or other deleterious materials or coatings. The method used to produce the crushed gravel 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, gravel, or slag 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 |
| Bulk density of slag | Weigh not less than 70 pounds per cubic foot (1.12 Mg/cubic meter) | ASTM C29 |
| 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 Tolerances¹ (Percent) |
|---------------------------------|--|---|--|
| 2 inch (50 mm) | 100 | | 0 |
| 1-1/2 inch (37.5 mm) | 95-100 | | ±5 |
| 1 inch (25.0 mm) | 70-95 | | ±8 |
| 3/4 inch (19.0 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) | 0-5 | | ±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. In addition, the RPR may take tests of on-site stockpiled aggregate base material prior to placing the material into its final position.

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 addition the RPR may take tests of in-place, un-compacted material for quality assurance purposes.

209-2.4 Separation Geotextile. Not used.

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 nor more than 12 inches 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 least 100% of the maximum density of laboratory specimens prepared from samples of the subbase 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 1557. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

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, reshaped and recompact 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 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 and -1/2 inch 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 Contractor's laboratory shall perform all density tests in the RPR's presence and provide the test results upon completion to the RPR for acceptance. In addition the RPR will perform density testing for quality assurance purposes. The RPR's testing will only occur after the Contractor's has shown that it meets project specifications

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 1557. The in-place field density shall be determined per 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. If the specified density is not attained, the area represented by the failed test must be reworked and/or recompact 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 in diameter that extend through the base. 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 area. Where the thickness is deficient by more than 1/2-inch, the Contractor shall correct such areas at no additional cost by scarifying to a depth of at least 3 inches, adding new material of proper gradation, and the material shall be blended and recompact to grade. The Contractor shall replace, at his expense, base material where depth tests have been taken. In lieu of taking thickness measurements via test holes, site survey may be used. Survey shall be required before and after placement of the completed base material.

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.

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.

Payment will be made under:

| <u>ITEM</u> | <u>DESCRIPTION</u> | <u>UNIT</u> |
|-------------|-------------------------------|-------------|
| P-209-1 | Crushed Aggregate Base Course | 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 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

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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, crushed slag, 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 (4.75 mm) sieve. Fine aggregate is the material passing the No. 4 (4.75 mm) 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 below.

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 | 0.3% maximum | ASTM C142 |
| Percentage of Fractured Particles | For pavements designed for aircraft gross weights of 60,000 pounds (27200 kg) 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 |
| | For pavements designed for aircraft gross weights less than 60,000 pounds (27200 kg): Minimum 50% by weight of particles with at least two fractured faces and 65% with at least one fractured face ¹ | |
| 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 |
| Bulk density of slag ³ | Weigh not less than 70 pounds per cubic foot (1.12 Mg/cubic meter) | ASTM C29. |

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).

³ Only required if slag is specified.

b. Fine aggregate. Fine aggregate shall consist of clean, sound, tough, durable, angular shaped particles produced by crushing stone, slag, 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 below.

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 | 0.3% maximum | ASTM C142 |
| Sand equivalent | 45 minimum | ASTM D2419 |

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) 64-28.

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Asphalt Binder PG Plus Test Requirements

| Material Test | Requirement | Standard |
|----------------------|--------------------|-------------------------|
| Elastic Recovery | 75% minimum | ASTM D6084 ¹ |

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 Department of Transportation of the State in which the project is located.

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 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 blows or 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 blows or 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 75 at a saturation of 70-80% | ASTM D4867 |
| Asphalt Pavement Analyzer (APA) ² | 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

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 Sieves | | |
|---|-------------------------------------|-------------|--------------------------|
| | Gradation 1 | Gradation 2 | Gradation 3 ¹ |
| 1 inch (25.0 mm) | 100 | -- | -- |
| 3/4 inch (19.0 mm) | 90-100 | 100 | -- |
| 1/2 inch (12.5 mm) | 68-88 | 90-100 | 100 |
| 3/8 inch (9.5 mm) | 60-82 | 72-88 | 90-100 |
| No. 4 (4.75 mm) | 45-67 | 53-73 | 58-78 |
| No. 8 (2.36 mm) | 32-54 | 38-60 | 40-60 |
| No. 16 (1.18 mm) | 22-44 | 26-48 | 28-48 |
| No. 30 (600 µm) | 15-35 | 18-38 | 18-38 |
| No. 50 (300 µm) | 9-25 | 11-27 | 11-27 |
| No. 100 (150 µm) | 6-18 | 6-18 | 6-18 |
| No. 200 (75 µm) | 3-6 | 3-6 | 3-6 |
| Minimum Voids in Mineral Aggregate (VMA) ² | 14.0 | 15.0 | 16.0 |
| Asphalt percent by total weight of mixture: | | | |
| Stone or gravel | 4.5-7.0 | 5.0-7.5 | 5.5-8.0 |
| Slag | 5.0-7.5 | 6.5-9.5 | 7.0-10.5 |
| Recommended Minimum Construction Lift Thickness | 3 inch | 2 inch | 1 1/2 inch |

¹Gradation 3 is intended for leveling courses. FAA approval is required for use in other locations.

²To 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 subplot, 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 (71°C). 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 4. The temperature requirements may be waived by the RPR, if requested; however, all other requirements including compaction shall be met.

Table 4. Surface Temperature Limitations of Underlying Course

| Mat Thickness | Base Temperature (Minimum) | |
|---|----------------------------|----|
| | °F | °C |
| 3 inches (7.5 cm) or greater | 40 ¹ | 4 |
| Greater than 2 inches (50 mm) but less than 3 inches (7.5 cm) | 45 | 7 |

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 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 (160°C) when added to the aggregate. The temperature of modified asphalt binder shall be no more than 350°F (175°C) 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 (175°C) 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 Prime and 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 12.5 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 (80°C); or are irregular, damaged, uncompacted or otherwise defective shall be cut back with a cutting wheel or pavement saw a maximum of 3 inches (75 mm) 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. Saw-cut grooves shall be provided as specified in Item 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 (0.9 m) wide. The saw blades shall be 1/8-inch (3-mm) wide with a sufficient number of blades to create grooves between 0.090 and 0.130 inches (2 and 3.5 mm) wide; and peaks and ridges approximately 1/32 inch (1 mm) 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 raveling, 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 ¼ inch in 12 feet, identifying areas that may pond water which could lead to hydroplaning of aircraft. If the smoothness criteria is 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 (3.7 m) “straightedge, a rolling inclinometer meeting the requirements of ASTM E2133 or rolling external reference device that can simulate a 12-foot (3.7m) 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 (15 m) 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 (6 m); and at the third points of paving lanes when widths of paving lanes are 20 ft (6 m) or greater.

Deviations on the final surface course in either the transverse or longitudinal direction that will trap water greater than 1/4 inch (6 mm) 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 (12 mm) 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 (12 mm) 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 (19.0 mm) | ±6% | ±9% |
| 1/2 inch (12.5 mm) | ±6% | ±9% |
| 3/8 inch (9.5 mm) | ±6% | ±9% |
| No. 4 (4.75 mm) | ±6% | ±9% |
| No. 16 (1.18 mm) | ±5% | ±7.5% |
| No. 50 (300 µm) | ±3% | ±4.5% |
| No. 200 (75 µm) | ±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 below 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 (12.5 mm) | 11% |
| 3/8 inch (9.5 mm) | 11% |
| No. 4 (4.75 mm) | 11% |
| No. 16 (1.18 mm) | 9% |
| No. 50 (300 µm) | 6% |
| No. 200 (75 µm) | 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 subplot basis.

(1) Sampling. Material from each subplot 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 subplot in accordance with ASTM D3203 for a set of compacted specimens prepared in accordance with ASTM D6925.

d. In-place asphalt mat and joint density. Each subplot 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 (125 mm) 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 subplot for density measurement. The maximum allowable deficiency at any point will not be more than 1/4 inch (6 mm) 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 subplot 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 subplot. 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 subplot sample by the TMD for that subplot.

(5) Joint density. One core centered over the longitudinal joint shall be taken for each subplot 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 (12 mm) vertically or 0.1 feet (30 mm) laterally.

Cross-sections of the pavement shall be taken at a minimum 25-foot longitudinal spacing and at all longitudinal grade breaks. Minimum cross-section grade points shall include grade at centerline, and edge of runway 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 subplot 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%.

401-6.5 Leveling course. The leveling course is the first variable thickness lift placed to correct surface irregularities prior to placement of subsequent courses. The leveling course shall meet the aggregate gradation in Table 2, paragraph 401-3.3. The leveling course shall meet the requirements of paragraph 401-3.3, 401-6.2b for air voids, but shall not be subject to the density requirements of paragraph 401-6.2b for mat density and 401-6.2c for joint density. The leveling course shall be compacted with the same effort used to achieve density of the control strip. The leveling course shall not exceed the lift thickness associated with each gradation in Table 2, paragraph 401-3.3.

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 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 subplot shall be reduced by 5%.

Table 6. Price adjustment schedule¹

| 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:

| <u>ITEM</u> | <u>DESCRIPTION</u> | <u>UNIT</u> |
|-------------|-------------------------|-------------|
| P-401-1 | Asphalt Surface Course | Ton |
| P-401-2 | Asphalt Leveling Course | 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- μ m (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 Gyrotory 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 |
| 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

Software

FAARFIELD

END OF ITEM P-401

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 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.

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 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 rates 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) | .06-0.12 (0.27-0.54) |
| Concrete | 0.03-0.05 (0.13-0.23) | 0.05-0.08 (0.23-0.36) |

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 ASTM D1250. 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:

| <u>ITEM</u> | <u>DESCRIPTION</u> | <u>UNIT</u> |
|-------------|------------------------------|-------------|
| P-603-1 | Emulsified Asphalt Tack Coat | 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 |

END ITEM P-603

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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 other than airfield pavement which are cast-in-place.

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. Not used.

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 Type I, IA, II or III.

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.

610-2.10 Steel Reinforcement. Reinforcing material shall conform to the following the requirements:

| | |
|------------------------------|--|
| Reinforcing Steel | ASTM A615, ASTM A706, ASTM A775, ASTM A934 |
| Welded Steel Wire Fabric | ASTM A185 |
| Welded Deformed Steel Fabric | ASTM A497 |
| Bar Mats | ASTM A704 |

610-2.11 Cover Materials. Curing materials shall conform to the following:

Materials for Curing

| | |
|--|-------------------|
| Waterproof paper | ASTM C171 |
| Clear or white Polyethylene Sheeting | ASTM C171 |
| Liquid Membrane-Forming Compound for Curing Concrete | ASTM C309, Type 2 |

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 plans and specified herein. 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. 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 as determined by ASTM C143.

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 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 nor more than 100°F. 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.

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. 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.

610-3. 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.

610-3.13 Cold Weather Placing. When concrete is placed at temperatures below 40°F, 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 85°F, 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 Concrete shall be considered incidental and no separate measurement shall be made.

BASIS OF PAYMENT

610-6.1 Payment shall not be made separately, but shall be considered incidental to the item requiring concrete.

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

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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.

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.

Table 1. Marking Materials

| Paint ¹ | | | | Glass Beads ² | |
|--------------------|--------|---------------------|-----------------------------|--------------------------|-----------------------------|
| Type | Color | Fed Std. 595 Number | Application Rate Maximum | Type | Application Rate Minimum |
| Waterborne II | White | 37925 | 115 ft ² /gal | III | 10 lb/gal |
| Waterborne II | Yellow | 33538 or 33655 | 115 ft ² /gal | III | 10 lb/gal |
| Waterborne II | Black | 37038 | 115 ft ² /gal | None | None |

Note: First coat of pavement markings on new pavement shall be applied at 50% of the rate listed in the above table without glass beads. The second coat of pavement markings, on new pavement, shall be applied at the full rate listed in the above table with glass beads. Re-painting of existing pavement markings will only receive one coat of paint at the full rates listed above with glass beads.

Waterborne. Paint shall meet the requirements of Federal Specification TT-P-1952F, Type II. 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.

620-2.3 Reflective media. Glass beads for white and yellow paint shall meet the requirements for Federal Specification TT-B-1325D Type III. 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 and green 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 contaminants 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.

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 rotary grinding, water blasting, or by other methods approved by the RPR minimizing damage to the pavement surface. The removal area may need to be larger than the area of the markings to eliminate ghost markings. After removal of markings on asphalt pavements, apply a fog seal or seal coat to 'block out' the removal area to eliminate 'ghost' markings.

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.

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 in 50 feet , and marking dimensions and spacing shall be within the following tolerances:

Marking Dimensions and Spacing Tolerance

| Dimension and Spacing | Tolerance |
|--------------------------------|----------------|
| 36 inch or less | $\pm 1/2$ inch |
| greater than 36 inch to 6 feet | ± 1 inch |
| greater than 6 feet to 60 feet | ± 2 inch |
| greater than 60 feet | ± 3 inch |

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.

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.

620-3.6 Application--preformed thermoplastic airport pavement markings. not used.

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.

Minimum Retro-Reflectance Values

| Material | Retro-reflectance mcd/m ² /lux | | |
|---|---|--------|--|
| | White | Yellow | |
| Initial Type I | 300 | 175 | |
| Initial Type III | 600 | 300 | |
| Initial Thermoplastic | 225 | 100 | |
| All materials, remark when less than ¹ | 100 | 75 | |

¹Prior 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

620-4.1a The quantity of markings shall be paid for shall be measured by the number of square feet of painting.

620-4.1b The quantity of reflective media shall be paid for by the number of pounds of reflective media.

BASIS OF PAYMENT

620-5.1 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.

620-5.2a Payment for markings shall be made at the contract price for the number of square feet of painting.

620-5.3b Payment for reflective media shall be made at the contract unit price for the number of pounds of reflective media.

Payment will be made under:

| <u>ITEM</u> | <u>DESCRIPTION</u> | <u>UNIT</u> |
|-------------|--|-------------|
| P-620-1 | Pavement Marking | Square Foot |
| P-620-2 | Reflective Media | Pound |
| P-620-3 | Pavement Marking (50% Application no reflective media) | Square Foot |

TESTING REQUIREMENTS

| | |
|------------|---|
| ASTM C371 | Standard Test Method for Wire-Cloth Sieve Analysis of Nonplastic Ceramic Powders |
| ASTM D92 | Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester |
| ASTM D711 | Standard Test Method for No-Pick-Up Time of Traffic Paint |
| 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 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 |

MATERIAL REQUIREMENTS

| | |
|-----------|--|
| ASTM D476 | Standard Classification for Dry Pigmentary Titanium Dioxide Products |
|-----------|--|

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 |
| 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).

CONSTRUCTION METHODS

621-2.1 Procedures. The Contractor shall submit to the RPR the grooving sequence and method of placing guidelines 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 ($\pm 1/16$ 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 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 $\pm 1-1/2$ inch in alignment for 75 feet along the runway length, allowing for realignment every 500 feet along the runway length.

b. Groove tolerance.

(1) Depth. The standard depth is 1/4 inch. At least 90% of the grooves must be at least 3/16 inch, at least 60% of the grooves must be at least 1/4 inch, and not more than 10% of the grooves may exceed 5/16 inch.

(2) Width. The standard width is 1/4 inch. At least 90% of the grooves must be at least 3/16 inch, at least 60% of the grooves must be at least 1/4 inch, and not more than 10% of the grooves may exceed 5/16 inch.

(3) Center-to-center spacing. The standard spacing is 1-1/2 inch. Minimum spacing 1-3/8 inch (34 mm). Maximum spacing 1-1/2 inch.

Saw-cut grooves must not be closer than 3 inches or more than 9 inches from transverse joints in concrete pavements. Grooves must not be closer than 6 inches and no more than 18 inches 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 or more than 5 inches 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.

621-2.3 Control strip. Not used

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 closing of the grooves under normal use. All grade corrections must be completed prior to grooving. Spalling along or tearing or raveling of the groove edges shall not be allowed.

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 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.

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 and a resolution of at least 0.005 inch. 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 and a resolution of at least 0.02 inch .

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 left or right of the centerline.
- Zone 2 5 feet to 25 feet left of the centerline.
- Zone 3 5 feet 25 feet right of the centerline.
- Zone 4 25 feet to edge of grooving left of the centerline.
- Zone 5 25 feet 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 .Measurements will be made along a line perpendicular to the grooves.

- Width or depth measurements less than 0.170 inch shall be considered less than 3/16 inch .
- Width or depth measurements more than 0.330 inch shall be considered more than 5/16 inch.
- Width or depth measurements more than 0.235 inch shall be considered more than 1/4 inch .

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 (square meters) of grooving performed in accordance with the specifications and accepted by the RPR per paragraph 621-3.1.

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:

| <u>ITEM</u> | <u>DESCRIPTION</u> | <u>UNIT</u> |
|-------------|--------------------|-------------|
| P-621-1 | Grooving | 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 D-701 PIPE FOR STORM DRAINS AND CULVERTS

DESCRIPTION

701-1.1 This item shall consist of the construction 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 M304 | Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Wall Drain Pipe and Fittings Based on Controlled Inside Diameter |
| ASTM C76 | Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe |
| ASTM C1840 | Standard Practice for Inspection and Acceptance of Installed Reinforced Concrete Culvert, Storm Drain, and Storm Sewer Pipe |

701-2.3 Concrete. Not used.

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.

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. Poured filler for joints shall conform to the requirements of ASTM D6690.

701-2.7 Plastic gaskets. Not used.

701-2.8. Controlled low-strength material (CLSM). Not used

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. Reinforced concrete pipe shall be Class V , tongue & groove with rubber gaskets.

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 or 1/2 inch 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.

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 . For pipes installed under paved areas, no more than 12% of the material shall pass the No. 200 sieve. For all other areas, no more than 50% of the material shall pass the No. 200 sieve. The bedding shall have a thickness of at least 6 inches 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.

Paved or partially lined pipe shall be placed so that the longitudinal center line of the paved segment coincides with the flow line.

701-3.4 Joining pipe. Joints shall be made with rubber gaskets.

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.

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 when leak resistant joints are required. Joints shall be thoroughly wetted before applying mortar or grout.

b. Metal pipe. Not used.

c. PVC, Polyethylene, or Polypropylene pipe. Joints for PVC, Polyethylene, or Polypropylene pipe shall conform to the requirements of ASTM D3212 when 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.

d. Fiberglass pipe. Not used

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.

c. Metal Pipe. Embedment material shall be granular as specified in the contract document and specifications, and shall be free of organic material, rock fragments larger than 1.5 inches in the greatest dimension and frozen lumps. As a minimum, backfill materials shall meet the requirements of ASTM D3282, A-1, A-2, or A-3. 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 on each side of the pipe and shall be brought up one foot 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 and shall be brought up evenly on each side of the pipe to one foot above the top of the pipe. All embedment material shall be compacted to a density required under Item P-152.

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 placed and compacted in layers as required to achieve compaction to at least 95 percent standard proctor per ASTM D698. 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.

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.

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. The 12 Inch RCP Drain Pipe and 8" PVC Drain Pipe shall be measured separately. All fittings shall be included in the footage as typical pipe sections in the pipe being measured.

701-4.2. Not used.

701-4.3 Not used.

701-4.4 Not used.

BASIS OF PAYMENT

701-5.1 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 at the contract unit price per linear foot for “12 Inch RCP Drain Pipe” and “8 Inch PVC Drain Pipe”.

701-5.3 Not used.

701-5.4 Not used.

701-5.5 Not used.

Payment will be made under:

| <u>ITEM</u> | <u>DESCRIPTION</u> | <u>UNIT</u> |
|-------------|------------------------|-------------|
| D-701-1 | 12 Inch RCP Drain Pipe | Linear Foot |
| D-701-2 | 8 Inch PVC Drain Pipe | 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.

American Association of State Highway and Transportation Officials (AASHTO)

| | |
|------------|--|
| ASTM C76 | Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe |
| ASTM C150 | Standard Specification for Portland Cement |
| ASTM C443 | Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets |
| ASTM C506 | Standard Specification for Reinforced Concrete Arch Culvert, Storm Drain, and Sewer Pipe |
| ASTM D3034 | Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings |
| ASTM F477 | Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe |

END ITEM D-701

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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 nor more than 48 inches. 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. Corrugated metal shall conform to the requirements of American Association of State Highway and Transportation Officials (AASHTO) M36.

751-2.6 Frames, covers, and grates. The castings shall conform to one of the following requirements:

- a. ASTM A48, Class 35B: Gray iron castings
- b. ASTM A47: Not used
- c. ASTM A27: Not used
- d. ASTM A283, Grade D: Not used
- e. ASTM A536, Grade 65-45-12: Not used
- f. ASTM A897: Not used

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 inlet structures. Manufactured in accordance with and conforming to ASTM C913.

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 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.

751-3.2 Brick structures.

a. **Foundations.** Not used

b. **Laying brick.** Not used

c. **Joints.** Not used

d. **Pointing.** Not used

e. **Cleaning.** Not used

f. **Curing and cold weather protection.** 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. 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. Corrugated metal structures shall be prefabricated. All standard or special fittings shall be furnished to provide pipe connections or branches with the correct dimensions and of sufficient length to accommodate connecting bands. The fittings shall be welded in place to the metal structures. The top of the metal structure shall be designed so that either a concrete slab or metal collar may be attached to allow the fastening of a standard metal frame and grate or cover. Steps or ladders shall be furnished as shown on the plans. Corrugated metal structures shall be constructed on prepared foundations, conforming to the dimensions and locations as shown on the plans. When indicated, the structures shall be placed on a reinforced concrete base.

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.

METHOD OF MEASUREMENT

751-4.1 Catch basins shall be measured by the unit.

BASIS OF PAYMENT

751-5.1 The accepted quantities of catch basins 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.

Payment will be made under:

| <u>ITEM</u> | <u>DESCRIPTION</u> | <u>UNIT</u> |
|-------------|--------------------|-------------|
| D-751-1 | Catch Basin | 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. |

American Association of State Highway and Transportation Officials (AASHTO)

| | |
|------------|--|
| AASHTO M36 | Standard Specification for Corrugated Steel Pipe, Metallic-Coated, for Sewers and Drains |
|------------|--|

END OF ITEM D-751

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ITEM F-162 CHAIN-LINK FENCE**DESCRIPTION**

162-1.1 This item shall consist of furnishing and erecting a chain-link fence in accordance with these specifications, the details shown on the plans, and in conformity with the lines and grades shown on the plans or established by the RPR.

MATERIALS

162-2.1 Fabric. The fabric shall be woven with a 9-gauge, galvanized steel wire in a 2-inch mesh and shall meet the requirements of ASTM A392, Class 2

162-2.2 Barbed wire. Barbed wire shall be 2-strand 12-1/2 gauge zinc-coated wire with 4-point barbs and shall conform to the requirements of ASTM A121, Class 3, Chain Link Fence Grade.

162-2.3 Posts, rails, and braces. Line posts, rails, and braces shall conform to the requirements of ASTM F1043 or ASTM F1083 as follows:

Galvanized tubular steel pipe shall conform to the requirements of Group IA, (Schedule 40) coatings conforming to Type A, or Group IC (High Strength Pipe), External coating Type B, and internal coating Type B or D.

The dimensions of the posts, rails, and braces shall be in accordance with Tables I through VI of Federal Specification RR-F-191/3 and as shown on the plans.

Tubular steel pipe shall have a PVC coating fused and adhered to the exterior zinc coating. PVC coatings shall have a minimum thickness of 10-mils (0.254 mm), per ASTM F1043. Color to match fabric.

162-2.4 Gates. Not Used

162-2.5 Wire ties and tension wires. Wire ties for use in conjunction with a given type of fabric shall be of the same material and coating weight identified with the fabric type. Tension wire shall be 7-gauge marcelled steel wire with the same coating as the fabric type and shall conform to ASTM A824.

All material shall conform to Federal Specification RR-F-191/4.

162-2.6 Miscellaneous fittings and hardware. Miscellaneous steel fittings and hardware for use with zinc-coated fabric shall be of commercial grade steel or better quality, wrought or cast as appropriate to the article, and sufficient in strength to provide a balanced design when used in conjunction with fabric posts, and wires of the quality specified herein. All steel fittings and hardware shall be protected with a zinc coating applied in conformance with ASTM A153.

Barbed wire support arms shall withstand a load of 250 pounds applied vertically to the outermost end of the arm.

162-2.7 Concrete. Concrete shall have a minimum 28-day compressive strength of 3500 psi

162-2.8 Marking. Each roll of fabric shall carry a tag showing the kind of base metal (steel, aluminum, or aluminum alloy number), kind of coating, the gauge of the wire, the length of fencing in the roll, and the name of the manufacturer. Posts, wire, and other fittings shall be identified as to manufacturer, kind of base metal (steel, aluminum, or aluminum alloy number), and kind of coating.

162-2.9 Color. All fencing fabric, posts and appurtenances, where indicated, shall be black PVC coated in accordance with ASTM F934.

CONSTRUCTION METHODS

162-3.1 General. The fence shall be constructed in accordance with the details on the plans and as specified here using new materials. All work shall be performed in a workmanlike manner satisfactory to the RPR. The Contractor shall layout the fence line based on the plans. The Contractor shall span the opening below the fence with barbed wire at all locations where it is not practical to conform the fence to the general contour of the ground surface because of natural or manmade features such as drainage ditches. The new fence shall be permanently tied to the terminals of existing fences as shown on the plans. The Contractor shall stake down the woven wire fence at several points between posts as shown on the plans.

Installation of fence, posts, gates and other ancillary items shall be in accordance with ASTM F 567 or these Plans and Specifications, whichever is more stringent.

162-3.2 Clearing fence line. Clearing shall consist of the removal of all stumps, brush, rocks, trees, or other obstructions that will interfere with proper construction of the fence. Stumps within the cleared area of the fence shall be grubbed or excavated. The bottom of the fence shall be placed a uniform distance above ground, as specified in the plans. When shown on the plans or as directed by the RPR, the existing fences which interfere with the new fence location shall be removed by the Contractor as a part of the construction work unless such removal is listed as a separate item in the bid schedule. All holes remaining after post and stump removal shall be refilled with suitable soil, gravel, or other suitable material and compacted with tampers.

The cost of removing and disposing of the material shall not constitute a pay item and shall be considered incidental to fence construction.

162-3.3 Installing posts. All posts shall be set in concrete at the required dimension and depth and at the spacing shown on the plans.

The concrete shall be thoroughly compacted around the posts by tamping or vibrating and shall have a smooth finish slightly higher than the ground and sloped to drain away from the posts. All posts shall be set plumb and to the required grade and alignment. No materials shall be installed on the posts, nor shall the posts be disturbed in any manner within seven (7) days after the individual post footing is completed.

Should rock be encountered at a depth less than the planned footing depth, a hole 2 inches larger than the greatest dimension of the posts shall be drilled to a depth of 12 inches. After the posts are set, the remainder of the drilled hole shall be filled with grout, composed of one part Portland cement and two parts mortar sand. Any remaining space above the rock shall be filled with concrete in the manner described above.

In lieu of drilling, the rock may be excavated to the required footing depth. No extra compensation shall be made for rock excavation.

If water is encountered, the Contractor shall make ample provisions for draining or pumping the excavation before placing the concrete. The cost of dewatering shall be included in the unit bid price for the item requiring the dewatering.

162-3.4 Installing top rails. The top rail shall be continuous and shall pass through the post tops. The coupling used to join the top rail lengths shall allow for expansion.

162-3.5 Installing braces. Horizontal brace rails, with diagonal truss rods and turnbuckles, shall be installed at all terminal posts.

162-3.6 Installing fabric. The wire fabric shall be firmly attached to the posts and braced as shown on the plans. All wire shall be stretched taut and shall be installed to the required elevations. The fence shall generally

follow the contour of the ground, with the bottom of the fence fabric no less than one inch or more than 4 inches from the ground surface. Grading shall be performed where necessary to provide a neat appearance.

At locations of small natural swales or drainage ditches and where it is not practical to have the fence conform to the general contour of the ground surface, longer posts may be used and multiple strands of barbed wire stretched to span the opening below the fence. The vertical clearance between strands of barbed wire shall be 6 inches or less.

162-3.7 Electrical grounds. Not used

162-3.8 Cleaning up. The Contractor shall remove from the vicinity of the completed work all tools, buildings, equipment, etc., used during construction. All disturbed areas shall be seeded per T-901.

METHOD OF MEASUREMENT

162-4.1 Chain-link fence will be measured for payment by the linear foot . Measurement will be along the top of the fence from center to center of end posts, excluding the length occupied by gate openings.

BASIS OF PAYMENT

162-5.1 Payment for chain-link fence will be made at the contract unit price per linear foot (meter).

The price shall be full compensation for furnishing all materials, and for all preparation, erection, and installation of these materials, and for all labor equipment, tools, and incidentals necessary to complete the item.-Item not used

Payment will be made under:

| <u>ITEM</u> | <u>DESCRIPTION</u> | <u>UNIT</u> |
|-------------|------------------------------|-------------|
| F-162-1 | 8 Foot High Chain Link Fence | 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 A121 | Standard Specification for Metallic-Coated Carbon Steel Barbed Wire |
| ASTM A153 | Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware |
| ASTM A392 | Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric |
| ASTM A491 | Standard Specification for Aluminum-Coated Steel Chain-Link Fence Fabric |
| ASTM A824 | Standard Specification for Metallic-Coated Steel Marcellled Tension Wire for Use with Chain Link Fence |
| ASTM B117 | Standard Practice for Operating Salt Spray (Fog) Apparatus |
| ASTM F668 | Standard Specification for Polyvinyl Chloride (PVC), Polyolefin and other Organic Polymer Coated Steel Chain-Link Fence Fabric |

| | |
|-----------------------------------|---|
| ASTM F1043 | Standard Specification for Strength and Protective Coatings on Steel Industrial Fence Framework |
| ASTM F1083 | Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures |
| ASTM F1183 | Standard Specification for Aluminum Alloy Chain Link Fence Fabric |
| ASTM F1345 | Standard Specification for Zinc 5% Aluminum-Mischmetal Alloy Coated Steel Chain-Link Fence Fabric |
| ASTM G152 | Standard Practice for Operating Open Flame Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials |
| ASTM G153 | Standard Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials |
| ASTM G154 | Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials |
| ASTM G155 | Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Nonmetallic Materials |
| Federal Specifications (FED SPEC) | |
| FED SPEC RR-F-191/3 | Fencing, Wire and Post, Metal (Chain-Link Fence Posts, Top Rails and Braces) |
| FED SPEC RR-F-191/4 | Fencing, Wire and Post, Metal (Chain-Link Fence Accessories) |
| FAA Standard | |
| FAA-STD-019 | Lightning and Surge Protection, Grounding, Bonding and Shielding Requirements for Facilities and Electronic Equipment |
| FAA Orders | |
| 5300.38 | AIP Handbook |

END OF ITEM F-162

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.

Seeding shall not be done during windy weather or on top of frozen or excessively wet ground.

Regardless of the time of seeding, the Contractor shall be responsible for a full growth of grass. When directed the Contractor shall refertilize, reseed, and remulch areas on the Project that do not develop a satisfactory growth of grass. Refertilizing, reseeding, and remulching shall be incidental to the original seed item requirements.

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 mesh sieve and 50% will pass through a No. 100 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 1 ton per acre. 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 19-19-19 commercial fertilizer and shall be spread at the rate of 250lb/acre

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.

901-2.5 Grassland habitat seed. Grassland habitat seed shall be New England Native Warm Season Grass Mix as manufactured by New England Wetland Plants, Inc. 820 West Street, Amherst, MA 01002, Telephone: (413) 548-8000, or approved equal. The seed shall contain a broad spectrum of native warm season grasses to insure that a variety of the species will survive in the sandy, droughty conditions typically found along roadsides, gravel mine reclamation areas, and other low-fertility well drained soil conditions.

Seeding shall be performed during the period between April 15 and June 1, and between August 15 and October 15, unless otherwise approved by the RPR. If seeding cannot occur within the specified time frame then the Contractor will have to seed the area to promote site stabilization over the winter months and come back in the spring to apply the correct seed. The following seed mix will be used to promote site stabilization over the winter months:

Stabilization Seeding:

| Seed | Minimum Seed Purity (Percent) | Minimum Germination (Percent) | Rate of Application lb./1,000 S.F. |
|-----------------------|-------------------------------|-------------------------------|------------------------------------|
| K31 Tall Fescue | 85 | 80 | 5 |
| Red Fescue (Creeping) | 85 | 80 | 5 |
| Winter Rye | 85 | 80 | 5 |

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 (50 mm) 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 as a result of grading operations and, if immediately prior to seeding, the top 3 inches 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. Clods shall be broken and the top 3 inches 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.

a. Liming. Lime shall be applied separately and prior to the application of any fertilizer or seed and only on seedbeds that have previously been prepared as described above. The lime shall then be worked into the top 3 inches of soil after which the seedbed shall again be properly graded and dressed to a smooth finish.

b. Fertilizing. Following advance preparations and cleanup fertilizer shall be uniformly spread at the rate that will provide not less than the minimum quantity stated in paragraph 901-2.3.

c. Seeding. Grass seed shall be sown at the rate specified in paragraph 901-2.1 immediately after fertilizing. The fertilizer and seed shall be raked within the depth range stated in the special provisions. Seeds of legumes, either alone or in mixtures, shall be inoculated before mixing or sowing, in accordance with the instructions of the manufacturer of the inoculant. When seeding is required at other than the seasons shown on the plans or in the special provisions, a cover crop shall be sown by the same methods required for grass and legume seeding.

d. Rolling. After the seed has been properly covered, the seedbed shall be immediately compacted by means of an approved lawn roller, weighing 40 to 65 pounds per foot (60 to 97 kg per meter) of width for clay soil (or any soil having a tendency to pack), and weighing 150 to 200 pounds per foot (223 to 298 kg per meter) of width for sandy or light soils.

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 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 per minute at a pressure of 100 lb / sq inches. 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 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. 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 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 of lime shall be added to and mixed with each 100 gallons of water. Seed and fertilizer shall be mixed together in the relative proportions specified, but not more than a total of 220 pounds of these combined solids shall be added to and mixed with each 100 gallons 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 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 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 yard 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:

| <u>ITEM</u> | <u>DESCRIPTION</u> | <u>UNIT</u> |
|-------------|-----------------------|-------------|
| T-901-1 | Seeding | Square Yard |
| T-901-2 | Stabilization Seeding | 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

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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 (2 inches (50 mm) or more in diameter), and clay lumps or similar objects. 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 10% as determined by the wet-combustion method (chromic acid reduction). There shall be not less than 20% nor more than 80% of the material passing the 200 mesh (75 μ m) 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 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 that has been stockpiled on the site by others, and is required for topsoil purposes, shall be removed 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.

When suitable topsoil is secured off the airport site, the Contractor shall locate and obtain the supply, subject to the approval of the RPR. The Contractor shall notify the RPR sufficiently in advance of operations in order that necessary measurements and tests can be made. The Contractor shall remove the topsoil from approved areas and to the depth as directed. The topsoil shall be hauled to the site of the work and placed for spreading, or spread as required. Any topsoil hauled to the site of the work and stockpiled shall be rehandled and placed without additional compensation.

905-3.4 Placing topsoil. The topsoil shall be evenly spread on the prepared areas to a uniform depth of 2 inches (50 mm) after compaction, unless otherwise shown on the plans or stated in the special provisions. 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 turving 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 (2 inches (50 mm) 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.

METHOD OF MEASUREMENT

905-4.1 Topsoil obtained on or off the site shall be measured by the number of square yards of topsoil placed in its final position. Stripping, stockpiling, and re-handling of topsoil (regardless the number of times it is re-handled) will not get measured separately for payment.

BASIS OF PAYMENT

905-5.1 Payment will be made at the contract unit price per square yard for topsoil placed in its final position. 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:

| <u>ITEM</u> | <u>DESCRIPTION</u> | <u>UNIT</u> |
|-------------|--------------------|-------------|
| T-905-1 | Topsoil | 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 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

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ITEM L-108 UNDERGROUND POWER CABLE FOR AIRPORTS**DESCRIPTION**

108-1.1 This item shall consist of furnishing and installing power cables that are direct buried and furnishing and/or 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 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. electronically submitted in pdf format. 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 ethylene propylene insulation, 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 THWN-2, 75°C for installation in conduit and RHW-2, 75°C for direct burial installations. 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, THWN-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 THWN-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.

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 or ground installations for airfield lighting systems shall be No. 6AWG bare solid copper wire for counterpoise and/or No. 6AWG insulated stranded for grounding bond wire per ASTM B3 and ASTM B8, and shall be bare copper wire. 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 3/4 inch 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.

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. Taped splices employing field-applied rubber, or synthetic rubber tape covered with plastic tape is acceptable. The rubber tape should meet the requirements of ASTM D4388 and the plastic tape should comply with Military Specification MIL-I-24391 or Commercial Item Description A-A-55809. Heat shrinkable tubing shall be heavy-wall, self-sealing tubing rated for the voltage of the wire being spliced and suitable for direct-buried installations. The tubing shall be factory coated with a thermoplastic adhesive-sealant that will adhere to the insulation of the wire being spliced forming a moisture- and dirt-proof seal. Additionally, heat shrinkable tubing for multi-conductor cables, shielded cables, and armored cables shall be factory kits that are designed for the application. Heat shrinkable tubing and tubing kits shall be manufactured by Tyco Electronics/ Raychem Corporation, Energy Division, or approved equivalent.

In all the above cases, connections of cable conductors shall be made using crimp connectors using a crimping tool designed to make a complete crimp before the tool can be removed. All L-823/L-824 splices and terminations shall be made per the manufacturer's recommendations and listings.

All connections of counterpoise, grounding conductors and ground rods shall be made by the exothermic process or approved equivalent, except that a light base ground clamp connector shall be used for attachment to the light base. All exothermic connections shall be made per the manufacturer's recommendations and listings.

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. Not used

108-2.7 Flowable backfill. Not used

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. 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 one foot (30 cm) 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.

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 assure 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.

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 and seeding 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. Restoration shall be considered incidental to the pay item of which it is a component part.

108-3.4 Cable markers for direct-buried cable. The location of direct buried circuits shall be marked by a concrete slab marker, 2 feet (60 cm) square and 4-6 inch (10 - 15 cm) thick, extending approximately one inch (25 mm) above the surface. Each cable run from a line of lights and signs to the equipment vault shall be marked at approximately every 200 feet (61 m) along the cable run, with an additional marker at each change of direction of cable run. All other direct-buried cable shall be marked in the same manner. Cable markers shall be installed directly above the cable. The Contractor shall impress the word "CABLE" and directional arrows on each cable marking slab. The letters shall be approximately 4 inches (100 mm) high and 3 inches (75 mm) wide, with width of stroke 1/2 inch (12 mm) and 1/4 inch (6 mm) deep. Stencils shall be used for cable marker lettering; no hand lettering shall be permitted.

At the location of each underground cable connection/splice, except at lighting units, or isolation transformers, a concrete marker slab shall be installed to mark the location of the connection/splice. The Contractor shall impress the word "SPLICE" on each slab. The Contractor also shall impress additional circuit identification symbols on each slab as directed by the RPR. All cable markers and splice markers shall be painted international orange. Paint shall be specifically manufactured for uncured exterior concrete. After placement, all cable or splice markers shall be given one coat of high-visibility aviation orange paint as approved by the RPR. Furnishing and installation of cable markers is incidental to the respective cable pay item.

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.

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. A taped splice shall be made in the following manner:

Bring the cables to their final position and cut so that the conductors will butt. Remove insulation and jacket allowing for bare conductor of proper length to fit compression sleeve connector with 1/4 inch (6 mm) of bare conductor on each side of the connector. Prior to splicing, the two ends of the cable insulation shall be penciled using a tool designed specifically for this purpose and for cable size and type. Do not use emery paper on splicing operation since it contains metallic particles. The copper conductors shall be thoroughly cleaned. Join the conductors by inserting them equidistant into the compression connection sleeve. Crimp conductors firmly in place with crimping tool that requires a complete crimp before tool can be removed. Test the crimped connection by pulling on the cable. Scrape the insulation to assure that the entire surface over which the tape will be applied (plus 3 inches (75 mm) on each end) is clean. After scraping, wipe the entire area with a clean lint-free cloth. Do not use solvents.

Apply high-voltage rubber tape one-half lapped over bare conductor. This tape should be tensioned as recommended by the manufacturer. Voids in the connector area may be eliminated by highly elongating the tape, stretching it just short of its breaking point. The manufacturer's recommendation for stretching tape during splicing shall be followed. Always attempt to exactly half-lap to produce a uniform buildup. Continue buildup to 1-1/2 times cable diameter over the body of the splice with ends tapered a distance of approximately one inch (25 mm) over the original jacket. Cover rubber tape with two layers of vinyl pressure-sensitive tape one-half lapped. Do not use glyptol or lacquer over vinyl tape as they react as solvents to the tape. No further cable covering or splice boxes are required.

Heat shrinkable tubing shall be installed following manufacturer's instructions. Direct flame heating shall not be permitted unless recommended by the manufacturer. Cable surfaces within the limits of the heat-shrink application shall be clean and free of contaminants prior to application.

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. The RPR shall select one of two methods of lightning protection for the airfield lighting circuit based upon sound engineering practice and lightning strike density.

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.

When a nonmetallic light base is used, the grounding electrode shall be bonded to the metallic light fixture or metallic base plate with a No. 6 AWG bare, annealed or soft drawn, solid copper conductor.

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.

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.

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 must maintain the test results throughout the entire project as well as during the warranty period that meet the following:

a. 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.

b. 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.

After installation, the Contractor shall test and demonstrate to the satisfaction of the RPR the following:

c. That all affected lighting power and control circuits (existing and new) are continuous and free from short circuits.

- d. That all affected circuits (existing and new) are free from unspecified grounds.
- e. That the insulation resistance to ground of all new non-grounded high voltage series circuits or cable segments is not less than 100 megohms. Verify continuity of all series airfield lighting circuits prior to energization.
- f. 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.
- g. That all affected circuits (existing and new) are properly connected per applicable wiring diagrams.
- h. 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.
- i. 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.

METHOD OF MEASUREMENT

108-4.1 Cable trenching shall be measured by the linear feet of trench, including the excavation, backfill, and restoration, completed, measured as excavated, and accepted as satisfactory.

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.

108-4.2 Cable, ground wire, 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, ground wire, or counterpoise wire installed in trench, duct bank or conduit.

Cable, ground wire, and counterpoise slack is considered incidental to this item and is included in the Contractor’s unit price. No separate measurement or payment will be made for cable or counterpoise slack.

108-4.3 No separate payment will be made for ground rods.

BASIS OF PAYMENT

108-5.1 Payment will be made at the contract unit price for trenching, cable, ground wire, 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:

| <u>ITEM</u> | <u>DESCRIPTION</u> | <u>UNIT</u> |
|-------------|---|-------------|
| L-108-1 | Cable Trench | Linear Foot |
| L-108-2 | No. 8 AWG 5kV, L-824, Type C Cable | Linear Foot |
| L-108-3 | No. 6 AWG, Solid, Bare Copper Counterpoise Wire | Linear Foot |
| L-108-4 | No. 6 AWG, Bare, Ground Wire | 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

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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. It shall also include all turfing trenching, backfilling, removal, and restoration of any paved or turfed areas; 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.

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 electronically submitted in pdf format, 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. Not used

110-2.3 Plastic conduit. Plastic conduit and fittings shall conform to the following requirements:

- UL 514B covers W-C-1094-Conduit fittings all types, classes 1 thru 3 and 6 thru 10.
- UL 514C covers W-C-1094- all types, Class 5 junction box and cover in plastic (PVC).
- UL 651 covers W-C-1094-Rigid PVC Conduit, types I and II, Class 4.
- UL 651A covers W-C-1094-Rigid PVC Conduit and high-density polyethylene (HDPE) Conduit type III and Class 4.

Underwriters Laboratories Standards UL-651 and Article 352 of the current National Electrical Code shall be one of the following, as shown on the plans:

- a. Type I—Schedule 40 and Schedule 80 PVC suitable for underground use either direct-buried or encased in concrete.
- b. Type II—Schedule 40 PVC suitable for either above ground or underground use.
- c. Type III – Schedule 80 PVC suitable for either above ground or underground use either direct-buried or encased in concrete.
- d. Type III –HDPE pipe, minimum standard dimensional ratio (SDR) 11, suitable for placement with directional boring under pavement.

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. Not used

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.

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 200-pound (90 kg) 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.

When rock is encountered, the rock 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 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 may alternatively be used

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 per federal, state, and local requirements is incidental to Item L-110.

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 previously identified cable is damaged during the course of construction, the Contractor shall be responsible for the complete repair.

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 3 feet (1 m) beyond the edges of the pavement or 3 feet (1 m) beyond any under drains that may be installed alongside the paved area. 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. Unless otherwise shown on the plans, all duct banks shall be placed on a layer of concrete not less than 3 inches (75 mm) thick prior to its initial set. The Contractor shall space the conduits 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 3 inches (75 mm) 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.

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. For duct banks equal to or greater than 24 inches (600 mm) in width, utilize more than one tape for sufficient coverage and identification of the duct bank as required.

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.

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 4 inches (100 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.

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 not 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.

110-3.4 Markers. The location of each end and of each change of direction of conduits and duct banks shall be marked by a concrete slab marker 2 feet (60 cm) square and 4 - 6 inches (100 - 150 mm) thick extending approximately one inch (25 mm) above the surface. The markers shall also be located directly above the ends of all conduits or duct banks, except where they terminate in a junction/access structure or building. Each cable or duct run from a line of lights and signs to the equipment vault must be marked at approximately every 200 feet (61 m) along the cable or duct run, with an additional marker at each change of direction of cable or duct run.

The Contractor shall impress the word "DUCT" or "CONDUIT" on each marker slab. Impression of letters shall be done in a manner, approved by the RPR, for a neat, professional appearance. All letters and words must be neatly stenciled. After placement, all markers shall be given one coat of high-visibility orange paint, as approved by the RPR. The Contractor shall also impress on the slab the number and size of conduits beneath the marker along with all other necessary information as determined by the RPR. The letters shall be 4 inches (100 mm) high and 3 inches (75 mm) wide with width of stroke 1/2 inch (12 mm) and 1/4 inch (6 mm) deep or as large as the available space permits. Furnishing and installation of duct markers is incidental to the respective duct pay item.

110-3.5 Backfilling for conduits. For conduits, 8 inches (200 mm) of sand, soft earth, or other fine fill (loose measurement) 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.

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 per Item P-152 "Excavation and Embankment" except that the material used for backfill shall be select material not larger than 4 inches (100 mm) in diameter. In addition to the requirements of Item P-152, 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.

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. 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 and seeding shown on the plans. The Contractor shall be held responsible for maintaining all disturbed surfaces and replacements until final acceptance. All restoration shall be considered incidental to the respective L-110 pay item. 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 Ownership of removed cable. Not used

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:

| <u>ITEM</u> | <u>DESCRIPTION</u> | <u>UNIT</u> |
|-------------|---|-------------|
| L-110-1 | 4 Way – 4 Inch Concrete Encased Duct Bank | Linear Foot |
| L-110-2 | 4 Way – 4 Inch Direct Buried Duct Bank | 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
UL Standard 651A Type EB and A Rigid PVC Conduit and HDPE Conduit

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, 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 electronically submitted in pdf format, 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 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.

115-2.3 Precast concrete structures. 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. Provide precast concrete structures where shown on the plans.

Precast concrete structures shall be an approved standard design of the manufacturer. Precast units shall have mortar or bitumastic sealer placed between all joints to make them watertight. The structure shall be designed to withstand 100,000 lb aircraft loads, unless otherwise shown on the plans. Openings or knockouts shall be provided in the structure as detailed on the plans.

Threaded inserts and pulling eyes shall be cast in as shown on the plans.

If the Contractor chooses to propose a different structural design, 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.

115-2.4 Junction boxes. Not used.

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. All concrete used in structures shall conform to the requirements of 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 A48 Gray iron castings
- b. ASTM A47 Not used
- c. ASTM A27 Not used
- d. ASTM A283, Grade D Not used
- e. ASTM A536 Not used
- f. ASTM A897 Not used

All castings specified shall withstand a maximum load of 100,000 lbs.

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.

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. Ladders, if specified, shall be galvanized steel or as shown on the plans.

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 be as shown on the plans.

115-2.11 Flowable backfill. Not used

115-2.12 Cable trays. -Not used

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)). 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 one piece, copper clad . The ground rods shall be of the length and diameter specified on the plans, but in no case shall they be less than 10 feet (2.4 m) long nor less than 3/4 inch in diameter.

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 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.

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 cost of 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 6 inches of sand or a material approved by the RPR as a suitable base to receive the structure. The base material shall be compacted and 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.

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; 4000 psi. concrete (min.). 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 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 in horizontal layers not to exceed 6 inches in thickness measured after compaction to the density requirements in Item P-152. 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 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.

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 above the floor. The ground rod shall be installed within one foot of a corner of the concrete structure. Ground rods shall be installed prior to casting the bottom slab. 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 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 above the floor of the structure and separate from other cables. No. 2 American wire gauge (AWG) bare copper pigtailed shall bond the grounding bus to all 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. The Contractor shall restore all disturbed areas equivalent to or better than their original condition. All sodding, grading and restoration shall be considered incidental to the respective Item L-115 pay item.

The Contractor shall grade around structures as required to provide positive drainage away from the structure.

Areas with special surface treatment, such as roads, sidewalks, or other paved areas shall have backfill compacted to match surrounding areas, and surfaces shall be repaired using materials comparable to original materials.

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.

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. 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. Not used

115-3.14 Not used

METHOD OF MEASUREMENT

115-4.1 Electrical handholes shall be measured by each unit completed in place and accepted. 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 Not used.

BASIS OF PAYMENT

115-5.1 The accepted quantity of electrical handholes 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.

Payment will be made under:

| <u>ITEM</u> | <u>DESCRIPTION</u> | <u>UNIT</u> |
|-------------|---------------------|-------------|
| L-115-1 | Electrical Handhole | Each |

Per Unit

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 A897 | Standard Specification for Austempered Ductile Iron Castings |
| 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

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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.

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 perform 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 electronic PDF format, 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.

EQUIPMENT AND MATERIALS

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. Rubber and plastic electrical tapes shall be Scotch Electrical Tape Numbers 23 and 88 respectively, as manufactured by 3M Company or an approved equal.

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 required.

125-2.7 Runway and Taxiway Lights. Runway and taxiway lights shall conform to the requirements of AC 150/5345-46. 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.

Lights

| Type | Class | Mode | Style | Option | Base | Filter | Transformer | Notes |
|--------|---------------------|--------|-------|--------|--------------------------------|--------|-------------|--|
| L-861T | Class 1 and Class 2 | 1-6.6A | NA | LED | Stake Mounted; L-867B Base Can | NA | L-830 | 24" high |
| L-861 | Class 1 and Class 2 | 1-6.6A | NA | LED | Stake Mounted; L-867B Base Can | NA | L-830 | 24" high |
| L-861E | Class 1 | 1-6.6A | NA | LED | Stake Mounted | NA | L-830 | 24" high for displaced threshold lights; 14" for runway end threshold lights |

125-2.8 Runway and Taxiway Signs. Runway and Taxiway Guidance Signs should conform to the requirements of AC 150/5345-44.

Signs

| Type | Size | Style | Class | Mode | Notes |
|-------|------|-------|-------|------|-------|
| L-858 | 2 | 2 | 2 | LED | |
| | | | | | |

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. 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, Class 1A, Size B 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.

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.

125-3.2 Testing. All lights 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.

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 Elevated and In-pavement Lights. 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 and facing in the required direction. The outermost edge of fixture shall be level with the surrounding pavement. Surplus sealant or flexible embedding material shall be removed. The holding device shall remain in place until sealant has reached its initial set.

METHOD OF MEASUREMENT

125-4.1 The quantity of "Base Mounted Elevated Runway Edge Light" to be paid for under this item shall be the number of base mounted runway edge lights, each, installed, complete and in place, accepted by the Owner and the Engineer, tested, operational and measured by the Engineer. This will include furnishing and installing light fixtures, lamps, isolation transformers, ground wire connections, base cans, concrete encasement of the base can, spacer rings, extension rings, concrete reinforcement, bonding, ground rods,

testing of the system, all excavation required to place the base, crushed stone, all dewatering operations and stabilization, all backfill and compacting and all restoration of the site.

125-4.2 The quantity of “Stake Mounted Elevated Runway Edge Light” to be paid for under this item shall be the number of base mounted runway edge lights, each, installed, complete and in place, accepted by the Owner and the Engineer, tested, operational and measured by the Engineer. This will include furnishing and installing light fixtures, lamps, isolation transformers, ground wire connections, backfill, spacer rings, extension rings, bonding, ground rods, testing of the system, all excavation required to place the base, crushed stone, all dewatering operations and stabilization, all backfill and compacting and all restoration of the site.

125-4.3 The quantity of “Stake Mounted Elevated Runway Threshold End Light” to be paid for under this item shall be the number of base mounted runway threshold end lights, each, installed, complete and in place, accepted by the Owner and the Engineer, tested, operational and measured by the Engineer. This will include furnishing and installing light fixtures, installing lamps, isolation transformers, ground wire connections, stakes, stakes, ground rods, all excavation, sand bedding, testing of the system, all dewatering operations and stabilization, all backfill and compacting and all restoration of the site.

125-4.4 The quantity of “Stake Mounted Elevated Runway Displaced Threshold Light” to be paid for under this item shall be the number of base mounted runway threshold end lights, each, installed, complete and in place, accepted by the Owner and the Engineer, tested, operational and measured by the Engineer. This will include furnishing and installing light fixtures, installing lamps, isolation transformers, ground wire connections, stakes, stakes, ground rods, all excavation, sand bedding, testing of the system, all dewatering operations and stabilization, all backfill and compacting and all restoration of the site.

125-4.5 The quantities of “Stake Mounted Elevated Taxiway Edge Light” to be paid for under this item shall be the number of taxiway lights, each, installed, complete and in place, accepted by the Owner and the Engineer, tested, operational and measured by the Engineer. This will include furnishing and installing light fixtures, installing lamps, isolation transformers, ground wire connections, stakes, stakes, ground rods, all excavation, sand bedding, testing of the system, all dewatering operations and stabilization, all backfill and compacting and all restoration of the site.

125-4.6 The quantities of “Base Mounted Elevated Taxiway Edge Light” to be paid for under this item shall be the number of taxiway lights, each, installed, complete and in place, accepted by the Owner and the Engineer, tested, operational and measured by the Engineer. This will include furnishing and installing light fixtures, installing lamps, isolation transformers, ground wire connections, base can, stakes, ground rods, concrete encasement of the base can, concrete reinforcement, bonding, all excavation required to place the base, crushed stoned, testing of the system, all dewatering operations and stabilization, all backfill and compacting and all restoration of the site.

125-4.7 The quantity of “Airfield Sign” to be paid for under this item shall be the number of signs regardless of size, each, furnished and installed at the location shown on the Drawings, operational, tested, accepted by the Owner and the Engineer, and measured by the Engineer, regardless of varying sign lengths in accordance with the sign schedule. Furnishing and installing lamps, isolation transformers, wiring from the transformer base to the sign, ground wire, ground rods, furnishing and installing the base cans, risers, concrete encasement of the base cans, bedding, filer fabric, concrete reinforcement, tethers, concrete for the foundation, crushed stone, sign housing and panels, all excavation required to place the base, all dewatering operations and trench stabilization, all backfill and compacting and all restoration of the site will not be measured for separate payment and will be considered to be included in the price bid for this item. Adjusting the operation of the sign in accordance with the manufacturer’s installation instructions as well as testing the operation of the sign are included in the work and are not measured separately for payment.

BASIS OF PAYMENT

125-5.1 Payment will be made at the Contract unit price for each complete runway or taxiway light, and guidance sign installed by the Contractor 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.

Payment will be made under:

| <u>ITEM</u> | <u>DESCRIPTION</u> | <u>UNIT</u> |
|-------------|--|-------------|
| L-125-1 | Base Mounted Elevated Runway Edge Light | Each |
| L-125-2 | Stake Mounted Elevated Runway Edge Light | Each |
| L-125-3 | Stake Mounted Elevated Runway Threshold End Light | Each |
| L-125-4 | Stake Mounted Elevated Runway Displaced Threshold Light | Each |
| L-125-5 | Stake Mounted Elevated Taxiway Edge Light | Each |
| L-125-6 | Base Mounted Elevated Taxiway Edge Light | Each |
| L-125-7 | Airfield Sign | 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.

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 150/5345-5 | Circuit Selector Switch |
| 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 150/5345-28 | Precision Approach Path Indicator (PAPI) Systems |
| AC 150/5345-39 | Specification for L-853, Runway and Taxiway Retroreflective Markers |
| 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 150/5345-51 | Specification for Discharge-Type Flashing Light Equipment |
| 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

APPENDIX A
CONSTRUCTION SAFETY AND PHASING PLAN (CSPP)

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ORANGE MUNICIPAL AIRPORT

ORANGE MUNICIPAL AIRPORT

ORANGE, MASSACHUSETTS

CONSTRUCTION SAFETY AND PHASING PLAN (CSPP)

RECONSTRUCT RUNWAY 1-19

MAY 2020

Prepared For:

**Town of Orange Airport Commission
80 Airport Street
Orange, Massachusetts 01364**

Prepared By:

**Airport Solutions Group
39 Winn Street
Burlington, Massachusetts
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CONSTRUCTION SAFETY PLANS..... APPENDIX A

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1. COORDINATION

Coordination of construction safety and phasing requirements for this project started at the initial pre-design meeting, and has been an on-going topic of conversation throughout the design process. The Contractor will be informed of the CSPP requirements at the pre-construction meeting prior to starting the work. All stake holders (ORE staff, FAA staff, MassDOT staff, Airport Solutions Group (ASG) staff, Contractor and Subcontractors, Airport users, etc.) will be involved in the coordination of construction safety and phasing.

Once construction begins, construction safety and phasing will be an on-going topic of conversation at regularly scheduled construction meetings. All phases of construction shall be scheduled by the Contractor in accordance with the safety and phasing drawings included with the contract drawings.

2. PHASING

The purpose of this project is a reconstruction of the pavement of Runway 1-19 and portions of Runway 14-32, Taxiways A and D. Work will include pavement reclamation for the majority of Runway 1-19, producing an 11" thick layer of P-207 subbase material that will be overlaid with 6" of new P-209 base course and 4" of new P-401 asphalt pavement. For other sections of Runway 1-19 (Add Alternate 1), Runway 14-32 and Taxiway A are to be milled, crack repaired and overlaid with 2" minimum of new P-401 asphalt pavement. Storm drainage improvements, grading, topsoil, seed, new lighting, signage, and pavement markings, will also be provided for the Runway 1-19 and the aforementioned taxiways. Also included in the project is the installation of a new 8' x 6' reinforced concrete box culvert between Rte 122 and the southerly end of Runway 1-19; and tree clearing within the Right-of-Way (ROW) for Rte 2 off the South end of Runway 1-19.

Grooving the new runway pavement (Add Alternate 2) may be included in the work as well.

The performance period for all proposed work under the contract is anticipated to start the summer of 2020 and last for one hundred and thirty one (131) calendar days of the date specified in the "Notice To Proceed" for the Award of the Base Bid, Add Alternate No. 1, and Add Alternate No. 2. The project will require to be shut down for thirty (30) calendar days prior to runway grooving and final coat of pavement markings.

To minimize the disturbance to Airport operations the project has been broken into four (4) work areas. These work areas are shown on the contract documents and are further described as follows:

Work Area I (Duration: 131 Calendar Days): Work Area I consists of the reconstruction of Runway 1-19 and intersecting Taxiway D. Major work items include pavement reclamation and pulverizing, excavation and earthwork, install base course material, runway and taxiway edge lighting and signage, paving, topsoiling and seeding. If Add Alternate No. 1 is awarded then mill and overlay the rest of Runway 19, portion of Runway 14-32 and Taxiway A; if Add Alternate No.2 is awarded then groove Runway 1-19 thirty (30) calendar days after final paving. Access to the work Area I is utilizing Haul Road I until such time the culvert work begins, then the contractor shall use Haul Road II.

Work Area II (Base Bid Duration: 5 Calendar Days; Add Alternate No. 1 Duration: 14 Calendar Days): This work area consists of two work options. If the Base Bid is awarded then the work will consist of new pavement markings and runway and taxiway electrical; if Add Alternate No.1 is awarded then the work

would consist of milling, crack repairs, pavement overlay, pavement markings, and runway and taxiway electrical. Access to Work Area II will be via Haul Road I. This work area has to be completed within the duration for Work Area I.

Work Area III (Duration: 21 Calendar Days): This work area consists of replacing of an existing culvert. Access to Work Area III, the contractor shall access through Haul Road I. During the culvert work the contractor's access Work Areas I, II, and IV will be vis Haul Road II, once culvert work is completed then the contractor can use Haul Road I.

Work Area IV (Duration: 21 Calendar Days): This work area consists of tree cleaning within Route 2 right of way off the Runway 1. Major work items include tree clearing and seeding with conservation seed mix. Access to the south portion of the tree clearing will be from the airport property. Access to the tree clearing north of Route 2 will be via the existing Route 2 shoulder. In both cases the contractor will setup a shoulder closure in accordance with MUTCD.

3. AREAS AND OPERATIONS AFFECTED BY THE CONSTRUCTION ACTIVITY

Mitigation of Effects: As stated above, there will be times that certain runways or taxiways will be closed for operations. These closed areas have been defined to mitigate the impact of the construction on airport operations. The main goal is to provide aircraft safe passage between aircraft parking aprons and runways. This mitigation will be accomplished by limiting the construction activities to specific work areas. The work areas will be delineated using low profile lighted barricades and 4 foot high snow fence while runway closures will require lighted and unlighted runway closed markers, and installed in accordance with the Phasing Plans. The following table shows the impacts to airport operations:

| AIRPORT OPERATIONS AFFECTED BY CONSTRUCTION | | | | | | |
|--|--|------------------|------------------|--|--------------------|--------------------------------------|
| Operational Requirements | Taxiway A | Taxiway B | Taxiway C | Taxiway D | Runway 1-19 | Runway 14-32 |
| Normal | Open | Open | Open | Open | Open | Open |
| Work Area I (Base Bid) | Open | Open | Open | Closed from RW 1-19 to Existing Airport Ramp | Closed | Open |
| Work Area II (Base Bid) | Closed from RW 1-19 to Existing Airport Ramp; Closed on a daily basis ¹ | Open | Open | Closed from RW 1-19 to Existing Airport Ramp; Closed on a daily basis ¹ | Closed | Closed on a daily basis ¹ |
| Work Area II (Add Alternate No. 1) | Closed from RW 1-19 to Existing Airport Ramp; Closed on a daily basis ¹ | Open | Open | Closed from RW 1-19 to Existing Airport Ramp; Closed on a daily basis ¹ | Closed | Closed on a daily basis ¹ |
| Work Area III | Open | Open | Open | Open | Open | Open |
| Work Area IV | Open | Open | Open | Open | Open | Open |

1 – Base Bid: Reopen at end of workshift. If Add Alternate No.1 is awarded, it will be closed.

4. NAVAID PROTECTION

The Airport does not have any FAA NAVAIDS.

5. CONTRACTOR ACCESS

Location of Stockpiled Construction Materials: Material stockpiles shall be located on the Airport within the staging areas at the location shown on the construction safety plans. All stockpiles will not penetrate the any runway approach airspace surfaces. Stockpile heights will be monitored by the Resident Engineer during construction.

See drawings S2.1-S2.4 for contractor staging and stockpile area.

Construction site parking, construction equipment parking, access and haul roads: The Contractor will be required to limit their operations only to the approved areas as described and depicted in the contract documents. The Contractor's materials storage areas, equipment staging vehicle parking areas, and haul roads have been carefully selected and clearly indicated within the contract documents. This is intended to ensure that no Contractor (or sub-contractor) materials, equipment or vehicles are allowed at any time within any restricted safety areas or protected airspace associated with active runways or taxiways. The Contractor's Superintendent will be required to monitor the CTAF frequency (122.8) continuously during the construction operations as well as the Resident Engineer.

Specific runway and taxiway safety areas for ORE and their applicability with the proposed airfield improvements will be discussed in detail at the pre-construction conference. The contractor will be required to demonstrate an ability to comprehend the importance of strict adherence to the project safety requirements and to safely operate ground vehicles on airports prior to the issuance of the notice to proceed and prior to being allowed onto the airfield.

The Airport will restrict the Contractor operations only to pre-approved personnel. All vehicle operators employed by the contractor (and sub-contractors) will be trained in the proper and safe operation of ground vehicles on airports and will be required to pass a driver training test prior to being allowed to operate on the airfield. All other Contractor, subcontractor, or vendor operations who have not taken the course will require an escort. All operators will be familiar with the contents and requirements of FAA Advisory Circular AC 150/5210-20A *Ground Vehicle Operations to include Taxiing or Towing an Aircraft on Airports* before they will be allowed to proceed onto the airfield.

Vehicle operators will be instructed that aircraft utilizing the airport shall be given the right-of-way over construction ground vehicle traffic at all times.

An ORE airfield plan will be provided to vehicle operators to ensure that they are able to orient themselves on the ground and know the layout and nomenclature of all runways, taxiways, and other aircraft movement areas.

Vehicle operators will be instructed to park vehicles and equipment outside of active ROFA's and TOFA's. This will allow the contractor to more quickly vacate the runway to allow an emergency aircraft landing if such a contingency should arise during construction.

The proposed designated locations for construction vehicle and equipment parking, and access and haul roads have been selected such that they are intended to minimize safety issues to pilots or other airport users as well as the public at large. The locations for these items have been carefully selected during the project design phase and will be reviewed with the selected contractor at the pre-construction meeting and throughout the construction period.

Marking and lighting of vehicles, Description of proper vehicle operations, required escorts: Contractor equipment and vehicles which are expected to work on the airfield shall be fitted with roof mounted flashing strobe lights. These lights shall be operating whenever the vehicles are within the airport property. It is also required that airport safety flags (3 ft. by 3 ft., checkered aviation orange and white) are utilized on all large construction equipment working on site. All Contractor vehicles shall have the company identification plainly visible on both sides of the vehicle. Marking and lighting of Contractor vehicles shall be in accordance with AC 150/5210-5D, *Painting, Marking and Lighting of Vehicles used on and Airport*.

A flag or escort vehicle is not required for ground vehicles which have been painted yellow or otherwise marked and lighted for routine use on the airport so long as the operator has received the proper training for operating ground vehicles on airports. The Contractor will be directed to consult with the airport management for additional current specific local requirements that may exist in this regard.

Vendors, suppliers, delivery drivers and other entities peripherally involved with the project will be instructed to wait outside the airfield security gate until they are met by contractor personnel and then, only if it is necessary, escorted onto the airfield. All non-general contractor personnel who are not vetted or otherwise approved by airport management will be escorted and closely monitored by the general contractor at all times when they are on the airfield.

No personal vehicles will be allowed on the airfield.

Training requirements for vehicle drivers: All vehicle operators employed by the contractor (and sub-contractors) will receive training by the Airport to the proper and safe operation of ground vehicles at ORE. All operators will be required to familiarize themselves with the contents and requirements of FAA Advisory Circular AC 150/5210-20 *Ground Vehicle Operations on Airports* before they will be allowed to proceed onto the airfield.

Situational awareness: Contractor vehicle operators shall confirm that no aircraft are approaching, even when given clearance, prior to crossing an active aircraft area. Contractor vehicle operators shall have a heightened sense of awareness while operating on the airfield.

Two-way radio communication procedures: The Contractor shall have with each working crew and all crossing guards at least one (1) person equipped with an aviation radio capable of communicating with the Orange Municipal Airport at the CTAF/UNICOM frequency 122.8 MHz. The individuals assigned to monitor the aviation radio shall be directed on the use of the radios and fully understand their responsibilities. These radios shall be capable of reliable two-way communication from any location on the airport.

The Contractor will be required to demonstrate proficiency with aviation radio communication procedures to the satisfaction of the Airport Manager and the Resident Engineer before any of his/her forces are allowed to proceed onto the airfield. During all times of construction on the airfield, the Contractor shall ensure that a competent employee is designated as a radio-flag person and is familiar

with airport radio communication procedures. When short duration work is being performed within Aircraft Operational Areas (AOA), the flag person shall position himself/herself to observe work being performed and shall monitor all pilot communications. If necessary due to excessive construction noise, the signal shall be amplified so as to be audible to the radio monitor/flag person. The Contractor's Superintendent and the Resident Engineer will also be monitoring the aviation radio at all times during construction.

The Radio Escort has to be fully dedicated to monitoring the radio for air traffic and display the ability to properly communicate with the air traffic control tower when escorting vehicles to and from the site.

If the Contractor's radios become disabled while on the AOA, the radio/flag person shall immediately contact the Resident Engineer by phone and await further instructions.

The contract documents prohibit the Contractor to use the aviation radio frequencies for any non-aviation use. The Contractor is required to provide cell phones or other forms of two-way radios to communicate with their workers.

Maintenance of Airfield Security: The Contractor shall maintain the airport's perimeter fencing and gates at all times, including the portions of work which require the installing of new fencing/gates. Temporary fencing and gates, as approved by the Owner through the Engineer, shall be installed (if required) to maintain existing fencing at all times.

Requirements for Contractor compliance with airport safety and security measures are described in the contract documents and will be further detailed and emphasized at the project pre-construction conference and as necessary during weekly project meetings.

Significant safety related airport requirements which the contractor must comply are shown and described on the project safety plan and are also described within this document.

The contractor will be required to enter and exit the airfield only through designated access gates unless otherwise approved the Engineer or Airport. The gates are controlled by the airport management and maintenance staff. The contractor will be required to ensure that all gates onto the airfield which are used by the contractor will be closed and locked as directed by the Airport Manager. Contractor personnel will be instructed to close and lock all gates that they have opened each time and immediately after they have passed through them to ensure that unauthorized piggyback intrusions do not occur. If an airport gate has to be left open to accommodate construction activity then it is the contractor's responsibility to supply a gate guard.

The general contractor superintendent will be responsible for monitoring the activities and whereabouts of all Contractor and sub-contractor personnel on the airfield. Contractor personnel and work activities will also be observed by the resident engineer and airport maintenance personnel. Additional security procedures mandated by local law enforcement, the Commonwealth (Massachusetts Department of Transportation Aeronautics Division) and Federal authorities (FAA, Homeland Security, and Transportation Security Administration) shall be strictly adhered to at all times.

6. WILDLIFE MANAGEMENT

From the standpoint of safety, there is no large wildlife such as deer, moose, coyotes, bears, or turkeys that are expected to pose significant safety hazards during the construction period. Contractor personnel will be instructed to close all access gates immediately after passing through them to ensure that no hazardous wildlife types are allowed to venture onto the airfield.

The Contractor shall keep the construction site free of trash and debris, which could become a wildlife attractant. All work areas, including haul roads and lay down areas shall be graded smooth and shall be well-draining to prevent the accumulation of standing water, which could become an attractant for wildlife.

The Contractor is required to keep the construction site free of trash and debris. All work areas, including haul roads and lay down areas shall be graded smooth and shall be well-draining to prevent the accumulation of standing water. If any Contractor personnel observe wildlife on or near the project work areas, they shall immediately notify the Airport Manager and Resident Engineer.

7. FOREIGN OBJECT DEBRIS (FOD) MANAGEMENT

The Contractor shall ensure that all airfield pavements trafficked by their vehicles or equipment and utilized by aircraft is immediately and continually swept clean (and washed if necessary) and that no foreign object debris (FOD) remains that could be hazardous to aircraft.

The Contractor will be required to allocate time prior to the Airport reopening airfield pavement to aircraft to complete a thorough physical sweep of all pavements within the limits of the project site. Sweeping of large areas will be accomplished by use of motorized sweepers and by use of hand brooms. If necessary, the Contractor will also pressure wash the pavement to ensure that all dried mud and other deleterious materials and residue are thoroughly removed from the pavement surface. Following the sweeping, the Contractor will employ sufficient labor as needed to carefully conduct close-interval “FOD walks” to find and pick up all visible remaining stones, pebbles, pavement shards, concrete rubble, loose sealants, or other materials or items that could pose a FOD hazard to aircraft. The pavement will then be inspected by the Airport Administration to ensure that this pavement can be re-opened to aircraft traffic. If necessary, the Contractor will be asked to conduct additional sweeping, washing, and/or FOD walking to remove remaining FOD. The runway, taxiway, or aircraft apron pavement will not be re-opened and the Contractor will not be released from the project site until the pavement is completely clean and approval has been granted by airport personnel.

The Contractor shall immediately, carefully, and continuously observe and inspect all airfield pavements over which vehicles and equipment have operated to ensure that all FOD that may have been deposited is identified and removed. This will include all ground vehicle traffic over airfield pavements such as pickup truck travel to the runway ends to place and recover closed runway markers.

Ground vehicle travel on airfield pavements will be minimized to the extent possible to reduce the likelihood of detrimental FOD production. This will be accomplished by stressing travel in turf safety areas and by travel around the airport to access the airfield through another access point as appropriate, by using as few vehicles on the airfield as possible, and by encouraging pedestrian activity between points on the airfield on the part of the contractor whenever possible.

The Contractor shall control his operations and possibly suspend some work activities as necessary such that airborne FOD (dust) generated as a result of construction activities is not allowed to drift across any area which is open to aircraft movements.

8. HAZARDOUS MATERIALS (HAZMAT) MANAGEMENT

Hazardous material that are needed for the project will be properly transported, stored, and secured in accordance with local, State, and Federal regulations. For this contract, hazardous materials are expected to include engine fluids such as fuels, oils, grease, and anti-freeze.

Contractors working on publicly funded projects in the Commonwealth of Massachusetts are required to maintain current Material Safety Data Sheets (MSDS) for all hazardous materials that are utilized or temporarily stored on the project site.

Vehicles and equipment shall not be refueled in the vicinity of any jurisdictionally protected wetlands which will be depicted on the contract drawings. All reportable spills of fuel or other hazardous liquids that may occur at any location will be promptly reported to airport personnel and to the proper environmental authorities. Reporting channels and procedures will be reviewed at the pre-construction conference.

9. NOTIFICATION OF CONSTRUCTION ACTIVITIES

General: The Contractor shall immediately notify the Resident Engineer if he/she observes any unsafe condition which adversely affects the operational safety of the airport.

List of Responsible Representatives:

Leonard Bedaw, Airport Manager
Orange Municipal Airport
80 Airport Street
Orange, MA 01364
978-544-8189

Craig Schuster, Engineer (Project Manager)
Airport Solutions Group, LLC
39 Winn Street
Burlington, MA 01803
781.491.0083

Emergency Contact List: As a part of the SPCD, the Contractor shall submit a complete Emergency Contact List, which includes the Contractor's and Subcontractor's primary point of contact (i.e. Superintendent) and other supervisory personnel. Contractor and Subcontractor Superintendents shall be made available 24 hours per day. The Emergency Contact List shall also include (but is not limited to) MassDOT staff, the Airport Manager and Maintenance staff, Airport Solutions Group staff, emergency medical, fire and police, and other contact names and numbers that are deemed necessary. The Emergency Contact List shall be distributed at the pre-construction conference, and shall be updated regularly as names and numbers are added and/or revised.

NOTAMs: Responsibility for the preparation and requesting the issuance of NOTAMs and the cancellation of NOTAMs with the FAA flight service rests with the airport management. There will be no other authorized representatives filed with the FAA flight service as a part of this project.

In order to support the contractor's work schedule and to allow work to progress as expeditiously as possible, it is imperative that the contractor closely coordinate with the airport management on a daily basis and at least 72 hours in advance of planned construction activities. This requirement will be placed on the contractor and will be stressed in the contract documents and will be given special emphasis at the pre-construction conference.

It will be recognized by the contractor that NOTAMs are subject to revocation at any time based upon changeable weather conditions and operational needs of the airport.

The Contractor will also be responsible for notifying airport management personnel that all work has been completed and the all Contractor forces and materials have been removed from the respective work area so that the NOTAM can be cancelled at the end of each NOTAM period.

Emergency Notification Procedures: Contractor personnel will be instructed to call the 911 for any type of emergency situation that requires the response of medical or law enforcement agencies. The Emergency Contact List will include contact information for key airport personnel and for local emergency responder personnel and will ensure that this information is posted and readily available on site throughout the construction period.

Part 77 Notification: As this project involves construction that will include equipment and parking areas for this equipment, FAA Form 7460-1 Notice of Proposed Construction or Alteration will be submitted to the FAA New England Region's Airports Division via the Obstruction Evaluation/Airport Airspace Analysis website. The Contractor is prohibited from using tall equipment (crane, equipment, etc.) without prior approval from the Engineer. FAA form 7460 must be filed, and a determination made by the FAA, prior to using tall equipment.

FAA Reimbursable Agreements: An FAA reimbursable agreement is not applicable to this project.

10. INSPECTION REQUIREMENTS

Daily Inspections: Several types of safety related inspections are conducted by the Airport Manager, Resident Engineer, and Contractor throughout the construction period. Safety briefings and inspections of vehicles and equipment are conducted by the project Superintendent or Foreperson at the start of each work shift. The Contractor's workers shall conduct frequent self-inspections of all ongoing work methods and compliance with airport safety requirements that are required under the contract. The Resident Engineer also assists with oversight of the Contractor's compliance with safety regulations and requirements during the technical observation of construction. Further oversight is provided by Airport Operations staff that frequently checks on work crews during the progress of construction.

Safety related deficiencies that are observed by the Resident Engineer will be immediately communicated to the project Superintendent. The Resident Engineer will then follow up to the extent necessary until the deficiency has been corrected. Depending upon the severity of the deficiency, the Resident Engineer may prepare a written summary of the incident along with corrective measures that are needed to ensure that a repeat of the deficiency does not occur. Such corrective measures may

range from the issuance of an oral censure to the Contractor's project superintendent to an immediate termination of all remaining contract work.

Final Inspection: A final inspection will be conducted once the Contractor notifies the Resident Engineer that substantial completion of construction has been reached. The FAA and MassDOT inspectors will be contracted prior to final inspection to determine if their attendance is necessary.

11. UNDERGROUND UTILITIES

The approximate locations of known utilities and underground cables are shown on the Contract Drawings. Existing utility locations are based on record drawings, and may not be accurate. It is the Contractor's responsibility to locate and verify all existing utilities within the vicinity of all excavations and trenches, regardless of whether or not the utility is shown on the Contract Drawings. The Contractor shall provide a utility locating service to locate and verify utility locations. **No excavation shall begin until the Contractor has exhausted every method available to him to locate and mark out existing utilities.** These methods shall include, but will not be limited to, opening manholes, handholes, and light bases to determine the orientation of existing circuits, measuring cable insulation resistances and using a utility locator device capable of locating both metallic and nonmetallic utilities to trace existing underground raceways, cables, and other utilities. Once existing utilities have been located and marked on the ground, the Contractor shall hand excavate all material in the vicinity of the known existing utility. The Contractor shall also meggar the cable of the appropriate circuit in the field lighting vault (at the output of the regulator) to verify the integrity of the circuit before and after excavation.

Prior to commencement of any excavation the Contractor shall coordinate all work on and near the underground utilities and cables with the following agencies as appropriate:

- Orange Municipal Airport – Airport Management / Maintenance Supervisor
- Dig Safe and indicated utilities
- The Federal Aviation Administration - Airways Facilities Sector Field Office (860.386.3401)
- National Weather Bureau
- Town of Orange Highway Department
- Town of Orange Water Department
- Comcast
- Verizon
- National Grid

The Contractor shall use every precaution to prevent injury or damage to all underground structures, such as pipes, wires and conduits; to all paved surfaces and to all turfed areas. The Contractor shall be responsible for injury or damage of any character resulting from any act, neglect, misconduct in the manner or method of execution or non-execution of said work, and such responsibility shall not be released until the work to repair all damage has been completed and accepted. Whenever any such damage or injury is done, the Contractor shall restore, at his/her own expense, the above to a condition equal or better to that existing before such damage or injury is done.

The Contractor shall furnish and install all materials necessary to protect existing underground utilities and cables that are to remain and to make any temporary connections necessary to maintain operations of the underground utilities and cables that are to be relocated until the permanent relocation can be made.

The Contractor shall notify the FAA of the time, date, and location of the pre-construction conference a minimum of 2 weeks in advance, so that a representative may attend. The Contractor shall also notify the FAA at (860) 386-3401 at least two business days prior to the start of work on the site.

The Contractor shall comply with the current version of the Dig Safe Law, effective Dec 17, 1998 or as revised. The Contractor is required to pre-mark the construction site and give notice of planned digging near utility, cable and fuel lines.

The Contractor shall immediately repair, at his/her own expense, any underground utilities and cables damaged by his/her operations including any damage done by driving his/her equipment over existing underground utilities and cables. The repair of any FAA cables, , if encountered, shall be inspected and approved by the FAA.

12. PENALTIES

The provisions for the appropriate disposition of safety violations recognize that penalties need to be commensurate with nature and severity of the offense and surrounding circumstances. All Contractor personnel will be instructed that safety violations of any type on an airport cannot be tolerated and that disciplinary actions will be pro-actively taken by the airport management and within the Contractor's organization if and when such a violation should occur. Penalties typically range from the issuance of an oral reprimand for infractions such as the improper placement of a barricade to immediate termination of all remaining contract work and disbarment of the Contractor from future work at the airport for creating a hazard situation on the scale of a potentially dangerous runway incursion. It is the policy of ORE that all incidents which involve noncompliance with established airport safety regulations are given a thorough forensic examination with the intent to identify and implement specific pro-active measures and procedures to ensure that similar incidents do not reoccur. A fundamental component of that policy involves the rapid imposition of severe and meaningful penalties which focus upon behavior modification and the deterrence of future unsafe conduct.

In addition to penalties levied by ORE, many safety conscientious contractors have internal policies to continually encourage safe employee behavior. Typical penalties for safety policy violations include oral reprimands, being sent home, i.e. dismissal from the jobsite for the remainder of the day or week, pay forfeiture, and demotions. Further violations as outlined in the specifications (M-001) are as follows:

| Violation | Consequence |
|--|-------------------------|
| Total Contract Time | \$3,000.00/calendar day |
| Contractor Access/Security Gate left unattended/unlocked | \$100/event |
| Contractor's Superintendent not onsite | \$180/hour |

13. SPECIAL CONDITIONS

Airport Events: Close coordination will be made with the airport management to ensure that special events that may be planned such as air shows or open houses are safely accommodated by the construction schedule. Special visits by dignitaries and entourages will be accommodated through adjustments in the Contractor's work schedule.

Weather: During periods of reduced visibility, the Airport reserves the right to have the Contractor vacate the airfield.

Incursions: If the Contractor/Subcontractor is involved with a Runway Incursion or a Vehicle/Pedestrian Deviation, the Airport reserves the right to suspend construction until an FAA investigation is completed. Any costs associated with suspension of construction for the purposes of this investigation shall be borne by the Contractor.

14. RUNWAY AND TAXIWAY VISUAL AIDS

Work associated with this project will be conducted, at times, within both Runway 1-19 and 14-32 safety areas, and within portions of taxiway safety areas. For the duration of the project, edge lighting and pavement markings for Runways/Taxiways that are open to aircraft operations will remain intact. The contractor will be responsible for furnishing and installing jumpers between circuits in order to keep portions of open pavement lighted and signed. Pavement markings shall be in accordance with AC 150/5340-1M Standards for Airport Markings, and lighting shall be in accordance with the latest versions of AC 150/5340-30J *Design and Installation Details for Airport Visual Aids* and AC 150/5345-53D *Airport Lighting Certification Program*. All airfield guidance signs shall conform to the latest editions of AC 150/5345-44K *Specification for Runway and Taxiway Signs*, AC 150/5340-18G *Standards for Airport Sign Systems*, and AC 150/5345-53D *Airport Lighting Certification Program*.

15. MARKING AND SIGNS FOR ACCESS ROUTES

Construction warning signs, plastic traffic cones, and other devices will be placed on the airfield and along public highways leading to the project work sites as appropriate. Visual aids will be furnished by the Contractor and utilized as required by the airport management in accordance with AC 150/5340-18G and the Manual for Uniform Traffic Control Devices.

16. HAZARD MARKING AND LIGHTING

Low profile barricades, snow fence, runway closed surface markers, and runway closed lighted Xs will be used as a method for traffic control in the project. The low profile barricades will be interlocked and placed end to end. Low profile barricades will be placed and relocated by the Contractor, as directed and/or approved by the Airport through the Engineer, throughout the construction as necessary to accommodate ongoing and changing work activities and requirements of the work phasing. The snow fence will be installed around the limits of the work area to pen in the contractor's employees and equipment. The runway closed surface marker will be placed over the runway numerals and the lighted X will be placed in the grass area immediately off the end of the runway. The contractor will be responsible for daily maintenance of all barricades, snow fence, lighted Xs and surface markers. The proposed locations of low profile barricades, snow fence, runway closed surface markers, and runway closed lighted Xs are shown in construction safety and phasing plans.

Construction Areas: The contractor will be required to utilize florescent orange or red flagging to conspicuously mark any open excavations or other safety hazards within the designated work areas. This flagging is typically mounted around and between survey riser stakes at 4-5 feet above ground level. Open excavations across vehicle routes on the airfield will be marked with flagging and barrels with flashing lights if they must be left open overnight.

Florescent orange ground marking paint will be used to mark ground hazards such as catch basin rims, manholes, electrical handholes, pullboxes, wires, rocks, and concrete monuments. Other safety hazards in the vicinity of the proposed construction work such as metal stakes, ground deformities and other tripping hazards, and hornet nests in grass areas are typically marked with orange safety paint.

17. PROTECTION OF RUNWAY AND TAXIWAY SAFETY AREAS

The Contractor will be allowed to work inside the runway safety areas and taxiway safety areas as shown on the construction safety and phasing plans because Runway 1-19 will be closed. While work is conducted within these work areas, the Airport will close portions of the facility as described above in Section 3. No construction may occur within a Runway Safety Area (RSA) or Taxiway Object Free Area (TOFA) while the associated runway or taxiway is open for aircraft operations.

The Contractor will be allowed to work and access haul roads within the ROFA with no runway closure, provided that the work areas and haul roads do not penetrate the RSA, and the Contractor is operating while in contact with the CTAF. All stored equipment and stockpiled material shall remain clear of the ROFA unless otherwise shown on the construction safety and phasing plans.

Excavations: Open trenches or excavations are not permitted within an RSA or TOFA while the associated runway or taxiway is open. If a runway or taxiway is closed due to trenching/excavation, prior to re-opening the pavement, open trenches must either be backfilled, compacted, and leveled out to match the existing adjacent grades, or appropriately covered to allow the safe operation of the heaviest aircraft operating on the runway across the trench without damage to the aircraft. While work is conducted outside of any runway or taxiway safety area, the Contractor will be required to limit their operations only to the approved areas as described and depicted in the contract documents. The Contractor's materials storage areas, equipment staging vehicle parking areas, and haul roads have been carefully selected and clearly indicated within the contract documents. This is intended to ensure that no Contractor (or sub-contractor) materials, equipment or vehicle are allowed at any time within any restricted safety areas or protected airspace associated with active runways or taxiways. Open trenches or excavations shall be prominently marked with red or orange flags, as approved by the Owner. Any open trenches left overnight shall be barricaded with barrel-type airport barricades with flashing red lights.

Soil erosion must be controlled to maintain RSA/TOFA standards. All RSAs and TOFAs must be cleared and graded and have no hazardous ruts, humps, depressions or other surface variations, and shall be capable, under dry conditions, of supporting snow removal equipment, ARFF vehicles, and occasional passage of aircraft without causing structural damage to the aircraft.

18. OTHER LIMITATIONS

Other limitations include requirements for dust and debris control during construction, closely monitoring all personnel at all times to ensure that no one is allowed to enter aircraft operations areas or restricted areas on the airfield, and ensuring that vehicles and equipment are always parked within designated areas and outside safety areas for active runways, taxiways, and aircraft parking aprons. Changeable and unforeseen weather conditions also place limitations on construction and require that the Contractor periodically revise daily and weekly work activity schedules. Airport operational needs change and also require that work scheduling be altered on short notice.

The Contractor is prohibited from using tall equipment (crane, equipment, etc.) without prior approval from the Owner. FAA form 7460 must be filed, and a determination made by the FAA, prior to using tall equipment. No open flames or flare pots shall be used without prior approval from the Owner.

Use of open flame welding and torches are prohibited, unless adequate fire safety precautions are provided and the airport operator has approved their use.

Blasting: Blasting will not be permitted on this project.

APPENDIX A

CONSTRUCTION SAFETY AND PHASING PLANS

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See Contract Drawings S1.1 through S1.3; and S2.1 through S2.3

APPENDIX B
CONTRACTOR SAFETY PLAN COMPLIANCE DOCUMENT (SPCD)

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SAFETY PLAN COMPLIANCE DOCUMENT

I, _____, (CONTRACTOR), have read the Orange Municipal Airport A.I.P. Project No. 3-25-0039-____-2020 Construction Safety and Phasing Plan (CSPP), approved, and will abide by it as written and with the following additions as noted:

Notes:

- 1. *If no supplemental information is necessary for any specific section, write "NO SUPPLEMENTAL INFORMATION"*
- 2. *Do not duplicate information in the CSPP.*

1. COORDINATION – Discuss details of proposed safety meetings with the airport operator and with contractor employees and subcontractors.

2. PHASING – Discuss proposed construction schedule elements including:

- a. Duration of each phase
- b. Daily start and finish of construction, including "night only" operation
- c. Duration of construction activities during:
 - i. Normal runway operations
 - ii. Closed runway operations
 - iii. Modified runway "Aircraft Reference Code" usage

3. AREAS AND OPERATIONS AFFECTED BY THE CONSTRUCTION ACTIVITY – Areas and operations are identified in the CSPP.

4. PROTECTION OF NAVAIDS – Discuss specific methods proposed to protect operating NAVAIDs.

5. CONTRACTOR ACCESS – Provide the following:

- a. Details on how the integrity of the airport security fence will be maintained (gate guards, daily log of construction personnel, or other
- b. List individuals required for driver training (as required)
- c. Radio communications
 - i. Types of radios and backup capabilities
 - ii. Who will be monitoring radios
 - iii. Whom to contact if ATCT cannot reach the contractor’s designated person by radio
- d. Details on how material delivery vehicles will be escorted on site

6. WILDLIFE MANAGEMENT – Discuss the following:

- a. Methods and procedures to prevent wildlife attraction
- b. Wildlife reporting procedures

7. FOREIGN OBJECT DEBRIS (FOD) MANAGEMENT – Discuss equipment and methods for controlling FOD, including construction debris and dust.

8. HAZARDOUS MATERIAL (HAZMAT) MANAGEMENT – Discuss equipment and methods for responding to hazardous spills.

9. NOTIFICATION OF CONSTRUCTION ACTIVITIES – Provide the following:

- a. Contractor points of contact
- b. Contractor emergency contact
- c. Listing of tall or other requested equipment proposed for use on the airport and the timeframe
- d. Batch plant details

10. INSPECTION REQUIREMENTS – Discuss daily (or more frequent) inspections and special inspection procedures.

11. UNDERGROUND UTILITIES – Discuss proposed methods of identifying and protecting underground utilities.

12. PENALTIES – Penalties are identified in the CSPP.

NO SUPPLEMENTAL INFORMATION

13. SPECIAL CONDITIONS – Discuss proposed actions for each special condition identified in the CSPP

14. RUNWAY AND TAXIWAY VISUAL AIDS – Discuss proposed visual aids (marking, lighting, signs, and visual NAVAIDs) including the following:

- a. Equipment and methods for covering signage and airfield lights
 - b. Equipment and methods for temporary closure markings (paint, fabric, other)
 - c. Types of temporary Visual Guidance Slope Indicators (VGSI)
-
-
-

15. MARKING AND SIGNS FOR ACCESS ROUTES – Discuss proposed methods of demarcating access routes for vehicle drivers.

16. HAZARD MARKING AND LIGHTING – Discuss proposed equipment and methods for identifying excavation areas.

17. PROTECTION OF RUNWAY AND TAXIWAY SAFETY AREAS – Discuss proposed methods of identifying, demarcating, and protecting airport surfaces (safety areas, object free areas, obstacle free zones, and approach/departure zones) including:

- a. Equipment and method for maintaining Runway or Taxiway Safety Area standards
 - b. Equipment and methods for separation of construction operations from aircraft operations, including details of barricades.
-
-
-

18. OTHER LIMITATIONS ON CONSTRUCTION – Other limitations (if any) shall be identified in the CSPP.

This Safety Plan Compliance Document (SPCD) must be submitted and approved by the Sponsor prior to issuing the Notice to Proceed for Construction. The contractor should allow at least two weeks for review by the Sponsor.

(CONTRACTOR) certifies that it understands the operational safety requirements of the CSPP and will not deviate from the approved CSPP and this SPCD unless written approval is granted by the Sponsor. It is our understanding that upon review and approval of this SPCD, we may request issuance of Notice to Proceed.

By _____, _____
Title Date

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APPENDIX C
SUBMITTAL LOG

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APPENDIX D
GEOTECHNICAL REPORT

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15 January 2020

Craig A. Schuster, P.E.
Airport Solutions Group, LLC
39 Winn Street
Burlington, MA 01803
cschuster@airportsolutionsgroup.com

Subject: Geotechnical Engineering Evaluation
Reconstruct Runway 1-19 – Orange Municipal Airport
Orange, Massachusetts
RWG&A Project No. 1229-021

Dear Mr. Schuster:

In accordance with Airport Solutions Group, LLC's (ASG's) request and authorization, R.W. Gillespie & Associates, Inc., (RWG&A) has completed a subsurface exploration and laboratory testing program for the subject project. The services were completed in general accordance with RWG&A Proposal No. P-10252.GI dated 30 July 2019. The scope of services as performed included the following:

1. Drilled, logged, and sampled twenty-seven (27) test borings, designated D-1 through D-27, along the existing runway. Cored asphalt at each boring location.
2. Recovered bulk samples from fourteen (14) boring locations for use in laboratory California Bearing Ratio (CBR) and moisture-density testing.
3. Completed twenty-five (25) sieve analyses, fifteen (15) sieve/hydrometer analyses, fourteen (14) Atterberg limits tests, eleven (11) laboratory CBR with moisture-density tests, and three (3) moisture-density relationship tests on recovered soil samples, and five (5) asphalt core extraction and gradation tests. The tests were performed in general accordance with their corresponding ASTM standards.
4. Prepared this summary report of the services together with the exploration logs and laboratory test results.

The project location is shown on Figure 1, *Locus Map*. The approximate test boring locations are shown on Figure 2, *Exploration Location Plan*. The boring locations were selected and marked in the field by ASG prior to drilling.

The borings were drilled by Seaboard Geotechnical & Environmental Drilling Services, Inc. of Chicopee, Massachusetts using a truck-mounted drill rig. The borings were drilled between 19 and 21 November 2019. Exploration activities were coordinated and monitored by RWG&A personnel who prepared the exploration logs. The soils were described in the field in general accordance with *ASTM D2488, Standard Practice for Description and Identification of Soils*

(Visual-Manual Procedure) and were re-described based on the results of the laboratory testing. Logs of the test borings are provided in Appendix A.

Laboratory testing was performed on soil samples recovered from the exploration program to assist in the description of the soils and estimation of engineering properties. All tests were conducted at the RWG&A soil and materials testing laboratory in Biddeford, Maine, which is accredited by the American Association of State Highway and Transportation Officials (AASHTO) for the tests performed. The tests were performed in general accordance with the following methods and procedures:

- *ASTM D2216 - 10, Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass.*
- *ASTM D6913 / D6913M – 17, Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis.*
- *ASTM D7928 – 17, Standard Test Method for Particle-Size Distribution (Gradation) of Fine-Grained Soils Using the Sedimentation (Hydrometer) Analysis.*
- *ASTM D1140 – 17, Standard Test Method for Amount of Material in Soils Finer Than the No. 200 (75- μ m) Sieve.*
- *ASTM D1557 – 12e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).*
- *ASTM D1883 - 16, Standard Test Method for CBR (California Bearing Ratio) of Laboratory-Compacted Soils.*
- *ASTM D2172 / D2172M - 17e1, Standard Test Methods for Quantitative Extraction of Asphalt Binder from Asphalt Mixtures.*

Laboratory results have been summarized in tabular form in Tables I and II; laboratory test results are also presented in graphical format in Appendices B through F. A summary of the data presentation is as follows:

- TABLE I, Summary of Sieve Analyses
- TABLE II, Summary of Laboratory CBR Values
- TABLE III, Blend Evaluation without Additional Stone
- TABLE IV, Blend Evaluation with Additional Stone
- APPENDIX A, Exploration Logs & Soil Description Sheet
- APPENDIX B, Sieve / Hydrometer Test Results
- APPENDIX C, Atterberg Limit Test Results
- APPENDIX D, Moisture-Density Relationship Test Results
- APPENDIX E, Laboratory CBR Test Results
- APPENDIX F, Asphalt Extraction and Gradation Test Results
- APPENDIX G, Asphalt Core Photographs

Subsurface Soil Conditions

Conditions at ground surface consisted of 2.5 to 4.25 inches of asphalt pavement over fill (pavement base) underlain by naturally deposited sand with varying amounts of silt. Fill has USCS classifications of SW, SP, SW-SM, and SP-SM. Naturally deposited soils generally classify as sand, silt with sand, and silty sand with USCS classifications SP, SP-SM, and SM. The on-site inorganic soils are moderately frost susceptible and moisture sensitive.

Free water was not observed the explorations to the depth drilled. The absence of free water data on the exploration logs implies no groundwater data is available but does not necessarily mean that groundwater will not be encountered at these locations within the vertical reaches of the explorations in the future. Wet soil samples were recovered at about 10 feet below ground surface in the borings. Groundwater levels at the site will fluctuate due to season, temperature, rainfall and construction activity in the area; therefore, water levels during and following construction will vary from those observed in the explorations.

Recommended CBR Value

Laboratory CBR tests were performed on bulk samples of soils recovered at about 0.5 to 4 feet below ground surface from borings D-2, D-6, D-10, D-12, D-14, D-16, D-18, D-22, D-24, D-26, and D-27. The laboratory CBR results ranged from 16.7 to 34.4 at about 97% to 100% of the maximum dry density. It is understood that the pavement section subgrade would be proof-rolled under the observation of a qualified inspector prior to pavement section construction and that identified soft areas would be excavated and replaced. In accordance with FAA document *AC 15015320-6F, Airport Pavement Design and Evaluation*, a CBR value of 17.5 should be used for pavement section thickness design. The recommended design CBR value is based on the subgrade compacted to a minimum of 98% of the maximum dry density as determined by ASTM D1557.

Reuse of On-site Soils

As requested, RWG&A evaluated blends of the existing pavement and pavement section base course for reuse. RWG&A's evaluation of the blends is based on the results of the laboratory particle-size tests performed on recovered pavement and base course materials and are considered suitable for planning purposes only and not for design or construction. It is recommended that test areas be selected and pulverized during construction. The blend from the test areas should be tested and evaluated for conformance with Federal Airport Administration (FAA) material specifications and to determine the amount of additional materials (such as crushed stone or gravel) that would be needed to meet material requirements.

Pavement / Base Course: The average, measured pavement thickness was about 3 inches and the base course thickness ranged from about 1 to 2 feet. Our evaluation is based on a total reclamation depth of 11 inches consisting of 3 inches of pavement blended with 8 inches of base course, and thorough pulverizing of the pavement and mixing with a composite blend of base course.

In summary, the calculated blend would meet the requirements of FAA Item P-154 Subbase but would not meet the requirements of FAA Item P-209 Base Course without modification. The

blend assessment is summarized in Table III, attached. In order to create a blend that meets the FAA Item P-209 Base Course gradation requirements, an equivalent thickness of about 2 inches of Massachusetts Highway Department 1.5-inch crushed stone would need to be added to the pulverized mix.

Base Course Only: The results of the laboratory gradation testing indicate the in-place base course materials meet FAA Item P-154 but do not meet the requirements of FAA Item P-209 without modification. RWG&A's evaluation indicates a blend of approximately 4 parts base coarse to 1 part Massachusetts Highway Department 1.5-inch crushed stone by dry weight would meet FAA Item P-209 requirements.

Closure

This report has been prepared for specific application to the Reconstruction of Runway 1-19 at Orange Municipal Airport in Orange, Massachusetts, and for the exclusive use of Airport Solutions Group, LLC. This work has been completed in accordance with generally accepted soil engineering practices. No other warranty, expressed or implied, is made.

We trust the foregoing meets your present needs, and if you have any questions, please contact us.

Sincerely,
R. W. GILLESPIE & ASSOCIATES, INC.



Marc R. Grenier, P.E. (NH, ME, CT)
Senior Geotechnical Engineer



Erik J. Wiberg, P.E.
Principal Geotechnical Engineer

EJW/MRG:sf

Attachments:

- Figure 1, Locus Map
- Figure 2, Exploration Location Plan
- Table I, Summary of Sieve Analyses
- Table II, Summary of Laboratory CBR Values
- Table III, Blend Evaluation without Additional Stone
- Table IV, Blend Evaluation with Additional Stone
- Appendix A, Exploration Logs & Soil Description Sheet
- Appendix B, Sieve / Hydrometer Test Results
- Appendix C, Atterberg Limit Test Results
- Appendix D, Moisture-Density Relationship Test Results
- Appendix E, Laboratory CBR Test Results
- Appendix F, Asphalt Extraction and Gradation Test Results
- Appendix G, Asphalt Core Photographs

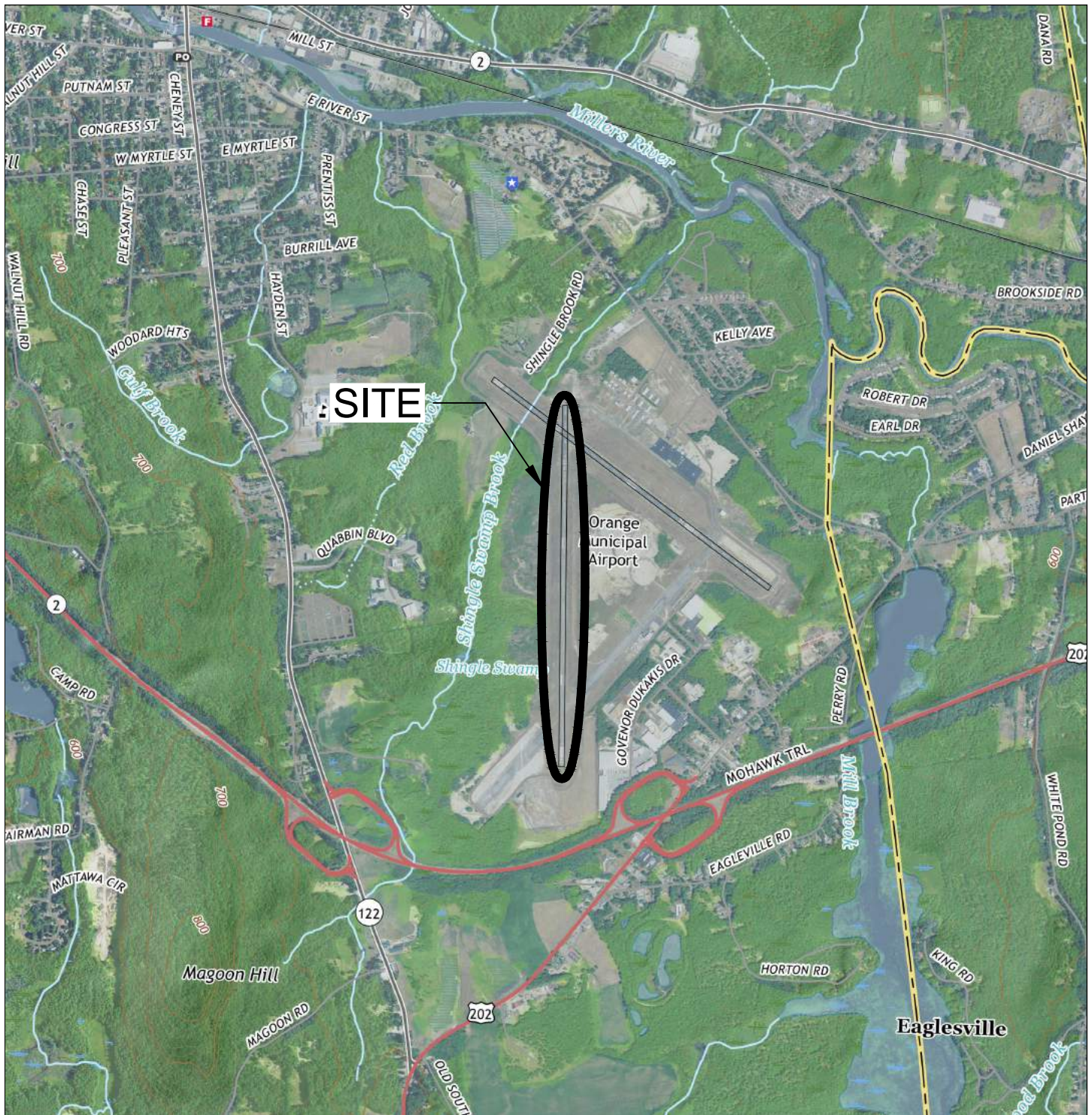
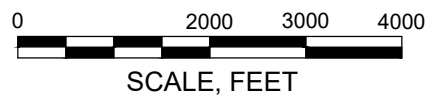


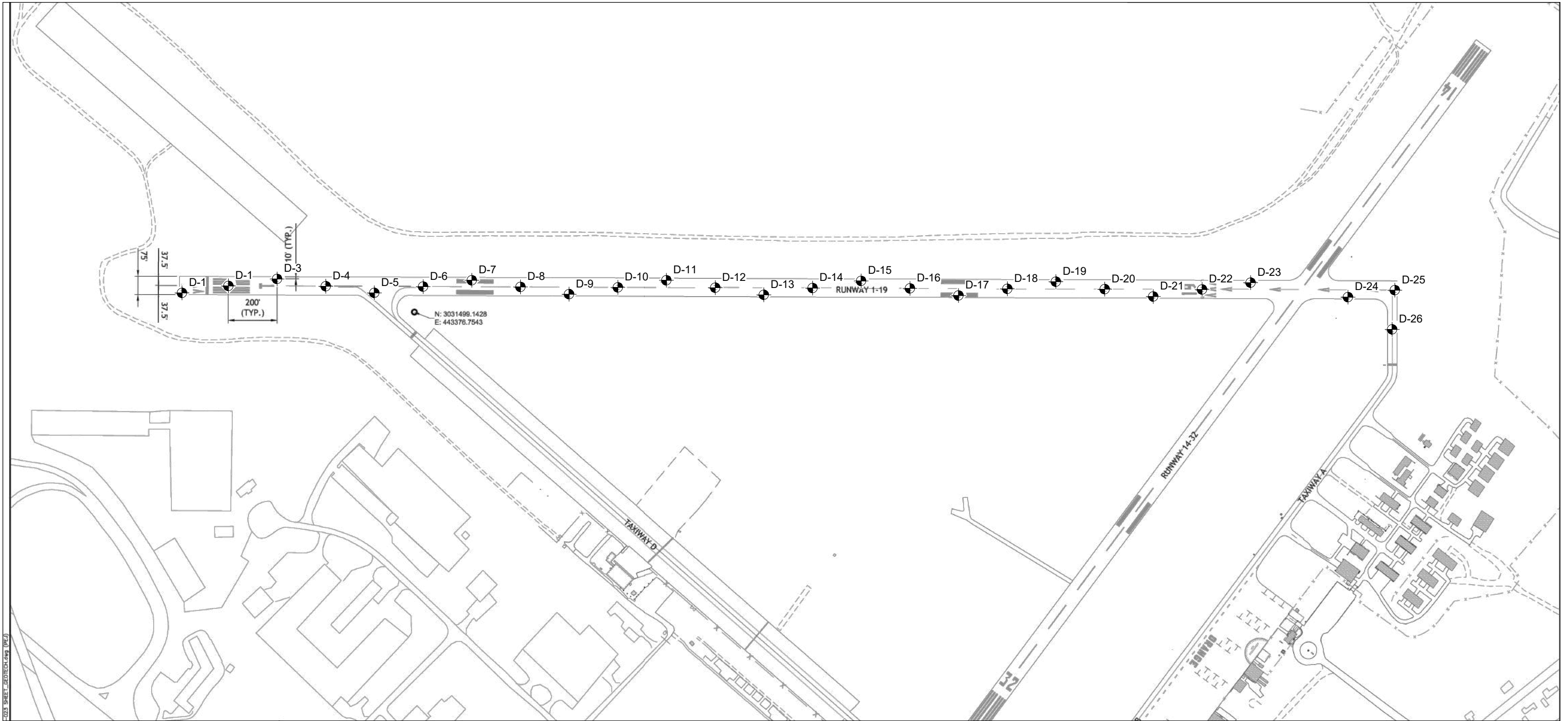
FIGURE 1
 LOCUS MAP
 GEOTECHNICAL ENGINEERING EVALUATION
 RECONSTRUCT RUNWAY 1-19
 ORANGE MUNICIPAL AIRPORT
 ORANGE, MASSACHUSETTS




JANUARY 2020 PROJECT NO. 1229-021

SOURCE:
 USGS 7.5-MINUTE TOPOGRAPHIC QUADRANGLE OF
 ORANGE, MA, DATED 2018.

**R.W. Gillespie
 & Associates**
 Geotechnical Engineering • Materials Testing Services
 Environmental Consulting • www.rwgillespie.com



LEGEND:


D-1 APPROXIMATE LOCATION OF SOIL BORING
 DRILLED 19 THROUGH 21 NOVEMBER 2019.

SOURCE:
 DRAWING NO. FIG 1, TITLED "GEOTECHNICAL INVESTIGATION
 PLAN", PREPARED BY AIRPORT SOLUTIONS GROUP, DATED
 JULY 2019.

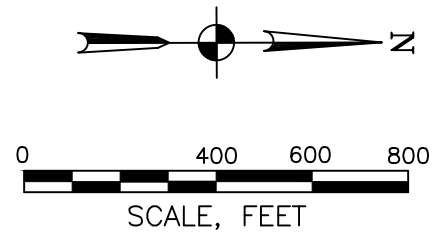


FIGURE 2
 EXPLORATION LOCATION PLAN
 GEOTECHNICAL ENGINEERING EVALUATION
 RECONSTRUCT RUNWAY 1-19
 ORANGE MUNICIPAL AIRPORT
 ORANGE, MASSACHUSETTS

JANUARY 2020

PROJECT NO. 1229-021





TABLE I
Summary of Sieve Analyses
Reconstruct Runway 1-19, Orange Municipal Airport
Orange, Massachusetts

| Sieve Analysis | | | | | | | | | | | | | | | |
|------------------------------|---------------------|--------------------------------------|------|------|------|------|------|------|------|------|------|------|------|----------------------|-------|
| Boring Number, Sample Number | Depth of Sample, ft | Percent Passing Screen or Sieve Size | | | | | | | | | | | | % Finer than 0.02 mm | USCS |
| | | 2" | 1" | 3/4" | 1/2" | 3/8" | 4 | 10 | 20 | 40 | 80 | 140 | 200 | | |
| D-1, S-2 | 5-7 | 100 | 90.4 | 86.3 | 86.3 | 86.3 | 83.5 | 79.5 | 64.0 | 32.8 | 10.7 | 7.0 | 5.4 | -- | SP-SM |
| D-2, Bulk | 0.5-4 | 100 | 98.2 | 95.9 | 92.7 | 90.3 | 84.2 | 78.1 | 63.8 | 32.9 | 11.6 | 6.6 | 4.9 | 1.8 | SP |
| D-2, S-1 | 0.3-2.3 | 100 | 100 | 96.4 | 88.9 | 77.0 | 60.7 | 48.0 | 36.8 | 24.0 | 12.0 | 7.4 | 5.3 | -- | SP-SM |
| D-4, Bulk | 0.5-4 | 100 | 100 | 97.7 | 94.6 | 91.2 | 81.4 | 70.9 | 55.5 | 30.2 | 11.9 | 7.8 | 6.3 | 3.2 | SW-SM |
| D-4, S-1 | 0.3-2.3 | 100 | 89.4 | 86.3 | 81.2 | 75.1 | 62.7 | 48.8 | 35.5 | 21.5 | 9.5 | 5.6 | 4.1 | -- | SP |
| D-4, S-2 | 5-7 | 100 | 100 | 100 | 100 | 100 | 99.3 | 97.4 | 78.3 | 27.8 | 5.3 | 2.9 | 2.1 | -- | SP |
| D-6, Bulk | 0.5-4 | 100 | 99.0 | 97.6 | 95.1 | 93.3 | 87.7 | 78.6 | 58.8 | 34.0 | 14.0 | 7.2 | 4.9 | 1.9 | SP |
| D-6, S-1 | 0.3-2.3 | 100 | 90.2 | 90.2 | 86.3 | 80.4 | 63.3 | 47.8 | 33.8 | 19.6 | 7.8 | 4.2 | 2.8 | -- | SP |
| D-6, S-2 | 5-7 | 100 | 100 | 100 | 100 | 100 | 99.9 | 99.5 | 93.4 | 66.8 | 17.5 | 4.0 | 2.1 | -- | SP |
| D-8, Bulk | 0.5-4 | 100 | 97.9 | 97.2 | 96.9 | 94.8 | 88.0 | 80.4 | 67.9 | 45.6 | 19.9 | 11.8 | 8.8 | 4.1 | SW-SM |
| D-8, S-1 | 0.3-2.3 | 100 | 100 | 100 | 89.3 | 86.3 | 74.2 | 60.6 | 47.6 | 32.6 | 17.6 | 11.5 | 9.2 | -- | SP-SM |
| D-8, S-2 | 5-7 | 100 | 100 | 100 | 100 | 100 | 99.8 | 95.9 | 77.3 | 28.6 | 4.7 | 2.7 | 2.1 | -- | SP |
| D-10, Bulk | 0.5-4 | 100 | 98.4 | 97.1 | 93.5 | 90.9 | 82.3 | 74.5 | 55.4 | 28.0 | 9.8 | 5.8 | 4.4 | 1.2 | SP |
| D-10, S-1 | 0.3-2.3 | 100 | 79.3 | 75.8 | 70.0 | 66.7 | 55.6 | 47.9 | 39.0 | 26.5 | 14.1 | 9.7 | 7.7 | -- | SP-SM |
| D-11, S-2 | 5-7 | 100 | 100 | 100 | 100 | 100 | 96.4 | 93.4 | 76.3 | 34.2 | 20.0 | 17.2 | 16.6 | -- | SM |



TABLE I (Continued)
 Summary of Sieve Analyses
 Reconstruct Runway 1-19, Orange Municipal Airport
 Orange, Massachusetts

| Sieve Analysis | | | | | | | | | | | | | | | |
|------------------------------|---------------------|--------------------------------------|------|------|------|------|------|------|------|------|------|------|-----|----------------------|-------|
| Boring Number, Sample Number | Depth of Sample, ft | Percent Passing Screen or Sieve Size | | | | | | | | | | | | % Finer than 0.02 mm | USCS |
| | | 2" | 1" | 3/4" | 1/2" | 3/8" | 4 | 10 | 20 | 40 | 80 | 140 | 200 | | |
| D-12, Bulk | 0.5-4 | 100 | 99.0 | 97.8 | 95.6 | 93.4 | 87.7 | 82.7 | 77.7 | 43.0 | 16.6 | 6.5 | 3.9 | 2.0 | SP |
| D-12, S-1 | 0.3-2.3 | 100 | 90.2 | 72.9 | 68.9 | 64.0 | 53.4 | 43.0 | 33.0 | 22.4 | 12.2 | 7.9 | 6.1 | -- | SP-SM |
| D-12, S-2 | 5-7 | 100 | 100 | 100 | 100 | 100 | 100 | 99.9 | 99.6 | 90.3 | 35.5 | 6.1 | 3.0 | -- | SP |
| D-14, Bulk | 0.5-4 | 100 | 98.6 | 96.2 | 90.9 | 86.8 | 75.0 | 62.0 | 43.9 | 27.3 | 11.6 | 7.2 | 5.5 | 1.5 | SP-SM |
| D-14, S-1 | 0.3-2.3 | 100 | 100 | 100 | 100 | 86.5 | 77.7 | 68.6 | 55.6 | 36.9 | 18.2 | 11.9 | 9.3 | -- | SW-SM |
| D-14, S-2 | 5-7 | 100 | 100 | 100 | 94.8 | 92.7 | 89.7 | 88.0 | 76.1 | 36.1 | 8.6 | 4.9 | 3.7 | -- | SP |
| D-16, Bulk | 0.5-4 | 100 | 96.9 | 94.3 | 90.3 | 86.9 | 78.7 | 71.1 | 59.2 | 38.1 | 14.5 | 8.6 | 6.5 | 3.0 | SP-SM |
| D-16, S-1 | 0.3-2.3 | 100 | 81.2 | 75.3 | 72.5 | 70.5 | 60.9 | 49.9 | 38.2 | 25.7 | 13.6 | 7.7 | 5.6 | -- | SP-SM |
| D-16, S-2 | 5-7 | 100 | 100 | 100 | 100 | 100 | 100 | 99.4 | 90.3 | 34.0 | 4.2 | 1.8 | 1.3 | -- | SP |
| D-18, Bulk | 0.5-4 | 100 | 97.0 | 92.7 | 89.7 | 85.3 | 81.6 | 70.4 | 57.1 | 19.2 | 7.7 | 4.9 | 3.8 | 1.0 | SP |
| D-18, S-1 | 0.3-2.3 | 100 | 100 | 97.0 | 89.4 | 83.2 | 71.5 | 58.3 | 44.4 | 28.3 | 14.7 | 9.0 | 7.1 | -- | SP-SM |
| D-18, S-2 | 5-7 | 100 | 100 | 100 | 100 | 100 | 98.0 | 92.8 | 74.9 | 29.6 | 6.3 | 3.8 | 2.7 | -- | SP |
| D-20, Bulk | 0.5-4 | 97.5 | 95.1 | 92.3 | 87.6 | 84.2 | 76.2 | 67.3 | 54.4 | 31.3 | 11.6 | 7.5 | 5.9 | 1.0 | SP-SM |
| D-20, S-1 | 0.3-2.3 | 100 | 100 | 95.1 | 85.6 | 81.4 | 71.9 | 63.2 | 49.8 | 30.2 | 12.6 | 7.8 | 6.3 | 0.9 | SP-SM |
| D-20, S-2 | 5-7 | 100 | 100 | 100 | 100 | 100 | 100 | 99.9 | 95.4 | 66.3 | 19.0 | 8.6 | 5.5 | -- | SP-SM |



TABLE I (Continued)
 Summary of Sieve Analyses
 Reconstruct Runway 1-19, Orange Municipal Airport
 Orange, Massachusetts

| Sieve Analysis | | | | | | | | | | | | | | | |
|------------------------------|---------------------|--------------------------------------|------|------|------|------|------|------|------|------|------|------|-----|----------------------|-------|
| Boring Number, Sample Number | Depth of Sample, ft | Percent Passing Screen or Sieve Size | | | | | | | | | | | | % Finer than 0.02 mm | USCS |
| | | 2" | 1" | 3/4" | 1/2" | 3/8" | 4 | 10 | 20 | 40 | 80 | 140 | 200 | | |
| D-22, Bulk | 0.5-4 | 100 | 99.0 | 97.8 | 94.1 | 90.6 | 80.9 | 71.1 | 57.6 | 35.7 | 13.2 | 8.4 | 6.5 | 3.1 | SW-SM |
| B-22, S-1 | 0.3-2.3 | 100 | 100 | 100 | 91.1 | 83.7 | 67.5 | 44.9 | 18.5 | 10.1 | 6.4 | 5.0 | 4.1 | -- | SW |
| B-22, S-2 | 5-7 | 100 | 100 | 100 | 100 | 100 | 99.3 | 97.8 | 89.9 | 67.5 | 18.1 | 8.2 | 5.9 | -- | SP-SM |
| B-24, Bulk | 0.5-4 | 100 | 98.5 | 96.9 | 93.9 | 91.9 | 82.8 | 71.1 | 50.7 | 26.7 | 9.7 | 6.1 | 4.7 | 1.4 | SW |
| B-24, S-1 | 0.3-2.3 | 100 | 91.4 | 84.4 | 79.8 | 77.7 | 68.4 | 58.3 | 26.7 | 13.3 | 7.9 | 7.2 | 6.1 | -- | SW-SM |
| B-24, S-2 | 5-7 | 100 | 84.5 | 84.5 | 80.8 | 77.6 | 67.5 | 52.6 | 22.1 | 10.1 | 4.7 | 3.2 | 2.6 | -- | SW |
| D-26, Bulk | 0.5-4 | 100 | 98.8 | 97.2 | 94.1 | 91.1 | 82.9 | 74.4 | 66.0 | 33.6 | 16.0 | 11.3 | 9.3 | 4.9 | SW-SM |
| D-26, S-1 | 0.3-2.3 | 100 | 100 | 91.1 | 89.8 | 83.6 | 71.0 | 58.3 | 46.1 | 32.3 | 17.9 | 11.4 | 9.0 | -- | SP-SM |
| D-26, S-2 | 5-7 | 100 | 100 | 100 | 98.8 | 97.7 | 93.7 | 89.4 | 74.9 | 34.0 | 8.5 | 5.2 | 4.1 | -- | SP |
| D-27, Bulk | 0.5-4 | 100 | 100 | 98.1 | 97.6 | 97.1 | 95.7 | 89.4 | 65.9 | 34.8 | 12.6 | 6.8 | 5.0 | 2.6 | SP-SM |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |



TABLE II

Summary of Laboratory CBR Values

Project: Reconstruct Runway 1-19, Orange Municipal Airport

RWG&A Project No: 1229-021

Client: Airport Solutions Group, LLC

Location: Orange, Massachusetts

Date: 1-January-20

| Boring Location | Sample Depth, ft | Percent Max. Dry Density/ CBR Value |
|------------------------|-------------------------|--|
| D-2 | 0.5 - 4 | 98.0% / 28.1 |
| D-6 | 0.5 - 4 | 99.2% / 34.4 |
| D-10 | 0.5 - 4 | 98.4% / 19.1 |
| D-12 | 0.5 - 4 | 98.1% / 18.7 |
| D-14 | 0.5 - 4 | 97.7% / 28.6 |
| D-16 | 0.5 - 4 | 97.4% / 22.3 |
| D-18 | 0.5 - 4 | 97.4% / 22.5 |
| D-22 | 0.5 - 4 | 96.6% / 16.7 |
| D-24 | 0.5 - 4 | 97.3% / 17.1 |
| D-26 | 0.5 - 4 | 99.9% / 25.2 |
| D-27 | 0.5 - 4 | 99.5% / 22.5 |



R.W. Gillespie & Associates, Inc.

Geotechnical Engineering • Environmental Consulting • Materials Testing Services

TABLE III
 Blend Evaluation Without Additional Stone
 Reconstruct Runway 1-19, Orange Municipal Airport
 Orange, Massachusetts

| Sieve Size | Average Asphalt Gradation, Percent Passing | Average Base Course Gradation, Percent Passing | Blend Gradation, Percent Passing | FAA Item P-209 Gradation, Percent Passing | FAA Item P-154 Gradation, Percent Passing |
|------------|--|--|----------------------------------|---|---|
| 2 Inch | 100 | 100 | 100 | 100 | 100 |
| 1-1/2 Inch | 100 | 98.3 | 98.8 | 95-100 | |
| 1 Inch | 100 | 92.9 | 94.8 | 70-95 | |
| 3/4 Inch | 99.8 | 87.7 | 91.0 | 55-85 | |
| 1/2 Inch | 91.8 | 82.0 | 84.6 | | |
| 3/8 Inch | 82.5 | 76.9 | 78.4 | | |
| #4 | 60.1 | 64.9 | 63.6 | 30-60 | |
| #8 | 46.5 | 57.0* | 54.1 | | |
| #10 | 43.9* | 53.1 | 50.6 | | 20-100 |
| #16 | 36.2 | 44.7* | 42.4 | | |
| #20 | 32.8* | 39.2 | 37.4 | | |
| #30 | 24.4 | 32.2* | 30.0 | 12-30 | |
| #40 | 19.3* | 25.1 | 23.5 | | 5-60 |
| #50 | 14.2 | 22.0* | 19.9 | | |
| #80 | 10.8* | 12.7 | 12.2 | | |
| #100 | 8.6 | 11.2* | 10.5 | | |
| #140 | 7.5* | 8.1 | 7.9 | | |
| #200 | 5.8 | 6.3 | 6.2 | 0-5 | 0-8 |

* Percent passing interpolated by straight line interpretation.
 Numbers in **bold** indicate blend does not meet the requirements of that sieve.



TABLE IV
Blend Evaluation With Additional Stone
Reconstruct Runway 1-19, Orange Municipal Airport
Orange, Massachusetts

| Sieve Size | Average Asphalt Gradation, Percent Passing | Average Base Course Gradation, Percent Passing | Massachusetts Highway 1-1/2" Crushed Stone | Blend Gradation, 2-inches of Stone, Percent Passing | FAA Item P-209 Gradation, Percent Passing | FAA Item P-154 Gradation, Percent Passing |
|------------|--|--|--|---|---|---|
| 2 Inch | 100 | 100 | 100 | 100 | 100 | 100 |
| 1-1/2 Inch | 100 | 98.3 | 100 | 98.9 | 95-100 | |
| 1 Inch | 100 | 92.9 | 70.0 | 91.0 | 70-95 | |
| 3/4 Inch | 99.8 | 87.7 | 25.0 | 83.1 | 55-85 | |
| 1/2 Inch | 91.8 | 82.0 | 0.0 | 72.9 | | |
| 3/8 Inch | 82.5 | 76.9 | 0.0 | 66.4 | | |
| #4 | 60.1 | 64.9 | 0.0 | 53.8 | 30-60 | |
| #8 | 46.5 | 57.0* | 0.0 | 45.8 | | |
| #10 | 43.9* | 53.1 | 0.0 | 42.8 | | 20-100 |
| #16 | 36.2 | 44.7* | 0.0 | 35.9 | | |
| #20 | 32.8* | 39.2 | 0.0 | 31.7 | | |
| #30 | 24.4 | 32.2* | 0.0 | 25.4 | 12-30 | |
| #40 | 19.3* | 25.1 | 0.0 | 19.9 | | 5-60 |
| #50 | 14.2 | 22.0* | 0.0 | 16.8 | | |
| #80 | 10.8* | 12.7 | 0.0 | 10.3 | | |
| #100 | 8.6 | 11.2* | 0.0 | 8.9 | | |
| #140 | 7.5* | 8.1 | 0.0 | 6.7 | | |
| #200 | 5.8 | 6.3 | 0.0 | 5.2 | 0-5 | 0-8 |

* Percent passing estimated using straight line interpolation.

Numbers in **bold** indicate blend does not meet the requirements of that sieve.

APPENDIX A

**EXPLORATION LOGS &
SOIL DESCRIPTION SHEET**

Geotechnical Engineering Evaluation
Reconstruct Runway 1-19
Orange Municipal Airport
Orange, Massachusetts



- Geotechnical Engineering
- Environmental Consulting
- Materials Testing Services

Boring Log: D-1

Total Depth (ft): 12

Sheet 1 of 1

Project Name: Reconstruct Runway 1-19
 RWG&A Project No. 1229-021
 Location: Orange, Massachusetts
 Client: Airport Solutions Group, LLC
 RWG&A Representative: Serena Pape
 Boring Location: See Exploration Location Plan
 Boring Abandonment Method: Backfill with cuttings
 Observed Water Depth: Not Obs.

Drilling Co.: Seaboard Drilling
 Drill Rig: Mobil B-53 Truck
 Driller Rep.: M. Glynn
 Date Started: 11/21/2019
 Date Completed: 11/21/2019
 Surface Elevation:
 Drilling Method: 2 1/4" HSA
 Casing Type: N/A

| DEPTH, FT. | SYMBOL SAMPLES | SAMPLE NUMBER | DESCRIPTION OF MATERIAL | SAMPLE RECOVERY, IN. | BLOWS PER 6" | SPT-N BLOWS PER FT. | MOISTURE CONTENT % | LAB TESTS |
|------------|----------------|---------------|--|----------------------|--------------|---------------------|--------------------|-----------|
| 0 | | S-1 | ASPHALTIC PAVEMENT (3 inches). | 17 | 26 | 65 | | |
| | | | FILL; Sandy gravel with silt, dark brown. | | 34 | | | |
| | | | FILL; Sandy gravel, light brown. | | 31 | | | |
| | | | SAND WITH SILT (SP-SM); Medium dense, moist to wet, coarse to fine sand, few fine gravel, few silt, tan. | 29 | | | | |
| 5 | | S-2 | | 9 | 13 | 38 | 4 | GS NM |
| | | | | | 19 | | | |
| | | | | | 19 | | | |
| | | | | | 19 | | | |
| 10 | | S-3 | Becomes loose, wet. | 13 | 4 | 9 | | |
| | | | | | 4 | | | |
| | | | | | 4 | | | |
| | | | | | 5 | | | |
| | | | | | 6 | | | |
| 15 | | | | | | | | |
| 20 | | | | | | | | |
| 25 | | | | | | | | |
| 30 | | | | | | | | |

Notes:



R.W. Gillespie & Associates

- Geotechnical Engineering
- Environmental Consulting
- Materials Testing Services

Boring Log: D-2

Total Depth (ft): 12

Sheet 1 of 1

Project Name: Reconstruct Runway 1-19
 RWG&A Project No. 1229-021
 Location: Orange, Massachusetts
 Client: Airport Solutions Group, LLC
 RWG&A Representative: Serena Pape
 Boring Location: See Exploration Location Plan
 Boring Abandonment Method: Backfill with cuttings
 Observed Water Depth: Not Obs.

Drilling Co.: Seaboard Drilling
 Drill Rig: Mobil B-53 Truck
 Driller Rep.: M. Glynn
 Date Started: 11/21/2019
 Date Completed: 11/21/2019
 Surface Elevation:
 Drilling Method: 2 1/4" HSA
 Casing Type: N/A

| DEPTH, FT. | SYMBOL SAMPLES | SAMPLE NUMBER | DESCRIPTION OF MATERIAL | SAMPLE RECOVERY, IN. | BLOWS PER 6" | SPT-N BLOWS PER FT. | MOISTURE CONTENT % | LAB TESTS |
|------------|----------------|---------------|--|----------------------|------------------|---------------------|--------------------|-----------|
| 0 | | S-1 | ASPHALTIC PAVEMENT (4 inches). | 6 | 32 50/3" | 50+ | 9 | GS NM |
| | | | FILL; Sandy gravel with silt, dark brown. | | | | | |
| | | | FILL; Sandy gravel, light brown. | | | | | |
| | | | SAND WITH SILT (SP-SM); Medium dense, moist to wet, coarse to fine sand, few fine gravel, few silt, tan. | | | | | |
| 5 | | S-2 | | 0 | 18 22 17 | 44 | | |
| 10 | | S-3 | Becomes loose, wet. | 17 | 5 4 5 6 | 9 | | |
| | | | Bottom of Exploration at 12'; Not refusal. | | | | | |
| 15 | | | | | | | | |
| 20 | | | | | | | | |
| 25 | | | | | | | | |
| 30 | | | | | | | | |

Notes: Bulk sample recovered from 0.5' to 4' for laboratory CBR test.



R.W. Gillespie & Associates

- Geotechnical Engineering
- Environmental Consulting
- Materials Testing Services

Boring Log: D-3

Total Depth (ft): 12

Sheet 1 of 1

Project Name: Reconstruct Runway 1-19
 RWG&A Project No. 1229-021
 Location: Orange, Massachusetts
 Client: Airport Solutions Group, LLC
 RWG&A Representative: Serena Pape
 Boring Location: See Exploration Location Plan
 Boring Abandonment Method: Backfill with cuttings
 Observed Water Depth: Not Obs.

Drilling Co.: Seaboard Drilling
 Drill Rig: Mobil B-53 Truck
 Driller Rep.: M. Glynn
 Date Started: 11/21/2019
 Date Completed: 11/21/2019
 Surface Elevation:
 Drilling Method: 2 1/4" HSA
 Casing Type: N/A

| DEPTH, FT. | SYMBOL SAMPLES | SAMPLE NUMBER | DESCRIPTION OF MATERIAL | SAMPLE RECOVERY, IN. | BLOWS PER 6" | SPT-N BLOWS PER FT. | MOISTURE CONTENT % | LAB TESTS |
|------------|----------------|---------------|---|----------------------|--------------|---------------------|--------------------|-----------|
| 0 | | S-1 | ASPHALTIC PAVEMENT (4 inches). | 16 | 22 | 73 | | |
| | | S-1 | FILL; Sandy gravel with silt, dark brown. | | 33 | | | |
| | | S-1 | FILL; Sandy gravel, light brown. | | 40 | | | |
| | | S-1 | SAND (SP); Medium dense, moist to wet, coarse to fine sand, few fine gravel, tan. | | 42 | | | |
| 5 | | S-2 | Becomes loose, wet. | 15 | 9 | 21 | | |
| | | | | | 11 | | | |
| | | | | | 10 | | | |
| | | | | | 12 | | | |
| 10 | | S-3 | | 24 | 3 | 7 | | |
| | | | | | 3 | | | |
| | | | | | 4 | | | |
| | | | | | 7 | | | |
| | | | Bottom of Exploration at 12'; Not refusal. | | | | | |
| 15 | | | | | | | | |
| 20 | | | | | | | | |
| 25 | | | | | | | | |
| 30 | | | | | | | | |

Notes:



**R.W. Gillespie
& Associates**

- Geotechnical Engineering
- Environmental Consulting
- Materials Testing Services

Boring Log: D-4

Total Depth (ft): 12

Sheet 1 of 1

Project Name: Reconstruct Runway 1-19
 RWG&A Project No. 1229-021
 Location: Orange, Massachusetts
 Client: Airport Solutions Group, LLC
 RWG&A Representative: Serena Pape
 Boring Location: See Exploration Location Plan
 Boring Abandonment Method: Backfill with cuttings
 Observed Water Depth: Not Obs.

Drilling Co.: Seaboard Drilling
 Drill Rig: Mobil B-53 Truck
 Driller Rep.: M. Glynn
 Date Started: 11/21/2019
 Date Completed: 11/21/2019
 Surface Elevation:
 Drilling Method: 2 1/4" HSA
 Casing Type: N/A

| DEPTH, FT. | SYMBOL | SAMPLES | SAMPLE NUMBER | DESCRIPTION OF MATERIAL | SAMPLE RECOVERY, IN. | BLOWS PER 6" | SPT-N BLOWS PER FT. | MOISTURE CONTENT % | LAB TESTS |
|------------|--------|---------|---------------|---|----------------------|--------------|---------------------|--------------------|-----------|
| 0 | | | S-1 | ASPHALTIC PAVEMENT (4.25 inches). | 17 | 34 | 80 | 5 | GS |
| | | | S-1 | FILL; Sandy gravel with silt, dark brown. | | 46 | | | NM |
| | | | S-1 | FILL; Sandy gravel, light brown. | | 34 | | | |
| | | | S-1 | SAND (SP); Medium dense to loose, moist to wet, mdium to fine sand, trace fine gravel, trace silt, tan. | | 37 | | | |
| 5 | | | S-2 | | 16 | 8 | 22 | 4 | GS |
| | | | S-2 | | | 10 | | | NM |
| | | | S-2 | | | 12 | | | |
| | | | S-2 | | | 15 | | | |
| 10 | | | S-3 | | 24 | 3 | 10 | | |
| | | | S-3 | | | 4 | | | |
| | | | S-3 | | | 6 | | | |
| | | | S-3 | | | 8 | | | |
| | | | | Bottom of Exploration at 12'; Not refusal. | | | | | |
| 15 | | | | | | | | | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |

Notes: Bulk sample recovered from 0.5' to 4' for laboratory CBR test.



R.W. Gillespie & Associates

- Geotechnical Engineering
- Environmental Consulting
- Materials Testing Services

Boring Log: D-5

Total Depth (ft): 12

Sheet 1 of 1

Project Name: Reconstruct Runway 1-19
 RWG&A Project No. 1229-021
 Location: Orange, Massachusetts
 Client: Airport Solutions Group, LLC
 RWG&A Representative: Serena Pape
 Boring Location: See Exploration Location Plan
 Boring Abandonment Method: Backfill with cuttings
 Observed Water Depth: Not Obs.

Drilling Co.: Seaboard Drilling
 Drill Rig: Mobil B-53 Truck
 Driller Rep.: M. Glynn
 Date Started: 11/21/2019
 Date Completed: 11/21/2019
 Surface Elevation:
 Drilling Method: 2 1/4" HSA
 Casing Type: N/A

| DEPTH, FT. | SYMBOL SAMPLES | SAMPLE NUMBER | DESCRIPTION OF MATERIAL | SAMPLE RECOVERY, IN. | BLOWS PER 6" | SPT-N BLOWS PER FT. | MOISTURE CONTENT % | LAB TESTS |
|------------|----------------|---------------|---|----------------------|--------------|---------------------|--------------------|-----------|
| 0 | | S-1 | ASPHALTIC PAVEMENT (3.25 inches). | 14 | 31 | 72 | | |
| | | | FILL; Sandy gravel with silt, dark brown. | | 37 | | | |
| | | | FILL; Sandy gravel, light brown. | | 35 | | | |
| | | | SAND (SP); Medium dense, moist to wet, medium to fine sand, trace fine gravel, trace silt, tan. | | 43 | | | |
| 5 | | S-2 | | 18 | 3 | 16 | | |
| | | | | | 7 | | | |
| | | | | | 9 | | | |
| | | | | | 9 | | | |
| 10 | | S-3 | | 22 | 5 | 22 | | |
| | | | | | 8 | | | |
| | | | | | 14 | | | |
| | | | | | 12 | | | |
| | | | Bottom of Exploration at 12'; Not refusal. | | | | | |
| 15 | | | | | | | | |
| 20 | | | | | | | | |
| 25 | | | | | | | | |
| 30 | | | | | | | | |

Notes:



**R.W. Gillespie
& Associates**

- Geotechnical Engineering
- Environmental Consulting
- Materials Testing Services

Boring Log: D-6

Total Depth (ft): 12

Sheet 1 of 1

Project Name: Reconstruct Runway 1-19
 RWG&A Project No. 1229-021
 Location: Orange, Massachusetts
 Client: Airport Solutions Group, LLC
 RWG&A Representative: Serena Pape
 Boring Location: See Exploration Location Plan
 Boring Abandonment Method: Backfill with cuttings
 Observed Water Depth: Not Obs.

Drilling Co.: Seaboard Drilling
 Drill Rig: Mobil B-53 Truck
 Driller Rep.: M. Glynn
 Date Started: 11/21/2019
 Date Completed: 11/21/2019
 Surface Elevation:
 Drilling Method: 2 1/4" HSA
 Casing Type: N/A

| DEPTH, FT. | SYMBOL SAMPLES | SAMPLE NUMBER | DESCRIPTION OF MATERIAL | SAMPLE RECOVERY, IN. | BLOWS PER 6" | SPT-N BLOWS PER FT. | MOISTURE CONTENT % | LAB TESTS |
|------------|-------------------|---------------|---|-------------------------|----------------------|------------------------|-----------------------|-----------|
| 0 | | S-1 | ASPHALTIC PAVEMENT (3.5 inches). | 16 | 37 41 43 31 | 84 | 3 | GS NM |
| | | | FILL; Sandy gravel with silt, dark brown. | | | | | |
| | | | FILL; Sandy gravel, light brown. | | | | | |
| 5 | | S-2 | SAND (SP); Medium dense to loose, moist to wet, medium to fine sand, trace fine gravel, trace silt, tan. | 16 | 7 7 8 9 | 15 | 4 | GS NM |
| | | | | | | | | |
| 10 | | S-3 | Becomes wet. | 24 | 4 4 6 7 | 10 | | |
| | | | Bottom of Exploration at 12'; Not refusal. | | | | | |
| 15 | | | | | | | | |
| 20 | | | | | | | | |
| 25 | | | | | | | | |
| 30 | | | | | | | | |

Notes:



- Geotechnical Engineering
- Environmental Consulting
- Materials Testing Services

Boring Log: D-7

Total Depth (ft): 12

Sheet 1 of 1

Project Name: Reconstruct Runway 1-19
 RWG&A Project No. 1229-021
 Location: Orange, Massachusetts
 Client: Airport Solutions Group, LLC
 RWG&A Representative: Serena Pape
 Boring Location: See Exploration Location Plan
 Boring Abandonment Method: Backfill with cuttings
 Observed Water Depth: Not Obs.

Drilling Co.: Seaboard Drilling
 Drill Rig: Mobil B-53 Truck
 Driller Rep.: M. Glynn
 Date Started: 11/21/2019
 Date Completed: 11/21/2019
 Surface Elevation:
 Drilling Method: 2 1/4" HSA
 Casing Type: N/A

| DEPTH, FT. | SYMBOL SAMPLES | SAMPLE NUMBER | DESCRIPTION OF MATERIAL | SAMPLE RECOVERY, IN. | BLOWS PER 6" | SPT-N BLOWS PER FT. | MOISTURE CONTENT % | LAB TESTS |
|------------|----------------|---------------|---|----------------------|--------------|---------------------|--------------------|-----------|
| 0 | | S-1 | ASPHALTIC PAVEMENT (3.5 inches). | 11 | 37 | 69 | | |
| | | | FILL; Sandy gravel with silt, dark brown. | | 38 | | | |
| | | | FILL; Sandy gravel, light brown. | | 31 | | | |
| | | | SAND (SP); Medium dense, moist to wet, medium to fine sand, trace fine gravel, trace silt, tan. | 28 | | | | |
| 5 | | S-2 | | 19 | 7 | 17 | | |
| | | | | | 8 | | | |
| | | | | | 9 | | | |
| | | | | | 9 | | | |
| 10 | | S-3 | | 22 | 7 | 14 | | |
| | | | | | 7 | | | |
| | | | | | 7 | | | |
| | | | | | 7 | | | |
| | | | | | 8 | | | |
| | | | Bottom of Exploration at 12'; Not refusal. | | | | | |
| 15 | | | | | | | | |
| 20 | | | | | | | | |
| 25 | | | | | | | | |
| 30 | | | | | | | | |

Notes:



**R.W. Gillespie
& Associates**

- Geotechnical Engineering
- Environmental Consulting
- Materials Testing Services

Boring Log: D-8

Total Depth (ft): 12

Sheet 1 of 1

Project Name: Reconstruct Runway 1-19
 RWG&A Project No. 1229-021
 Location: Orange, Massachusetts
 Client: Airport Solutions Group, LLC
 RWG&A Representative: Serena Pape
 Boring Location: See Exploration Location Plan
 Boring Abandonment Method: Backfill with cuttings
 Observed Water Depth: Not Obs.

Drilling Co.: Seaboard Drilling
 Drill Rig: Mobil B-53 Truck
 Driller Rep.: M. Glynn
 Date Started: 11/20/2019
 Date Completed: 11/20/2019
 Surface Elevation:
 Drilling Method: 2 1/4" HSA
 Casing Type: N/A

| DEPTH, FT. | SYMBOL SAMPLES | SAMPLE NUMBER | DESCRIPTION OF MATERIAL | SAMPLE RECOVERY, IN. | BLOWS PER 6" | SPT-N BLOWS PER FT. | MOISTURE CONTENT % | LAB TESTS |
|------------|----------------|---------------|--|----------------------|-------------------|---------------------|--------------------|-----------|
| 0 | | S-1 | ASPHALTIC PAVEMENT (3.5 inches). | 8 | 77 62 50/4" | 112+ | 5 | GS NM |
| | | | FILL; Sandy gravel with silt, dark brown. | | | | | |
| | | | FILL; Sandy gravel, light brown. | | | | | |
| | | | SAND (SP); Medium dense, moist to wet, medium to fine sand, trace silt, tan. | | | | | |
| 5 | | S-2 | | 11 | 7 9 9 10 | 18 | 3 | GS NM |
| 10 | | S-3 | | 11 | 4 6 7 12 | 13 | | |
| | | | Bottom of Exploration at 12'; Not refusal. | | | | | |
| 15 | | | | | | | | |
| 20 | | | | | | | | |
| 25 | | | | | | | | |
| 30 | | | | | | | | |

Notes:



**R.W. Gillespie
& Associates**

- Geotechnical Engineering
- Environmental Consulting
- Materials Testing Services

Boring Log: D-9

Total Depth (ft): 12

Sheet 1 of 1

Project Name: Reconstruct Runway 1-19
 RWG&A Project No. 1229-021
 Location: Orange, Massachusetts
 Client: Airport Solutions Group, LLC
 RWG&A Representative: Serena Pape
 Boring Location: See Exploration Location Plan
 Boring Abandonment Method: Backfill with cuttings
 Observed Water Depth: Not Obs.

Drilling Co.: Seaboard Drilling
 Drill Rig: Mobil B-53 Truck
 Driller Rep.: M. Glynn
 Date Started: 11/20/2019
 Date Completed: 11/20/2019
 Surface Elevation:
 Drilling Method: 2 1/4" HSA
 Casing Type: N/A

| DEPTH, FT. | SYMBOL SAMPLES | SAMPLE NUMBER | DESCRIPTION OF MATERIAL | SAMPLE RECOVERY, IN. | BLOWS PER 6" | SPT-N BLOWS PER FT. | MOISTURE CONTENT % | LAB TESTS |
|------------|-------------------|---------------|--|-------------------------|---------------------|------------------------|-----------------------|-----------|
| 0 | | S-1 | ASPHALTIC PAVEMENT (3 inches). | 8 | 50 50/5" | 50+ | | |
| | | | FILL; Sandy gravel with silt, dark brown. | | | | | |
| | | | FILL; Sandy gravel, light brown. | | | | | |
| 5 | | S-2 | SAND (SP); Medium dense, moist to wet, medium to fine sand, trace silt, tan. | 10 | 9 11 13 13 | 24 | | |
| 10 | | S-3 | | 22 | 4 5 6 7 | 11 | | |
| | | | Bottom of Exploration at 12'; Not refusal. | | | | | |
| 15 | | | | | | | | |
| 20 | | | | | | | | |
| 25 | | | | | | | | |
| 30 | | | | | | | | |

Notes:



R.W. Gillespie & Associates

- Geotechnical Engineering
- Environmental Consulting
- Materials Testing Services

Boring Log: D-10

Total Depth (ft): 12

Sheet 1 of 1

Project Name: Reconstruct Runway 1-19
 RWG&A Project No. 1229-021
 Location: Orange, Massachusetts
 Client: Airport Solutions Group, LLC
 RWG&A Representative: Serena Pape
 Boring Location: See Exploration Location Plan
 Boring Abandonment Method: Backfill with cuttings
 Observed Water Depth: Not Obs.

Drilling Co.: Seaboard Drilling
 Drill Rig: Mobil B-53 Truck
 Driller Rep.: M. Glynn
 Date Started: 11/20/2019
 Date Completed: 11/20/2019
 Surface Elevation:
 Drilling Method: 2 1/4" HSA
 Casing Type: N/A

| DEPTH, FT. | SYMBOL | SAMPLES | SAMPLE NUMBER | DESCRIPTION OF MATERIAL | SAMPLE RECOVERY, IN. | BLOWS PER 6" | SPT-N BLOWS PER FT. | MOISTURE CONTENT % | LAB TESTS |
|------------|--------|---------|---------------|---|----------------------|--------------|---------------------|--------------------|-----------|
| 0 | | | S-1 | ASPHALTIC PAVEMENT (2.75 inches). | 10 | 37 | 97 | 4 | GS NM |
| | | | | FILL; Sandy gravel with silt, dark brown. | | 47 | | | |
| | | | | FILL; Sandy gravel, light brown. | | 50 | | | |
| | | | | SAND (SP); Medium dense to loose, moist to wet, medium to fine sand, trace silt, tan. | | 45 | | | |
| 5 | | | S-2 | | 0 | 6 | 14 | | |
| | | | | | | 7 | | | |
| | | | | | | 7 | | | |
| 10 | | | S-3 | | 12 | 4 | 10 | | |
| | | | | | | 5 | | | |
| | | | | | | 5 | | | |
| | | | | | | 6 | | | |
| 15 | | | | Bottom of Exploration at 12'; Not refusal. | | | | | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |

Notes:



R.W. Gillespie & Associates

- Geotechnical Engineering
- Environmental Consulting
- Materials Testing Services

Boring Log: D-11

Total Depth (ft): 12

Sheet 1 of 1

Project Name: Reconstruct Runway 1-19
 RWG&A Project No. 1229-021
 Location: Orange, Massachusetts
 Client: Airport Solutions Group, LLC
 RWG&A Representative: Serena Pape
 Boring Location: See Exploration Location Plan
 Boring Abandonment Method: Backfill with cuttings
 Observed Water Depth: Not Obs.

Drilling Co.: Seaboard Drilling
 Drill Rig: Mobil B-53 Truck
 Driller Rep.: M. Glynn
 Date Started: 11/20/2019
 Date Completed: 11/20/2019
 Surface Elevation:
 Drilling Method: 2 1/4" HSA
 Casing Type: N/A

| DEPTH, FT. | SYMBOL SAMPLES | SAMPLE NUMBER | DESCRIPTION OF MATERIAL | SAMPLE RECOVERY, IN. | BLOWS PER 6" | SPT-N BLOWS PER FT. | MOISTURE CONTENT % | LAB TESTS |
|------------|----------------|---------------|--|----------------------|----------------------|---------------------|--------------------|-----------|
| 0 | | S-1 | ASPHALTIC PAVEMENT (2.75 inches). | 5 | 50/5" | 50+ | | |
| | | | FILL; Sandy gravel with silt, dark brown. | | | | | |
| | | | FILL; Sandy gravel, light brown. | | | | | |
| | | | SAND (SP); Medium dense, moist to wet, medium to fine sand, trace silt, tan. | | | | | |
| 5 | | S-2 | SILTY SAND (SM); Medium dense, medium to fine sand, little silt, tan. | 17 | 7 7 9 12 | 16 | 4 | GS NM |
| 10 | | S-3 | | 20 | 10 11 11 10 | 22 | | |
| | | | Bottom of Exploration at 12'; Not refusal. | | | | | |
| 15 | | | | | | | | |
| 20 | | | | | | | | |
| 25 | | | | | | | | |
| 30 | | | | | | | | |

Notes:



**R.W. Gillespie
& Associates**

- Geotechnical Engineering
- Environmental Consulting
- Materials Testing Services

Boring Log: D-12

Total Depth (ft): 12

Sheet 1 of 1

Project Name: Reconstruct Runway 1-19
 RWG&A Project No. 1229-021
 Location: Orange, Massachusetts
 Client: Airport Solutions Group, LLC
 RWG&A Representative: Serena Pape
 Boring Location: See Exploration Location Plan
 Boring Abandonment Method: Backfill with cuttings
 Observed Water Depth: Not Obs.

Drilling Co.: Seaboard Drilling
 Drill Rig: Mobil B-53 Truck
 Driller Rep.: M. Glynn
 Date Started: 11/20/2019
 Date Completed: 11/20/2019
 Surface Elevation:
 Drilling Method: 2 1/4" HSA
 Casing Type: N/A

| DEPTH, FT. | SYMBOL SAMPLES | SAMPLE NUMBER | DESCRIPTION OF MATERIAL | SAMPLE RECOVERY, IN. | BLOWS PER 6" | SPT-N BLOWS PER FT. | MOISTURE CONTENT % | LAB TESTS |
|------------|-------------------|---------------|--|-------------------------|----------------------|------------------------|-----------------------|-----------|
| 0 | | S-1 | ASPHALTIC PAVEMENT (3 inches). | 6 | 45 50/4" | 50+ | 6 | GS NM |
| | | | FILL; Sandy gravel with silt, dark brown. | | | | | |
| | | | FILL; Sandy gravel, light brown. | | | | | |
| 5 | | S-2 | SAND (SP); Medium dense, moist to wet, medium to fine sand, trace silt, tan. | 17 | 13 11 12 14 | 23 | 4 | GS NM |
| 10 | | S-3 | | 18 | 13 14 11 11 | 25 | | |
| | | | Bottom of Exploration at 12'; Not refusal. | | | | | |
| 15 | | | | | | | | |
| 20 | | | | | | | | |
| 25 | | | | | | | | |
| 30 | | | | | | | | |

Notes:



R.W. Gillespie & Associates

- Geotechnical Engineering
- Environmental Consulting
- Materials Testing Services

Boring Log: D-13

Total Depth (ft): 12

Sheet 1 of 1

Project Name: Reconstruct Runway 1-19
 RWG&A Project No. 1229-021
 Location: Orange, Massachusetts
 Client: Airport Solutions Group, LLC
 RWG&A Representative: Serena Pape
 Boring Location: See Exploration Location Plan
 Boring Abandonment Method: Backfill with cuttings
 Observed Water Depth: Not Obs.

Drilling Co.: Seaboard Drilling
 Drill Rig: Mobil B-53 Truck
 Driller Rep.: M. Glynn
 Date Started: 11/20/2019
 Date Completed: 11/20/2019
 Surface Elevation:
 Drilling Method: 2 1/4" HSA
 Casing Type: N/A

| DEPTH, FT. | SYMBOL SAMPLES | SAMPLE NUMBER | DESCRIPTION OF MATERIAL | SAMPLE RECOVERY, IN. | BLOWS PER 6" | SPT-N BLOWS PER FT. | MOISTURE CONTENT % | LAB TESTS |
|------------|----------------|---------------|--|----------------------|--------------|---------------------|--------------------|-----------|
| 0 | | S-1 | ASPHALTIC PAVEMENT (3 inches). | 11 | 35 | 85 | | |
| | | S-1 | FILL; Sandy gravel with silt, dark brown. | | 40 | | | |
| | | S-1 | FILL; Sandy gravel, light brown. | | 45 | | | |
| | | | SAND (SP); Medium dense, moist to wet, medium to fine sand, trace silt, tan. | 36 | | | | |
| 5 | | S-2 | | 18 | 6 | 26 | | |
| | | | | | 10 | | | |
| | | | | | 16 | | | |
| | | | | | 26 | | | |
| 10 | | S-3 | | 12 | 12 | 26 | | |
| | | | | | 13 | | | |
| | | | | | 13 | | | |
| | | | | | 13 | | | |
| | | | Bottom of Exploration at 12'; Not refusal. | | | | | |
| 15 | | | | | | | | |
| 20 | | | | | | | | |
| 25 | | | | | | | | |
| 30 | | | | | | | | |

Notes:



R.W. Gillespie & Associates

- Geotechnical Engineering
- Environmental Consulting
- Materials Testing Services

Boring Log: D-14

Total Depth (ft): 12

Sheet 1 of 1

Project Name: Reconstruct Runway 1-19
 RWG&A Project No. 1229-021
 Location: Orange, Massachusetts
 Client: Airport Solutions Group, LLC
 RWG&A Representative: Serena Pape
 Boring Location: See Exploration Location Plan
 Boring Abandonment Method: Backfill with cuttings
 Observed Water Depth: Not Obs.

Drilling Co.: Seaboard Drilling
 Drill Rig: Mobil B-53 Truck
 Driller Rep.: M. Glynn
 Date Started: 11/20/2019
 Date Completed: 11/20/2019
 Surface Elevation:
 Drilling Method: 2 1/4" HSA
 Casing Type: N/A

| DEPTH, FT. | SYMBOL SAMPLES | SAMPLE NUMBER | DESCRIPTION OF MATERIAL | SAMPLE RECOVERY, IN. | BLOWS PER 6" | SPT-N BLOWS PER FT. | MOISTURE CONTENT % | LAB TESTS |
|------------|----------------|---------------|--|----------------------|----------------------|---------------------|--------------------|-----------|
| 0 | | S-1 | ASPHALTIC PAVEMENT (3 inches). | 13 | 35 44 44 44 | 88 | 9 | GS NM |
| | | | FILL; Sandy gravel with silt, dark brown. | | | | | |
| | | | FILL; Sandy gravel, light brown. | | | | | |
| | | | SAND (SP); Medium dense, moist to wet, medium to fine sand, trace silt, tan. | | | | | |
| 5 | | S-2 | | 11 | 6 13 16 16 | 29 | 3 | GS NM |
| 10 | | S-3 | | 21 | 6 7 9 9 | 16 | | |
| | | | Bottom of Exploration at 12'; Not refusal. | | | | | |
| 15 | | | | | | | | |
| 20 | | | | | | | | |
| 25 | | | | | | | | |
| 30 | | | | | | | | |

Notes:



R.W. Gillespie & Associates

- Geotechnical Engineering
- Environmental Consulting
- Materials Testing Services

Boring Log: D-15

Total Depth (ft): 12

Sheet 1 of 1

Project Name: Reconstruct Runway 1-19
 RWG&A Project No. 1229-021
 Location: Orange, Massachusetts
 Client: Airport Solutions Group, LLC
 RWG&A Representative: Serena Pape
 Boring Location: See Exploration Location Plan
 Boring Abandonment Method: Backfill with cuttings
 Observed Water Depth: Not Obs.

Drilling Co.: Seaboard Drilling
 Drill Rig: Mobil B-53 Truck
 Driller Rep.: M. Glynn
 Date Started: 11/20/2019
 Date Completed: 11/20/2019
 Surface Elevation:
 Drilling Method: 2 1/4" HSA
 Casing Type: N/A

| DEPTH, FT. | SYMBOL SAMPLES | SAMPLE NUMBER | DESCRIPTION OF MATERIAL | SAMPLE RECOVERY, IN. | BLOWS PER 6" | SPT-N BLOWS PER FT. | MOISTURE CONTENT % | LAB TESTS |
|------------|----------------|---------------|--|----------------------|------------------|---------------------|--------------------|-----------|
| 0 | | S-1 | ASPHALTIC PAVEMENT (2.25 inches). | 5 | 27 50/4" | 50+ | | |
| | | | FILL; Sandy gravel with silt, dark brown. | | | | | |
| | | | FILL; Sandy gravel, light brown. | | | | | |
| | | | SAND (SP); Medium dense, moist to wet, medium to fine sand, trace silt, tan. | | | | | |
| 5 | | S-2 | | 17 | 7 8 8 | 15 | | |
| 10 | | S-3 | | 19 | 5 5 8 9 | 13 | | |
| | | | Becomes wet. | | | | | |
| | | | Bottom of Exploration at 12'; Not refusal. | | | | | |
| 15 | | | | | | | | |
| 20 | | | | | | | | |
| 25 | | | | | | | | |
| 30 | | | | | | | | |

Notes:



R.W. Gillespie & Associates

- Geotechnical Engineering
- Environmental Consulting
- Materials Testing Services

Boring Log: D-16

Total Depth (ft): 12

Sheet 1 of 1

Project Name: Reconstruct Runway 1-19
 RWG&A Project No. 1229-021
 Location: Orange, Massachusetts
 Client: Airport Solutions Group, LLC
 RWG&A Representative: Serena Pape
 Boring Location: See Exploration Location Plan
 Boring Abandonment Method: Backfill with cuttings
 Observed Water Depth: Not Obs.

Drilling Co.: Seaboard Drilling
 Drill Rig: Mobile B-53 Truck
 Driller Rep.: M. Glynn
 Date Started: 11/20/2019
 Date Completed: 11/20/2019
 Surface Elevation:
 Drilling Method: 2 1/4" HSA
 Casing Type: N/A

| DEPTH, FT. | SYMBOL SAMPLES | SAMPLE NUMBER | DESCRIPTION OF MATERIAL | SAMPLE RECOVERY, IN. | BLOWS PER 6" | SPT-N BLOWS PER FT. | MOISTURE CONTENT % | LAB TESTS |
|------------|----------------|---------------|--|----------------------|----------------------|---------------------|--------------------|-----------|
| 0 | | S-1 | ASPHALTIC PAVEMENT (3.25 inches). | 10 | 29 53 46 42 | 99 | 6 | GS NM |
| | | | FILL; Sandy gravel with silt, dark brown. | | | | | |
| | | | FILL; Sandy gravel, light brown. | | | | | |
| | | | SAND (SP); Medium dense, moist to wet, medium to fine sand, trace silt, tan. | | | | | |
| 5 | | S-2 | | 17 | 7 7 8 8 | 15 | 5 | GS NM |
| 10 | | S-3 | | 19 | 5 5 8 9 | 13 | | |
| | | | Becomes wet. | | | | | |
| | | | Bottom of Exploration at 12'; Not refusal. | | | | | |
| 15 | | | | | | | | |
| 20 | | | | | | | | |
| 25 | | | | | | | | |
| 30 | | | | | | | | |

Notes:



R.W. Gillespie & Associates

- Geotechnical Engineering
- Environmental Consulting
- Materials Testing Services

Boring Log: D-17

Total Depth (ft): 12

Sheet 1 of 1

Project Name: Reconstruct Runway 1-19
 RWG&A Project No. 1229-021
 Location: Orange, Massachusetts
 Client: Airport Solutions Group, LLC
 RWG&A Representative: Serena Pape
 Boring Location: See Exploration Location Plan
 Boring Abandonment Method: Backfill with cuttings
 Observed Water Depth: Not Obs.

Drilling Co.: Seaboard Drilling
 Drill Rig: Mobile B-53 Truck
 Driller Rep.: M. Glynn
 Date Started: 11/20/2019
 Date Completed: 11/20/2019
 Surface Elevation:
 Drilling Method: 2 1/4" HSA
 Casing Type: N/A

| DEPTH, FT. | SYMBOL SAMPLES | SAMPLE NUMBER | DESCRIPTION OF MATERIAL | SAMPLE RECOVERY, IN. | BLOWS PER 6" | SPT-N BLOWS PER FT. | MOISTURE CONTENT % | LAB TESTS |
|------------|----------------|---------------|---|----------------------|----------------------|---------------------|--------------------|-----------|
| 0 | | S-1 | ASPHALTIC PAVEMENT (3.25 inches). | 13 | 30 42 26 31 | 68 | | |
| | | | FILL; Sandy gravel with silt, dark brown. | | | | | |
| | | | FILL; Sandy gravel, light brown. | | | | | |
| | | | SAND (SP); Medium dense to dense, moist to wet, medium to fine sand, trace silt, tan. | | | | | |
| 5 | | S-2 | | 17 | 11 12 15 11 | 27 | | |
| 10 | | S-3 | | 20 | 16 15 18 14 | 33 | | |
| | | | Becomes wet. | | | | | |
| | | | Bottom of Exploration at 12'; Not refusal. | | | | | |
| 15 | | | | | | | | |
| 20 | | | | | | | | |
| 25 | | | | | | | | |
| 30 | | | | | | | | |

Notes:



R.W. Gillespie & Associates

- Geotechnical Engineering
- Environmental Consulting
- Materials Testing Services

Boring Log: D-18

Total Depth (ft): 12

Sheet 1 of 1

Project Name: Reconstruct Runway 1-19
 RWG&A Project No. 1229-021
 Location: Orange, Massachusetts
 Client: Airport Solutions Group, LLC
 RWG&A Representative: Serena Pape
 Boring Location: See Exploration Location Plan
 Boring Abandonment Method: Backfill w/cuttings & patch
 Observed Water Depth: Not Obs.

Drilling Co.: Seaboard Drilling
 Drill Rig: Mobile B-53 Truck
 Driller Rep.: M. Glynn
 Date Started: 11/19/2019
 Date Completed: 11/19/2019
 Surface Elevation:
 Drilling Method: 2 1/4" HSA
 Casing Type: N/A

| DEPTH, FT. | SYMBOL SAMPLES | SAMPLE NUMBER | DESCRIPTION OF MATERIAL | SAMPLE RECOVERY, IN. | BLOWS PER 6" | SPT-N BLOWS PER FT. | MOISTURE CONTENT % | LAB TESTS |
|------------|----------------|---------------|--|----------------------|----------------------|---------------------|--------------------|-----------|
| 0 | | S-1 | ASPHALTIC PAVEMENT (3 inches). | 10 | 26 38 34 36 | 72 | 6 | GS NM |
| | | | FILL; Sandy gravel with silt, dark brown. | | | | | |
| | | | FILL; Sandy gravel, light brown. | | | | | |
| | | | SAND (SP); Medium dense, moist to wet, medium to fine sand, trace silt, tan. | | | | | |
| 5 | | S-2 | | 15 | 6 7 9 7 | 16 | 4 | GS NM |
| 10 | | S-3 | | 17 | 7 7 8 8 | 15 | | |
| | | | Becomes wet. | | | | | |
| | | | Bottom of Exploration at 12'; Not refusal. | | | | | |
| 15 | | | | | | | | |
| 20 | | | | | | | | |
| 25 | | | | | | | | |
| 30 | | | | | | | | |

Notes:



R.W. Gillespie & Associates

- Geotechnical Engineering
- Environmental Consulting
- Materials Testing Services

Boring Log: D-19

Total Depth (ft): 12

Sheet 1 of 1

Project Name: Reconstruct Runway 1-19
 RWG&A Project No. 1229-021
 Location: Orange, Massachusetts
 Client: Airport Solutions Group, LLC
 RWG&A Representative: Serena Pape
 Boring Location: See Exploration Location Plan
 Boring Abandonment Method: Backfill w/cuttings & patch
 Observed Water Depth: Not Obs.

Drilling Co.: Seaboard Drilling
 Drill Rig: Mobile B-53 Truck
 Driller Rep.: M. Glynn
 Date Started: 11/19/2019
 Date Completed: 11/19/2019
 Surface Elevation:
 Drilling Method: 2 1/4" HSA
 Casing Type: N/A

| DEPTH, FT. | SYMBOL | SAMPLES | SAMPLE NUMBER | DESCRIPTION OF MATERIAL | SAMPLE RECOVERY, IN. | BLOWS PER 6" | SPT-N BLOWS PER FT. | MOISTURE CONTENT % | LAB TESTS |
|------------|--------|---------|---------------|--|----------------------|-------------------|---------------------|--------------------|-----------|
| 0 | | | S-1 | ASPHALTIC PAVEMENT (2.75 inches). | 10 | 25 | 67 | | |
| | | | | FILL; Sandy gravel with silt, dark brown. | | 33 | | | |
| | | | | FILL; Sandy gravel, light brown. | | 34 | | | |
| | | | | SAND (SP); Medium dense, moist to wet, medium to fine sand, trace silt, tan. | | 37 | | | |
| 5 | | | S-2 | | 18 | 6 6 7 10 | 13 | | |
| 10 | | | S-3 | | 20 | 5 6 7 8 | 13 | | |
| | | | | Becomes wet. | | | | | |
| | | | | Bottom of Exploration at 12'; Not refusal. | | | | | |
| 15 | | | | | | | | | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |

Notes:



R.W. Gillespie & Associates

- Geotechnical Engineering
- Environmental Consulting
- Materials Testing Services

Boring Log: D-20

Total Depth (ft): 12

Sheet 1 of 1

Project Name: Reconstruct Runway 1-19
 RWG&A Project No. 1229-021
 Location: Orange, Massachusetts
 Client: Airport Solutions Group, LLC
 RWG&A Representative: Serena Pape
 Boring Location: See Exploration Location Plan
 Boring Abandonment Method: Backfill w/cuttings & patch
 Observed Water Depth: Not Obs.

Drilling Co.: Seaboard Drilling
 Drill Rig: Mobile B-53 Truck
 Driller Rep.: M. Glynn
 Date Started: 11/19/2019
 Date Completed: 11/19/2019
 Surface Elevation:
 Drilling Method: 2 1/4" HSA
 Casing Type: N/A

| DEPTH, FT. | SYMBOL SAMPLES | SAMPLE NUMBER | DESCRIPTION OF MATERIAL | SAMPLE RECOVERY, IN. | BLOWS PER 6" | SPT-N BLOWS PER FT. | MOISTURE CONTENT % | LAB TESTS |
|------------|----------------|---------------|---|----------------------|----------------------|---------------------|--------------------|-----------|
| 0 | | S-1 | ASPHALTIC PAVEMENT (2.5 inches). | 16 | 43 50 49 31 | 99 | 5 | GS NM |
| | | | FILL; Sandy gravel with silt, dark brown. | | | | | |
| | | | FILL; Sandy gravel, brown. | | | | | |
| | | | SAND WITH SILT (SP-SM); Dense to medium dense, moist, medium to fine sand, few silt, tan. | | | | | |
| 5 | | S-2 | | 16 | 15 22 25 22 | 47 | 5 | GS NM |
| | | | | | | | | |
| 10 | | S-3 | Becomes wet. | 20 | 8 11 14 19 | 25 | | |
| | | | Bottom of Exploration at 12'; Not refusal. | | | | | |
| 15 | | | | | | | | |
| 20 | | | | | | | | |
| 25 | | | | | | | | |
| 30 | | | | | | | | |

Notes: Bulk sample recovered from 0.5' to 4' for laboratory CBR test.



R.W. Gillespie & Associates

- Geotechnical Engineering
- Environmental Consulting
- Materials Testing Services

Boring Log: D-21

Total Depth (ft): 12

Sheet 1 of 1

Project Name: Reconstruct Runway 1-19
 RWG&A Project No. 1229-021
 Location: Orange, Massachusetts
 Client: Airport Solutions Group, LLC
 RWG&A Representative: Serena Pape
 Boring Location: See Exploration Location Plan
 Boring Abandonment Method: Backfill w/cuttings & patch
 Observed Water Depth: Not Obs.

Drilling Co.: Seaboard Drilling
 Drill Rig: Mobile B-53 Truck
 Driller Rep.: M. Glynn
 Date Started: 11/19/2019
 Date Completed: 11/19/2019
 Surface Elevation:
 Drilling Method: 2 1/4" HSA
 Casing Type: N/A

| DEPTH, FT. | SYMBOL SAMPLES | SAMPLE NUMBER | DESCRIPTION OF MATERIAL | SAMPLE RECOVERY, IN. | BLOWS PER 6" | SPT-N BLOWS PER FT. | MOISTURE CONTENT % | LAB TESTS |
|------------|----------------|---------------|--|----------------------|----------------------|---------------------|--------------------|-----------|
| 0 | | S-1 | ASPHALTIC PAVEMENT (2.75 inches). | 16 | 34 39 45 37 | 84 | | |
| | | | FILL; Sandy gravel with silt, dark brown. | | | | | |
| | | | FILL; Sandy gravel, brown. | | | | | |
| | | | SAND WITH SILT (SP-SM); Dense, moist to wet, medium to fine sand, few gravel, trace silt, tan. | | | | | |
| 5 | | S-2 | | 14 | 10 15 19 16 | 34 | | |
| 10 | | S-3 | | 20 | 12 16 29 27 | 45 | | |
| | | | Becomes wet. | | | | | |
| | | | Bottom of Exploration at 12'; Not refusal. | | | | | |
| 15 | | | | | | | | |
| 20 | | | | | | | | |
| 25 | | | | | | | | |
| 30 | | | | | | | | |

Notes:



R.W. Gillespie & Associates

- Geotechnical Engineering
- Environmental Consulting
- Materials Testing Services

Boring Log: D-22

Total Depth (ft): 12

Sheet 1 of 1

Project Name: Reconstruct Runway 1-19
 RWG&A Project No. 1229-021
 Location: Orange, Massachusetts
 Client: Airport Solutions Group, LLC
 RWG&A Representative: Serena Pape
 Boring Location: See Exploration Location Plan
 Boring Abandonment Method: Backfill w/cuttings & patch
 Observed Water Depth: Not Obs.

Drilling Co.: Seaboard Drilling
 Drill Rig: Mobile B-53 Truck
 Driller Rep.: M. Glynn
 Date Started: 11/19/2019
 Date Completed: 11/19/2019
 Surface Elevation:
 Drilling Method: 2 1/4" HSA
 Casing Type: N/A

| DEPTH, FT. | SYMBOL SAMPLES | SAMPLE NUMBER | DESCRIPTION OF MATERIAL | SAMPLE RECOVERY, IN. | BLOWS PER 6" | SPT-N BLOWS PER FT. | MOISTURE CONTENT % | LAB TESTS |
|------------|----------------|---------------|---|--|----------------------|---------------------|--------------------|-----------|
| 0 | | S-1 | ASPHALTIC PAVEMENT (3.5 inches). | 8 | 38 50/3" | 50+ | 8 | GS NM |
| | | | FILL; Sandy gravel with silt, dark brown. | | | | | |
| | | | FILL; Sandy gravel, light brown. | | | | | |
| | | | SAND WITH SILT (SP-SM); Dense, moist, medium to fine sand, few silt, tan. | | | | | |
| 5 | | S-2 | | 13 | 18 26 20 | 51 | 4 | GS NM |
| | | | | | | | | |
| 10 | | S-3 | | 17 | 12 17 19 17 | 36 | | |
| | | | | Becomes wet. Bottom of Exploration at 12'; Not refusal. | | | | |
| 15 | | | | | | | | |
| 20 | | | | | | | | |
| 25 | | | | | | | | |
| 30 | | | | | | | | |

Notes: Bulk sample recovered from 0.5' to 4' for laboratory CBR test.



R.W. Gillespie & Associates

- Geotechnical Engineering
- Environmental Consulting
- Materials Testing Services

Boring Log: D-23

Total Depth (ft): 12

Sheet 1 of 1

Project Name: Reconstruct Runway 1-19
 RWG&A Project No. 1229-021
 Location: Orange, Massachusetts
 Client: Airport Solutions Group, LLC
 RWG&A Representative: Serena Pape
 Boring Location: See Exploration Location Plan
 Boring Abandonment Method: Backfill w/cuttings & patch
 Observed Water Depth: Not Obs.

Drilling Co.: Seaboard Drilling
 Drill Rig: Mobile B-53 Truck
 Driller Rep.: M. Glynn
 Date Started: 11/19/2019
 Date Completed: 11/19/2019
 Surface Elevation:
 Drilling Method: 2 1/4" HSA
 Casing Type: N/A

| DEPTH, FT. | SYMBOL SAMPLES | SAMPLE NUMBER | DESCRIPTION OF MATERIAL | SAMPLE RECOVERY, IN. | BLOWS PER 6" | SPT-N BLOWS PER FT. | MOISTURE CONTENT % | LAB TESTS |
|------------|----------------|---------------|--|----------------------|--------------|---------------------|--------------------|-----------|
| 0 | | S-1 | ASPHALTIC PAVEMENT (3.25 inches). | 10 | 23 | 99+ | | |
| | | | FILL; Sandy gravel with silt, dark brown. | | 49 | | | |
| | | | FILL; Sandy gravel, brown. | | 50/4" | | | |
| | | | SAND WITH SILT (SP-SM); Dense, medium to fine sand, few silt, tan. | | | | | |
| 5 | | S-2 | | 1 | 30 | 50+ | | |
| | | S-3 | | 18 | 7 | 34 | | |
| | | | Becomes wet. | | 15 | | | |
| | | | Bottom of Exploration at 12'; Not refusal. | | 19 | | | |
| | | | | | 15 | | | |
| 15 | | | | | | | | |
| 20 | | | | | | | | |
| 25 | | | | | | | | |
| 30 | | | | | | | | |

Notes:



R.W. Gillespie & Associates

- Geotechnical Engineering
- Environmental Consulting
- Materials Testing Services

Boring Log: D-24

Total Depth (ft): 12

Sheet 1 of 1

Project Name: Reconstruct Runway 1-19
 RWG&A Project No. 1229-021
 Location: Orange, Massachusetts
 Client: Airport Solutions Group, LLC
 RWG&A Representative: Serena Pape
 Boring Location: See Exploration Location Plan
 Boring Abandonment Method: Backfill w/cuttings & patch
 Observed Water Depth: Not Obs.

Drilling Co.: Seaboard Drilling
 Drill Rig: Mobile B-53 Truck
 Driller Rep.: M. Glynn
 Date Started: 11/19/2019
 Date Completed: 11/19/2019
 Surface Elevation:
 Drilling Method: 2 1/4" HSA
 Casing Type: N/A

| DEPTH, FT. | SYMBOL SAMPLES | SAMPLE NUMBER | DESCRIPTION OF MATERIAL | SAMPLE RECOVERY, IN. | BLOWS PER 6" | SPT-N BLOWS PER FT. | MOISTURE CONTENT % | LAB TESTS |
|------------|----------------|---------------|--|----------------------|--------------|---------------------|--------------------|-----------|
| 0 | | S-1 | ASPHALTIC PAVEMENT (3.5 inches). | 14 | 31 | 77 | 4 | GS NM |
| | | | FILL; Sandy gravel with silt, dark brown. | | 36 | | | |
| | | | FILL; Sandy gravel, brown. | | 41 | | | |
| | | | SAND WITH GRAVEL (SW); Very dense, moist, coarse to fine sand, little gravel, trace silt, tan. | | 42 | | | |
| 5 | | S-2 | SAND (SP); Medium dense, moist to wet, medium to fine sand, trace silt, tan. | 11 | 18 | 71 | 3 | GS NM |
| | | | | | 35 | | | |
| | | | | | 23 | | | |
| 10 | | S-3 | Bottom of Exploration at 12'; Not refusal. | 18 | 7 | 15 | | |
| | | | | | 7 | | | |
| | | | | | 8 | | | |
| | | | | | 10 | | | |

Notes: Bulk sample recovered from 0.5' to 4' for laboratory CBR test.



**R.W. Gillespie
& Associates**

- Geotechnical Engineering
- Environmental Consulting
- Materials Testing Services

Boring Log: D-25

Total Depth (ft): 12

Sheet 1 of 1

Project Name: Reconstruct Runway 1-19
 RWG&A Project No. 1229-021
 Location: Orange, Massachusetts
 Client: Airport Solutions Group, LLC
 RWG&A Representative: Serena Pape
 Boring Location: See Exploration Location Plan
 Boring Abandonment Method: Backfill w/cuttings & patch
 Observed Water Depth: Not Obs.

Drilling Co.: Seaboard Drilling
 Drill Rig: Mobile B-53 Truck
 Driller Rep.: M. Glynn
 Date Started: 11/19/2019
 Date Completed: 11/19/2019
 Surface Elevation:
 Drilling Method: 2 1/4" HSA
 Casing Type: N/A

| DEPTH, FT. | SYMBOL SAMPLES | SAMPLE NUMBER | DESCRIPTION OF MATERIAL | SAMPLE RECOVERY, IN. | BLOWS PER 6" | SPT-N BLOWS PER FT. | MOISTURE CONTENT % | LAB TESTS |
|------------|-------------------|---------------|---|-------------------------|----------------------|------------------------|-----------------------|-----------|
| 0 | | S-1 | ASPHALTIC PAVEMENT (3.5 inches). | 15 | 32 49 30 37 | 79 | | |
| | | | FILL; Sandy gravel with silt, dark brown. | | | | | |
| | | | FILL; Sandy gravel, brown. | | | | | |
| | | | SAND (SP); Medium dense to dense, moist to wet, medium to fine sand, trace silt, tan. | | | | | |
| 5 | | S-2 | | 12 | 8 12 14 18 | 26 | | |
| 10 | | S-3 | Becomes dense. | 6 | 10 21 20 14 | 41 | | |
| | | | Becomes wet. | | | | | |
| | | | Bottom of Exploration at 12'; Not refusal. | | | | | |
| 15 | | | | | | | | |
| 20 | | | | | | | | |
| 25 | | | | | | | | |
| 30 | | | | | | | | |

Notes:



- Geotechnical Engineering
- Environmental Consulting
- Materials Testing Services

Boring Log: D-26

Total Depth (ft): 12

Sheet 1 of 1

Project Name: Reconstruct Runway 1-19
 RWG&A Project No. 1229-021
 Location: Orange, Massachusetts
 Client: Airport Solutions Group, LLC
 RWG&A Representative: Serena Pape
 Boring Location: See Exploration Location Plan
 Boring Abandonment Method: Backfill w/cuttings & patch
 Observed Water Depth: Not Obs.

Drilling Co.: Seaboard Drilling
 Drill Rig: Mobile B-53 Truck
 Driller Rep.: M. Glynn
 Date Started: 11/19/2019
 Date Completed: 11/19/2019
 Surface Elevation:
 Drilling Method: 2 1/4" HSA
 Casing Type: N/A

| DEPTH, FT. | SYMBOL | SAMPLES | SAMPLE NUMBER | DESCRIPTION OF MATERIAL | SAMPLE RECOVERY, IN. | BLOWS PER 6" | SPT-N BLOWS PER FT. | MOISTURE CONTENT % | LAB TESTS |
|------------|--------|---------|---------------|--|----------------------|--------------|---------------------|--------------------|-----------|
| 0 | | | S-1 | ASPHALTIC PAVEMENT (3 inches). | 10 | 30 | 100+ | 8 | GS |
| | | | | FILL; Sandy gravel with silt, dark brown. | | 50 | | | NM |
| | | | | FILL; Sandy gravel, brown. | | 50/4" | | | |
| | | | | SAND (SP); Dense to medium dense, moist, medium to fine sand, few gravel, trace silt, tan. | | | | | |
| 5 | | | S-2 | | 16 | 13 | 33 | 4 | GS |
| | | | | | | 14 | | | NM |
| | | | | | | 19 | | | |
| | | | | | | 21 | | | |
| 10 | | | S-3 | | 1 | 8 | 17 | | |
| | | | | Becomes wet. | | 8 | | | |
| | | | | Bottom of Exploration at 12'; Not refusal. | | 9 | | | |
| | | | | | | 17 | | | |
| 15 | | | | | | | | | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |

Notes: Bulk sample recovered from 0.5' to 4' for laboratory CBR test.



R.W. Gillespie & Associates

- Geotechnical Engineering
- Environmental Consulting
- Materials Testing Services

Boring Log: D-27

Total Depth (ft): 12

Sheet 1 of 1

Project Name: Reconstruct Runway 1-19
 RWG&A Project No. 1229-021
 Location: Orange, Massachusetts
 Client: Airport Solutions Group, LLC
 RWG&A Representative: Serena Pape
 Boring Location: See Exploration Location Plan
 Boring Abandonment Method: Backfill with cuttings
 Observed Water Depth: Not Obs.

Drilling Co.: Seaboard Drilling
 Drill Rig: Mobile B-53 Truck
 Driller Rep.: M. Glynn
 Date Started: 11/21/2019
 Date Completed: 11/21/2019
 Surface Elevation:
 Drilling Method: 2 1/4" HSA
 Casing Type: N/A

| DEPTH, FT. | SYMBOL SAMPLES | SAMPLE NUMBER | DESCRIPTION OF MATERIAL | SAMPLE RECOVERY, IN. | BLOWS PER 6" | SPT-N BLOWS PER FT. | MOISTURE CONTENT % | LAB TESTS |
|------------|----------------|---------------|--|----------------------|--------------|---------------------|--------------------|-----------|
| 0 | | S-1 | TOPSOIL AND ORGANIC MATERIAL (4 inches). | 18 | 3 | 24 | | |
| | | | FILL; Sand with silt and gravel. | | 8 | | | |
| | | | SAND (SP-SM); Medium dense, moist to wet, medium to fine sand, trace silt, tan and orange. | | 16 | | | |
| | | | | | 36 | | | |
| 5 | | S-2 | Becomes wet. | 24 | 6 | 16 | | |
| | | | | | 8 | | | |
| | | | | | 8 | | | |
| | | | | | 9 | | | |
| 10 | | S-3 | | 24 | 4 | 11 | | |
| | | | | | 5 | | | |
| | | | | | 7 | | | |
| | | | | | 8 | | | |
| | | | Bottom of Exploration at 12'; Not refusal. | | | | | |
| 15 | | | | | | | | |
| 20 | | | | | | | | |
| 25 | | | | | | | | |
| 30 | | | | | | | | |

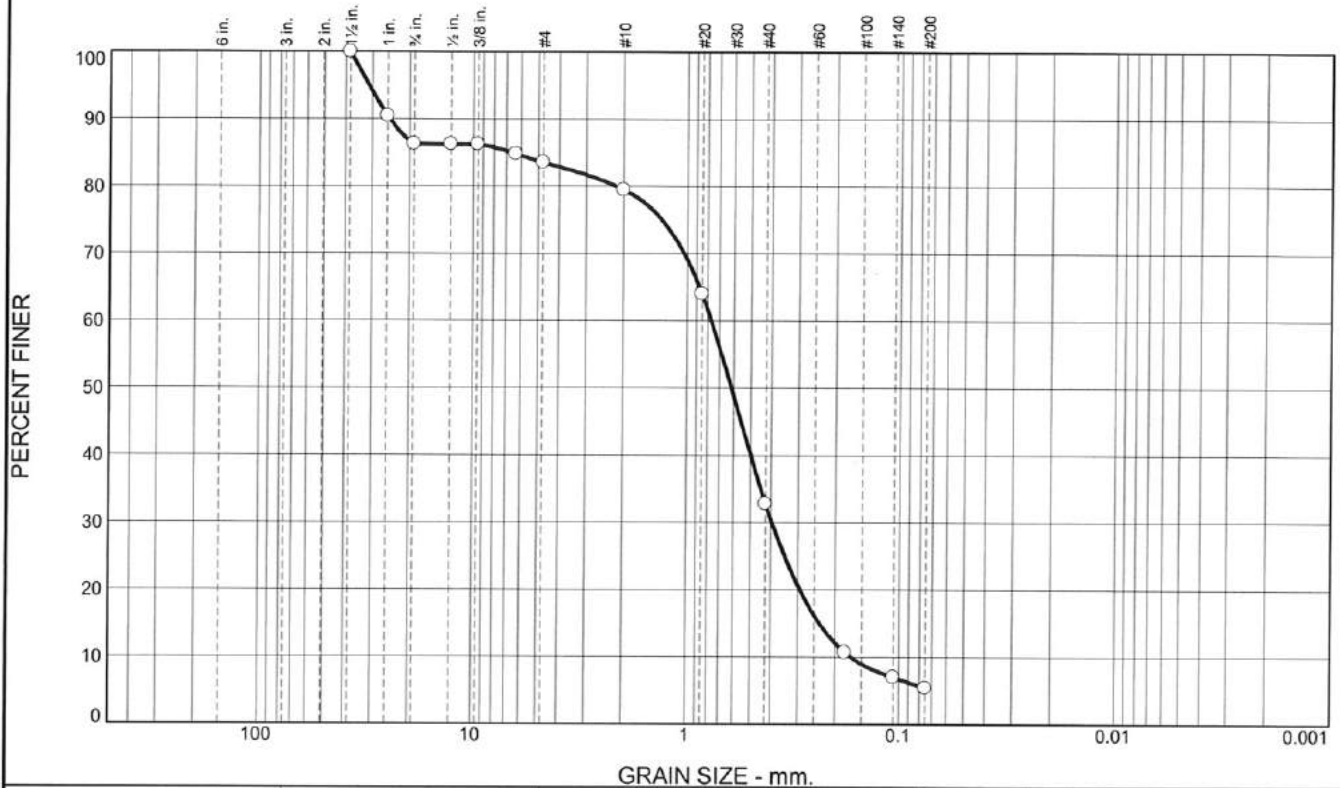
Notes: Bulk sample recovered from 0.5' to 4' for laboratory CBR test.

APPENDIX B

SIEVE / HYDROMETER TEST RESULTS

Geotechnical Engineering Evaluation
Reconstruct Runway 1-19
Orange Municipal Airport
Orange, Massachusetts

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 13.7 | 2.8 | 4.0 | 46.7 | 27.4 | 5.4 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1 1/2" | 100.0 | | |
| 1" | 90.4 | | |
| 3/4" | 86.3 | | |
| 1/2" | 86.3 | | |
| 3/8" | 86.3 | | |
| 1/4" | 84.8 | | |
| #4 | 83.5 | | |
| #10 | 79.5 | | |
| #20 | 64.0 | | |
| #40 | 32.8 | | |
| #80 | 10.7 | | |
| #140 | 7.0 | | |
| #200 | 5.4 | | |

Soil Description

poorly graded sand with silt and gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D₉₀= 24.8922 D₈₅= 6.6174 D₆₀= 0.7674
D₅₀= 0.6154 D₃₀= 0.3970 D₁₅= 0.2367
D₁₀= 0.1687 C_u= 4.55 C_c= 1.22

Classification

USCS= SP-SM AASHTO= A-1-b

Remarks

Moisture Content: 4.0%

* (no specification provided)

Location: Boring D-1
Sample Number: S-2 Depth: 5'-7'

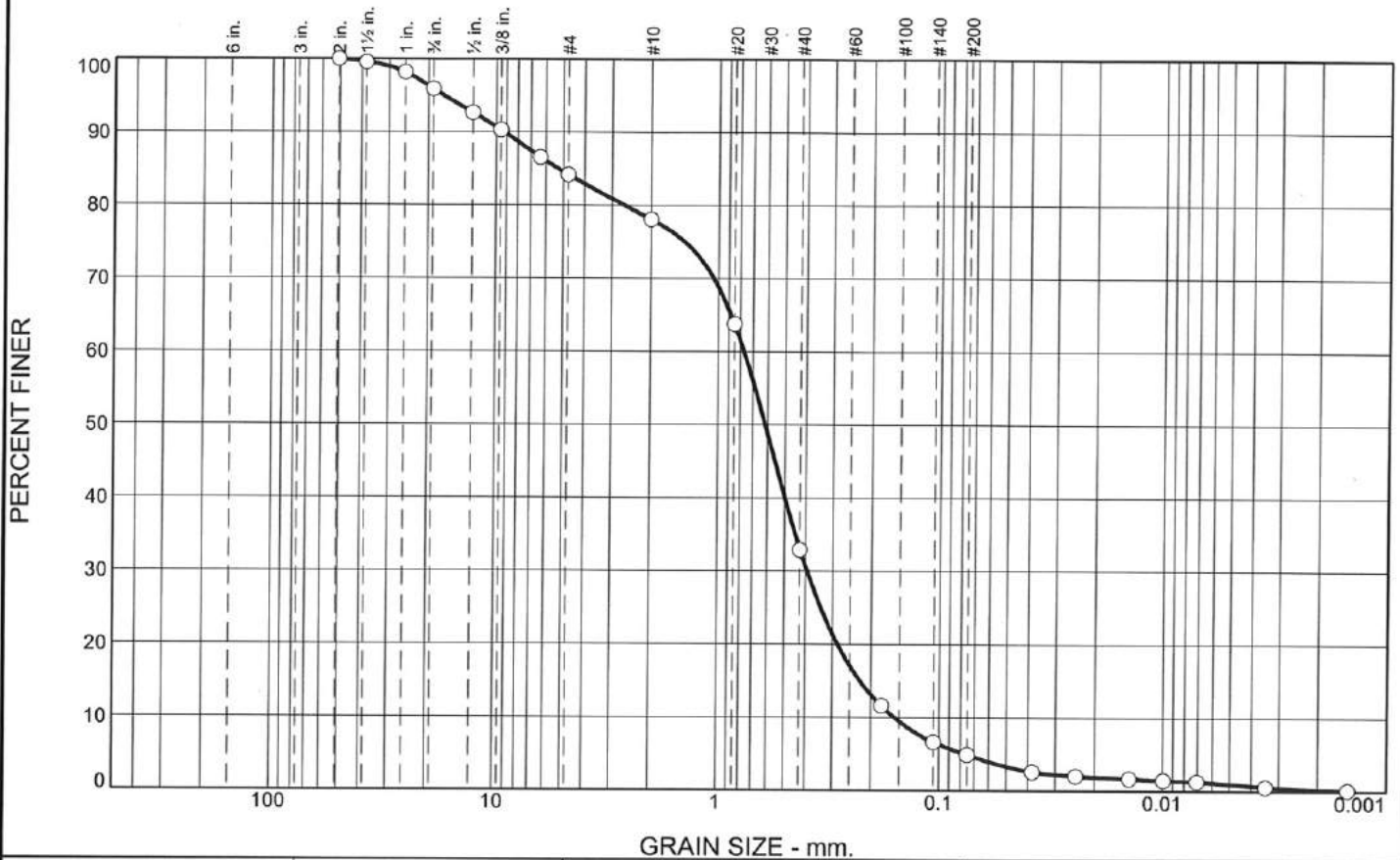
Date: 12-24-2019

| | | |
|---|---|-------------------------|
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | Client: Airport Solutions Group, LLC Project: Reconstruct Runway I-19 Orange, MA Project No: 1229-021 | Lab No. 15850-02 |
|---|---|-------------------------|

Tested By: CAG/JJB

Checked By: MRG

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 4.1 | 11.7 | 6.1 | 45.2 | 28.0 | 4.7 | 0.2 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 2" | 100.0 | | |
| 1 1/2" | 99.5 | | |
| 1" | 98.2 | | |
| 3/4" | 95.9 | | |
| 1/2" | 92.7 | | |
| 3/8" | 90.3 | | |
| 1/4" | 86.6 | | |
| #4 | 84.2 | | |
| #10 | 78.1 | | |
| #20 | 63.8 | | |
| #40 | 32.9 | | |
| #80 | 11.6 | | |
| #140 | 6.6 | | |
| #200 | 4.9 | | |
| 0.0383 mm. | 2.6 | | |
| 0.0243 mm. | 2.0 | | |
| 0.0140 mm. | 1.7 | | |
| 0.0099 mm. | 1.5 | | |
| 0.0070 mm. | 1.3 | | |
| 0.0034 mm. | 0.6 | | |
| 0.0015 mm. | 0.1 | | |

Soil Description

poorly graded sand with gravel

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D₉₀= 9.2158 D₈₅= 5.2608 D₆₀= 0.7703
D₅₀= 0.6162 D₃₀= 0.3947 D₁₅= 0.2248
D₁₀= 0.1578 C_u= 4.88 C_c= 1.28

Classification

USCS= SP AASHTO= A-1-b

Remarks

Moisture Content: 3.0%

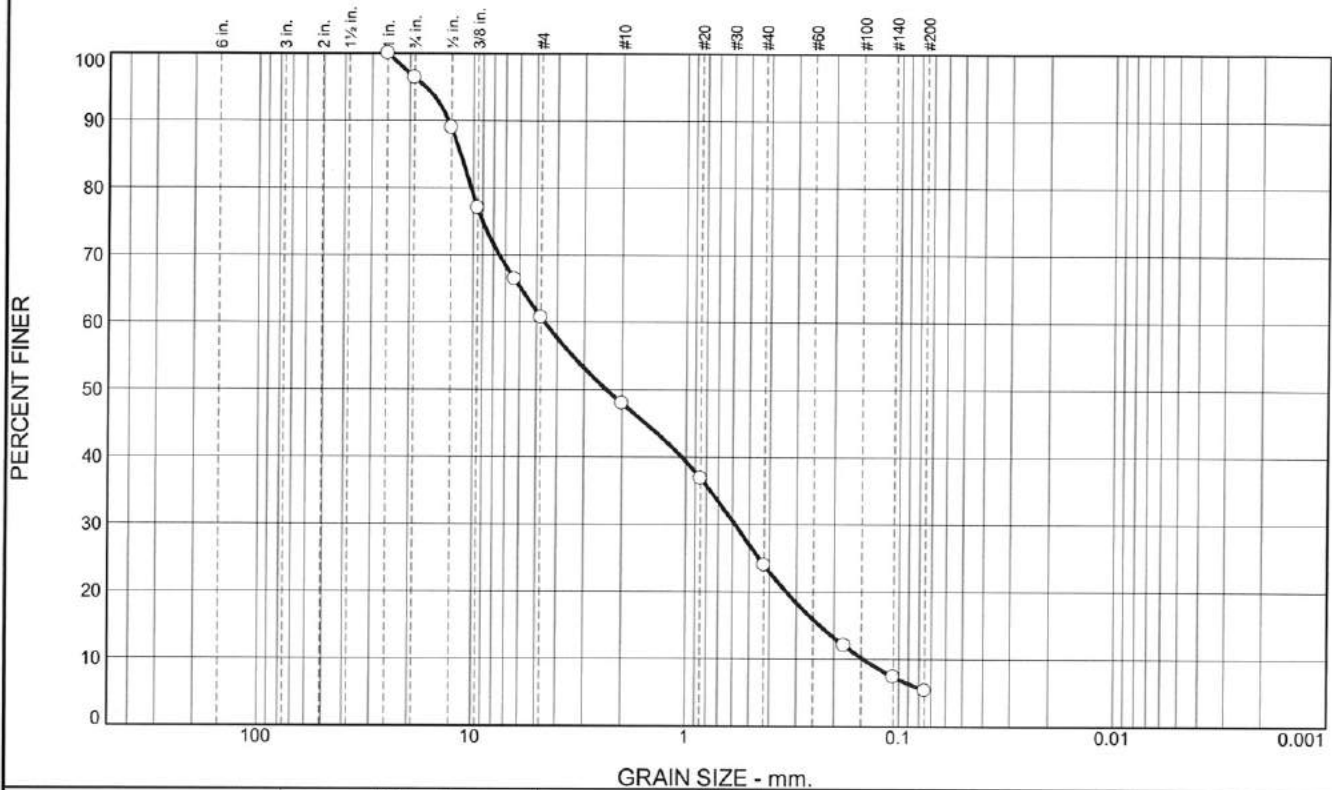
* (no specification provided)

Location: Boring D-2 Sample Number: Bulk Depth: 0.5'-4' Date: 12-10-2019

| | |
|--|--|
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | Client: Airport Solutions Group, LLC Project: Reconstruct Runway 1-19 Orange, MA Project No: 1229-021 |
| Lab No. 15831-01 | |

Tested By: JJB Checked By: MTG *MTG*

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 3.6 | 35.7 | 12.7 | 24.0 | 18.7 | 5.3 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1" | 100.0 | | |
| 3/4" | 96.4 | | |
| 1/2" | 88.9 | | |
| 3/8" | 77.0 | | |
| 1/4" | 66.4 | | |
| #4 | 60.7 | | |
| #10 | 48.0 | | |
| #20 | 36.8 | | |
| #40 | 24.0 | | |
| #80 | 12.0 | | |
| #140 | 7.4 | | |
| #200 | 5.3 | | |

Soil Description

poorly graded sand with silt and gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D₉₀= 13.1241 D₈₅= 11.4801 D₆₀= 4.5748
D₅₀= 2.3612 D₃₀= 0.5855 D₁₅= 0.2331
D₁₀= 0.1467 C_u= 31.18 C_c= 0.51

Classification

USCS= SP-SM AASHTO= A-1-a

Remarks

Moisture Content: 8.6%

* (no specification provided)

Location: Boring D-2
Sample Number: S-1 Depth: 0.3'-2'

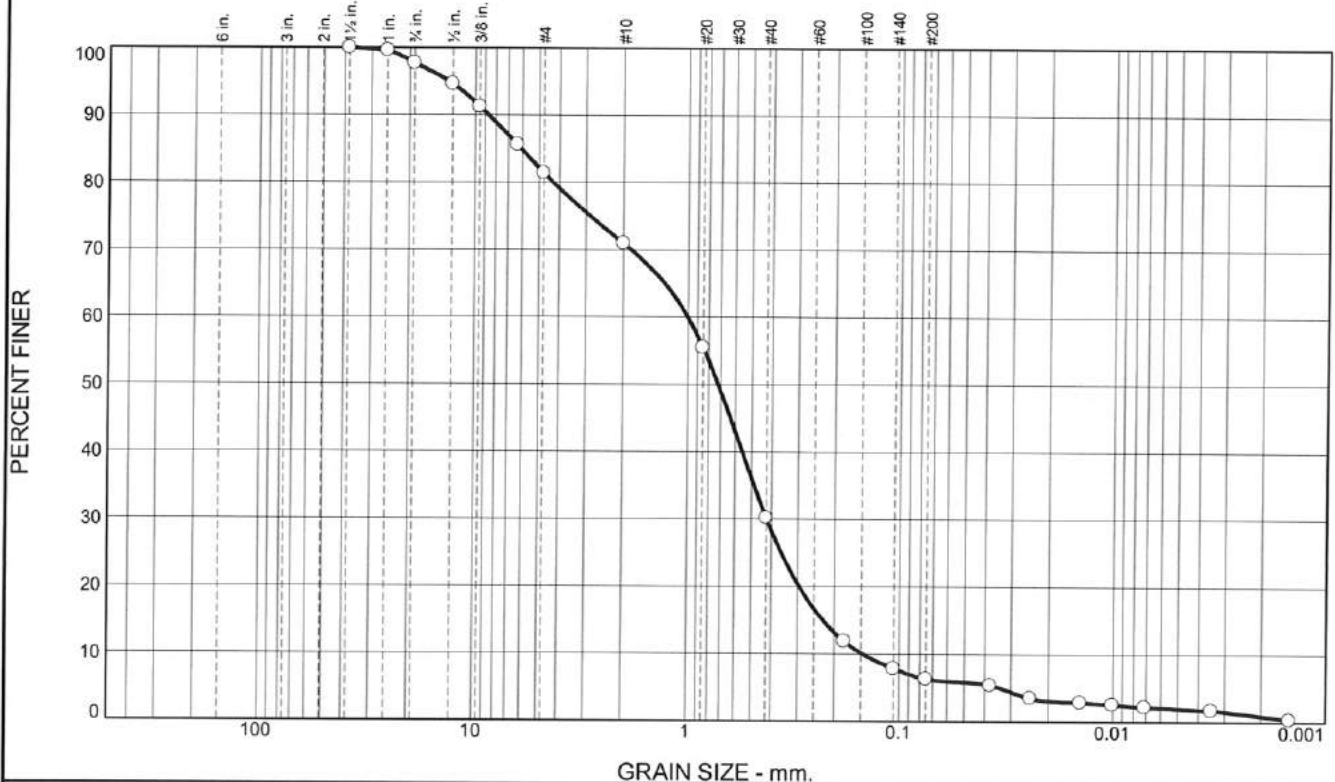
Date: 12-24-2019

| | | |
|---|---|-------------------------|
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | Client: Airport Solutions Group, LLC Project: Reconstruct Runway 1-19 Orange, MA Project No: 1229-021 | Lab No. 15850-01 |
|---|---|-------------------------|

Tested By: CAG/JJB

Checked By: MRG

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 2.3 | 16.3 | 10.5 | 40.7 | 23.9 | 5.4 | 0.9 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1 1/2" | 100.0 | | |
| 1" | 99.6 | | |
| 3/4" | 97.7 | | |
| 1/2" | 94.6 | | |
| 3/8" | 91.2 | | |
| 1/4" | 85.6 | | |
| #4 | 81.4 | | |
| #10 | 70.9 | | |
| #20 | 55.5 | | |
| #40 | 30.2 | | |
| #80 | 11.9 | | |
| #140 | 7.8 | | |
| #200 | 6.3 | | |
| 0.0378 mm. | 5.4 | | |
| 0.0243 mm. | 3.5 | | |
| 0.0141 mm. | 2.9 | | |
| 0.0100 mm. | 2.5 | | |
| 0.0071 mm. | 2.2 | | |
| 0.0035 mm. | 1.7 | | |
| 0.0015 mm. | 0.4 | | |

Soil Description

Well-graded sand with silt and gravel

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D₉₀= 8.6836 D₈₅= 6.1049 D₆₀= 1.0044
D₅₀= 0.7221 D₃₀= 0.4230 D₁₅= 0.2268
D₁₀= 0.1477 C_u= 6.80 C_c= 1.21

Classification

USCS= SW-SM AASHTO= A-1-b

Remarks

As Received Moisture Content: 3.9%

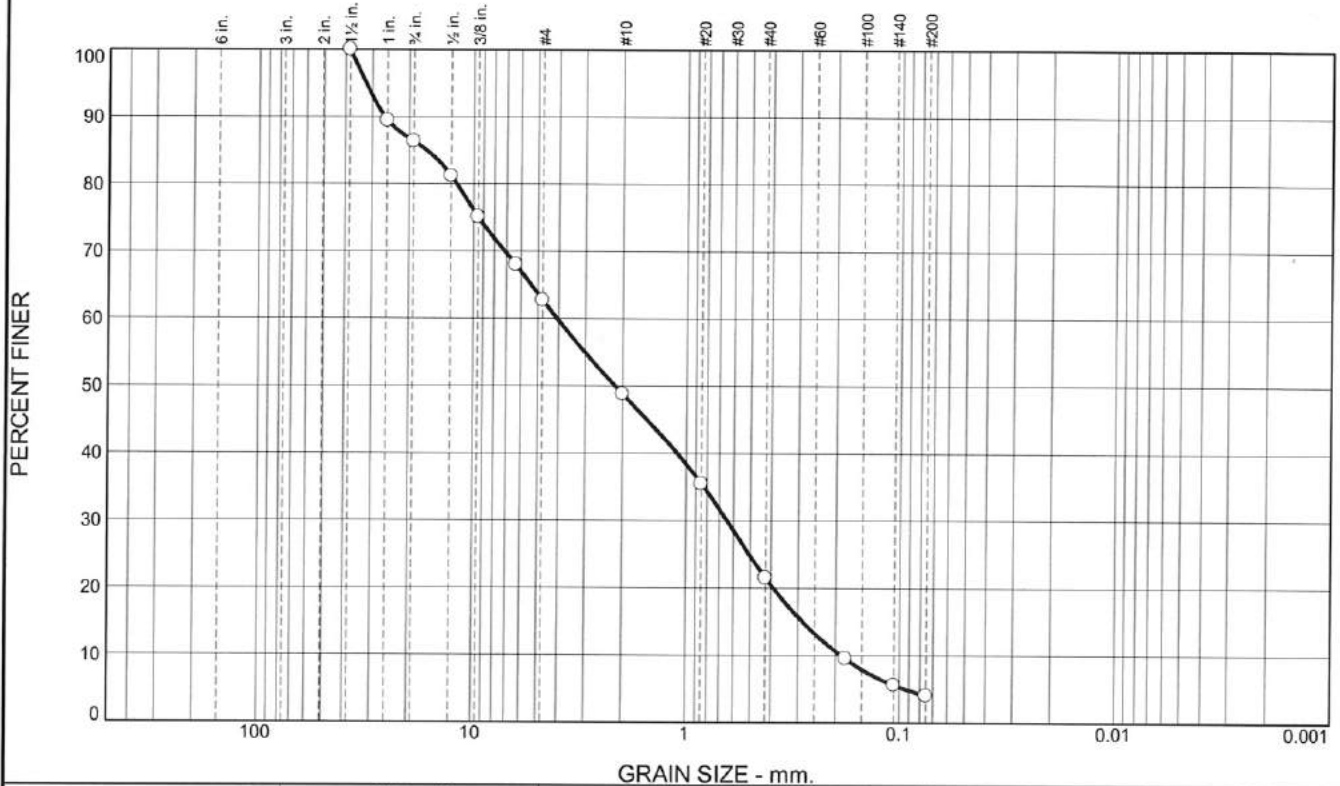
* (no specification provided)

Location: Boring D-4 Sample Number: Bulk Depth: 0.5'-4' Date: 1/2/2019

| | |
|---|---|
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | Client: Airport Solutions Group, LLC Project: Reconstruct Runway 1-19 Orange, MA Project No: 1229-021 Lab No. 15831-02 |
|---|---|

Tested By: JJB Checked By: MTG

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 13.7 | 23.6 | 13.9 | 27.3 | 17.4 | 4.1 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1 1/2" | 100.0 | | |
| 1" | 89.4 | | |
| 3/4" | 86.3 | | |
| 1/2" | 81.2 | | |
| 3/8" | 75.1 | | |
| 1/4" | 68.0 | | |
| #4 | 62.7 | | |
| #10 | 48.8 | | |
| #20 | 35.5 | | |
| #40 | 21.5 | | |
| #80 | 9.5 | | |
| #140 | 5.6 | | |
| #200 | 4.1 | | |

Soil Description

poorly graded sand with gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D₉₀= 26.2235 D₈₅= 16.5534 D₆₀= 4.0791
D₅₀= 2.1732 D₃₀= 0.6452 D₁₅= 0.2855
D₁₀= 0.1885 C_u= 21.64 C_c= 0.54

Classification

USCS= SP AASHTO= A-1-a

Remarks

Moisture Content: 5.0%

* (no specification provided)

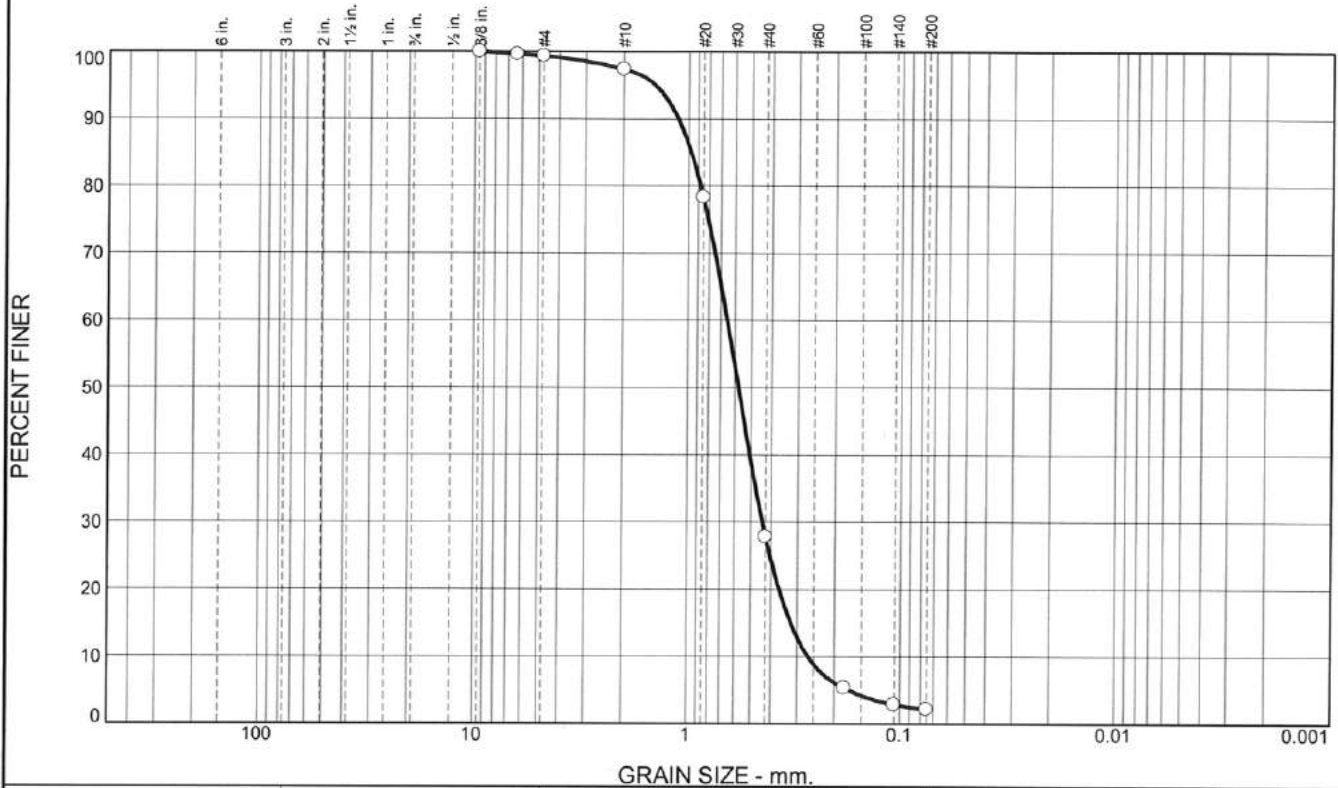
Location: Boring D-4
Sample Number: S-1 Depth: 0.3'-2'

Date: 12-24-2019

| | |
|---|---|
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | Client: Airport Solutions Group, LLC Project: Reconstruct Runway 1-19 Orange, MA Project No: 1229-021 Lab No. 15850-03 |
|---|---|

Tested By: CAG/JJB Checked By: MRG *MRG*

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 0.0 | 0.7 | 1.9 | 69.6 | 25.7 | 2.1 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 3/8" | 100.0 | | |
| 1/4" | 99.6 | | |
| #4 | 99.3 | | |
| #10 | 97.4 | | |
| #20 | 78.3 | | |
| #40 | 27.8 | | |
| #80 | 5.3 | | |
| #140 | 2.9 | | |
| #200 | 2.1 | | |

Soil Description
poorly graded sand

Atterberg Limits
 PL= LL= PI=

Coefficients
 D₉₀= 1.1179 D₈₅= 0.9722 D₆₀= 0.6545
 D₅₀= 0.5769 D₃₀= 0.4404 D₁₅= 0.3221
 D₁₀= 0.2665 C_u= 2.46 C_c= 1.11

Classification
 USCS= SP AASHTO= A-1-b

Remarks
 Moisture Content: 3.7%

* (no specification provided)

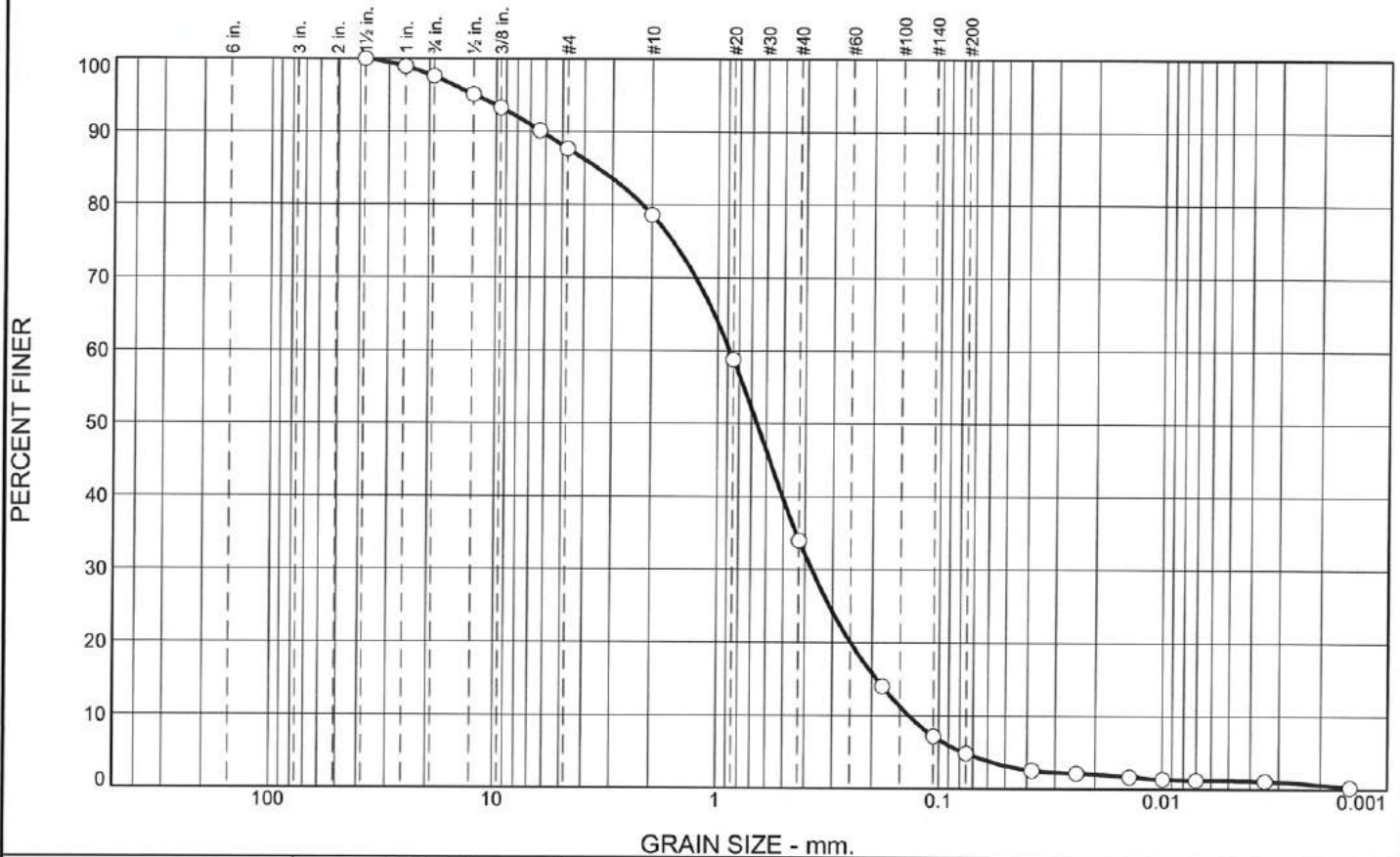
Location: Boring D-4
 Sample Number: S-2 Depth: 5'-7'

Date: 12-24-2019

| | |
|---|---|
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | Client: Airport Solutions Group, LLC Project: Reconstruct Runway 1-19 Orange, MA Project No: 1229-021 Lab No. 15850-04 |
|---|---|

Tested By: JJB/CAG Checked By: MRG *MRG*

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 2.4 | 9.9 | 9.1 | 44.6 | 29.1 | 4.3 | 0.6 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1 1/2" | 100.0 | | |
| 1" | 99.0 | | |
| 3/4" | 97.6 | | |
| 1/2" | 95.1 | | |
| 3/8" | 93.3 | | |
| 1/4" | 90.2 | | |
| #4 | 87.7 | | |
| #10 | 88.6 | | |
| #20 | 58.8 | | |
| #40 | 34.0 | | |
| #80 | 14.0 | | |
| #140 | 7.2 | | |
| #200 | 4.9 | | |
| 0.0382 mm. | 2.5 | | |
| 0.0242 mm. | 2.2 | | |
| 0.0140 mm. | 1.7 | | |
| 0.0099 mm. | 1.4 | | |
| 0.0070 mm. | 1.3 | | |
| 0.0034 mm. | 1.1 | | |
| 0.0015 mm. | 0.3 | | |

* (no specification provided)

Soil Description

well-graded sand

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D₉₀= 6.2138 D₈₅= 3.4862 D₆₀= 0.8822
D₅₀= 0.6629 D₃₀= 0.3738 D₁₅= 0.1910
D₁₀= 0.1368 C_u= 6.45 C_c= 1.16

Classification

USCS= SW AASHTO= A-1-b

Remarks

Moisture Content: 3.2%

Location: Boring D-6
Sample Number: Bulk **Depth:** 0.5'-4'

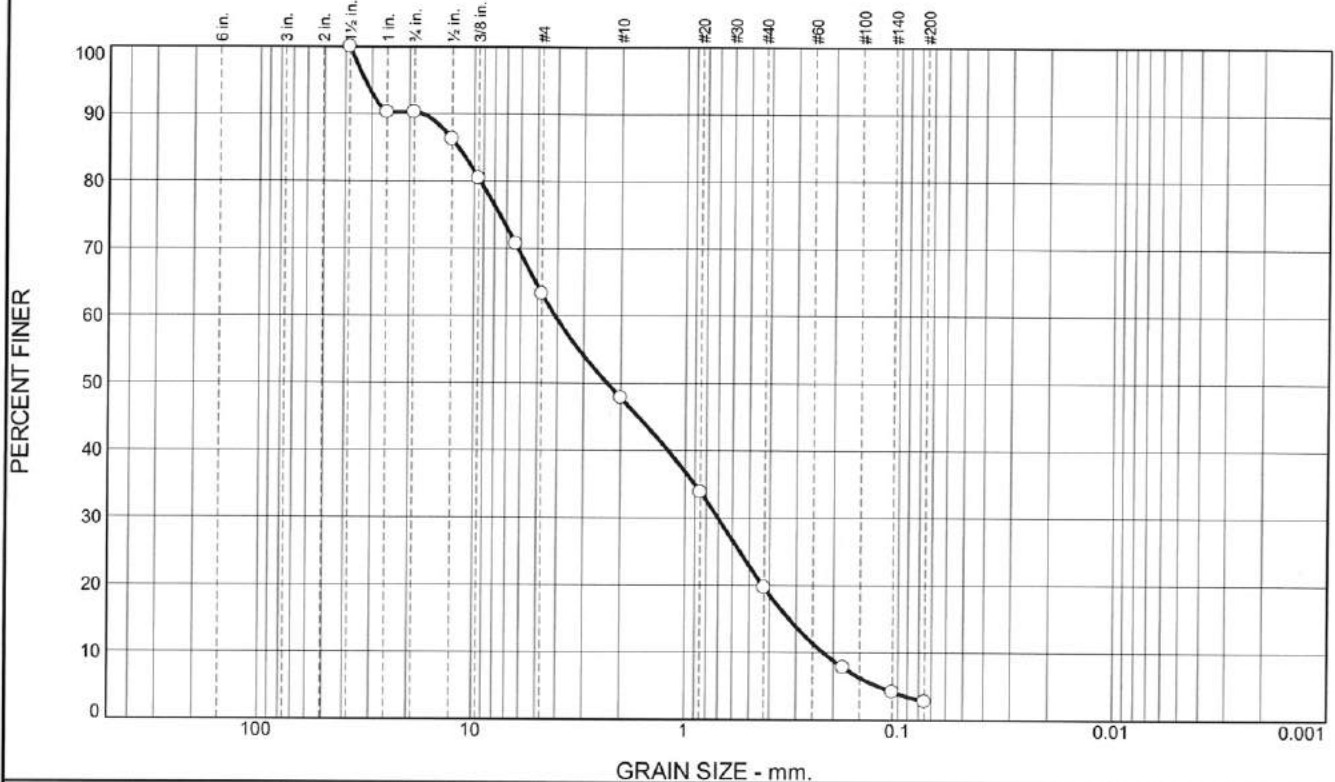
Date: 12-10-2019

| | |
|---|---|
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | Client: Airport Solutions Group, LLC Project: Reconstruct Runway 1-19 Orange, MA Project No: 1229-021 |
| Lab No. 15831-03 | |

Tested By: JJB

Checked By: MTG

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 9.8 | 26.9 | 15.5 | 28.2 | 16.8 | 2.8 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1 1/2" | 100.0 | | |
| 1" | 90.2 | | |
| 3/4" | 90.2 | | |
| 1/2" | 86.3 | | |
| 3/8" | 80.4 | | |
| 1/4" | 70.7 | | |
| #4 | 63.3 | | |
| #10 | 47.8 | | |
| #20 | 33.8 | | |
| #40 | 19.6 | | |
| #80 | 7.8 | | |
| #140 | 4.2 | | |
| #200 | 2.8 | | |

Soil Description
Poorly graded sand with gravel

Atterberg Limits
 PL= LL= PI=

Coefficients
 D₉₀= 17.3734 D₈₅= 11.8500 D₆₀= 4.1085
 D₅₀= 2.3142 D₃₀= 0.7043 D₁₅= 0.3240
 D₁₀= 0.2230 C_u= 18.42 C_c= 0.54

Classification
 USCS= SP AASHTO= A-1-a

Remarks
 Moisture Content: 3.1%

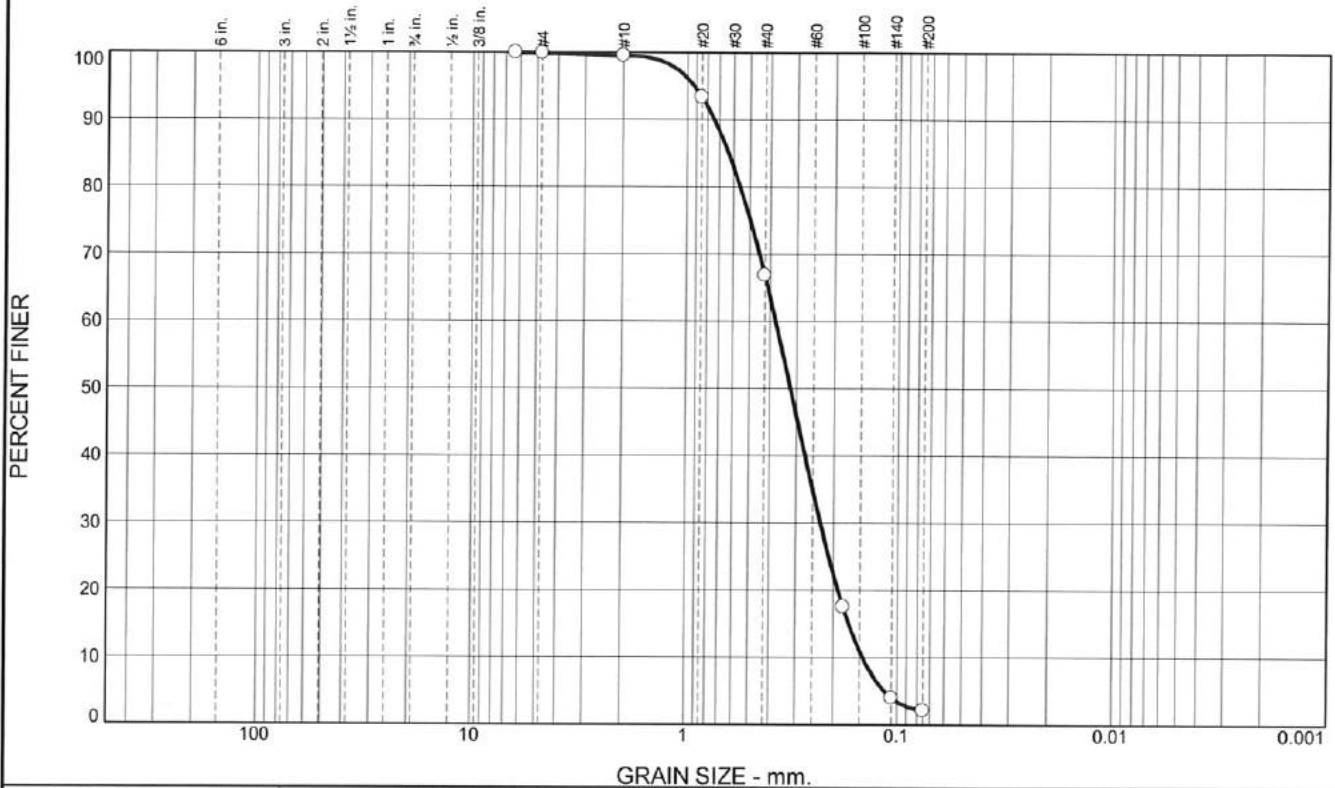
* (no specification provided)

Location: Boring D-6 Sample Number: S-1 Depth: 0.3'-2' Date: 12/23/2019

| | |
|---|--|
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | Client: Airport Solutions Group, LLC Project: Reconstruct Runway 1-19 Orange, MA Project No: 1229-021 Lab No. 15850-05 |
|---|--|

Tested By: AGS/JJB Checked By: MRG *MTG*

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 0.0 | 0.1 | 0.4 | 32.7 | 64.7 | 2.1 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1/4" | 100.0 | | |
| #4 | 99.9 | | |
| #10 | 99.5 | | |
| #20 | 93.4 | | |
| #40 | 66.8 | | |
| #80 | 17.5 | | |
| #140 | 4.0 | | |
| #200 | 2.1 | | |

Soil Description
Poorly graded sand

Atterberg Limits
 PL= LL= PI=

Coefficients
 D₉₀= 0.7421 D₈₅= 0.6344 D₆₀= 0.3771
 D₅₀= 0.3202 D₃₀= 0.2306 D₁₅= 0.1693
 D₁₀= 0.1456 C_u= 2.59 C_c= 0.97

Classification
 USCS= SP AASHTO= A-3

Remarks
 Moisture Content: 3.9%

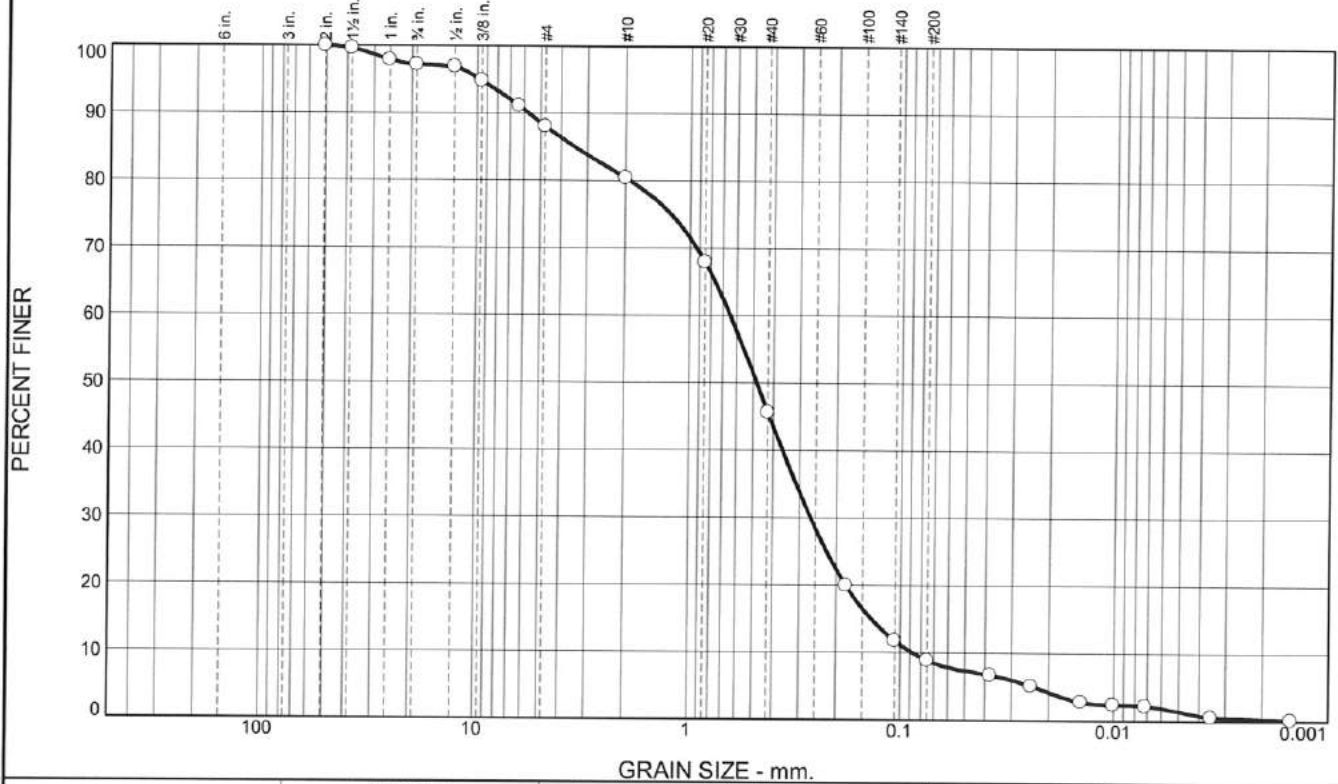
* (no specification provided)

Location: Boring D-6 Sample Number: S-2 Depth: 5'-7' Date: 12/23/2019

| | |
|---|---|
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | Client: Airport Solutions Group, LLC Project: Reconstruct Runway 1-19 Orange, MA Project No: 1229-021 Lab No. 15850-06 |
|---|---|

Tested By: AGS/JJB Checked By: MRG *MRG*

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 2.8 | 9.2 | 7.6 | 34.8 | 36.8 | 8.5 | 0.3 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 2" | 100.0 | | |
| 1 1/2" | 99.6 | | |
| 1" | 97.9 | | |
| 3/4" | 97.2 | | |
| 1/2" | 96.9 | | |
| 3/8" | 94.8 | | |
| 1/4" | 91.1 | | |
| #4 | 88.0 | | |
| #10 | 80.4 | | |
| #20 | 67.9 | | |
| #40 | 45.6 | | |
| #80 | 19.9 | | |
| #140 | 11.8 | | |
| #200 | 8.8 | | |
| 0.0375 mm. | 6.7 | | |
| 0.025 mm. | 5.1 | | |
| 0.015 mm. | 2.8 | | |
| 0.0106 mm. | 2.4 | | |
| 0.0075 mm. | 2.2 | | |
| 0.0053 mm. | 0.5 | | |
| 0.0015 mm. | 0.2 | | |

(no specification provided)

Soil Description

Well-graded sand with silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D₉₀= 5.7281 D₈₅= 3.4432 D₆₀= 0.6461
D₅₀= 0.4816 D₃₀= 0.2649 D₁₅= 0.1367
D₁₀= 0.0881 C_u= 7.33 C_c= 1.23

Classification

USCS= SW-SM AASHTO= A-1-b

Remarks

As Recieved Moisture Content: 5.6%

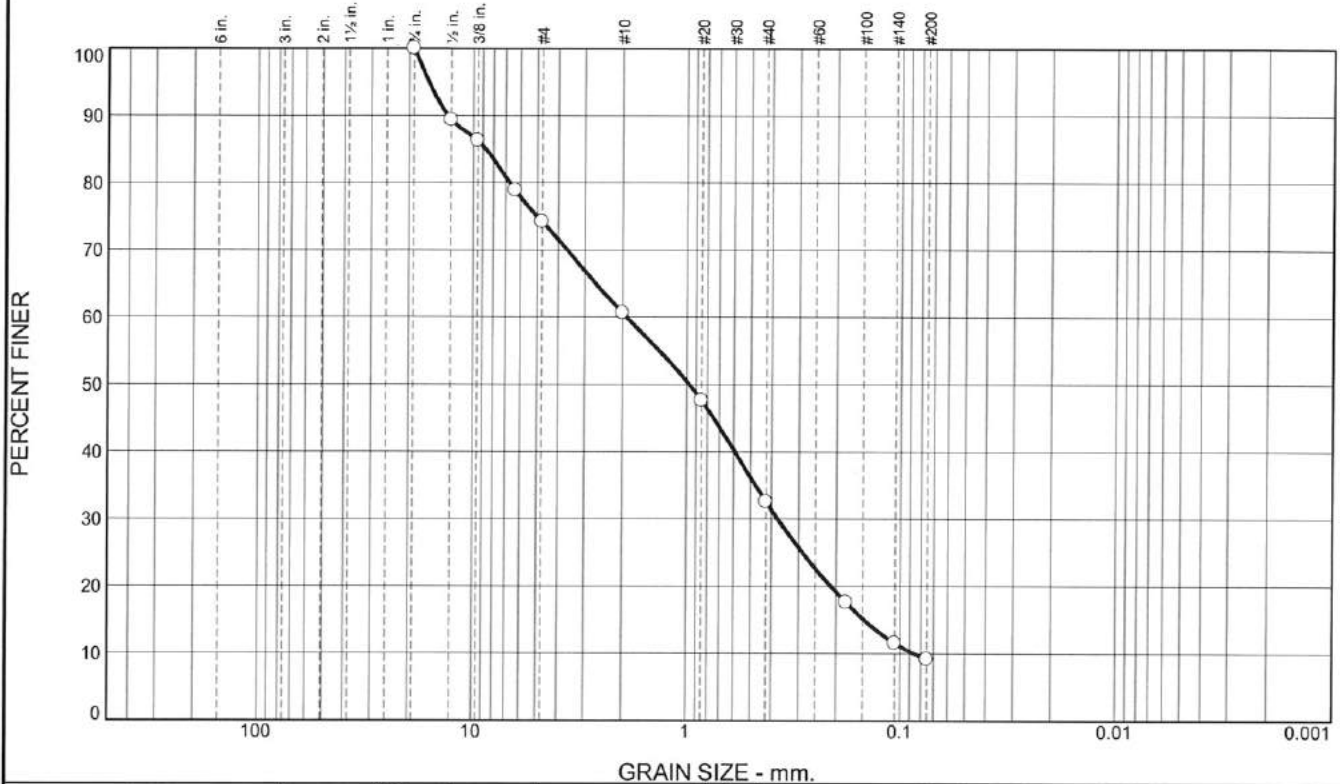
Location: Boring D-8
Sample Number: Bulk Depth: 0.5'-4'

Date: 1/2/2019

| | |
|---|---|
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | Client: Airport Solutions Group, LLC Project: Reconstruct Runway 1-19 Orange, MA Project No: 1229-021 Lab No. 15831-04 |
|---|---|

Tested By: AGS Checked By: MTG *MTG*

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 0.0 | 25.8 | 13.6 | 28.0 | 23.4 | 9.2 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 3/4" | 100.0 | | |
| 1/2" | 89.3 | | |
| 3/8" | 86.3 | | |
| 1/4" | 78.9 | | |
| #4 | 74.2 | | |
| #10 | 60.6 | | |
| #20 | 47.6 | | |
| #40 | 32.6 | | |
| #80 | 17.6 | | |
| #140 | 11.5 | | |
| #200 | 9.2 | | |

Soil Description

poorly graded sand with silt and gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D₉₀= 13.2115 D₈₅= 8.6996 D₆₀= 1.9179
D₅₀= 0.9726 D₃₀= 0.3752 D₁₅= 0.1476
D₁₀= 0.0860 C_u= 22.30 C_c= 0.85

Classification

USCS= SP-SM AASHTO= A-1-b

Remarks

Moisture Content: 5.0%

* (no specification provided)

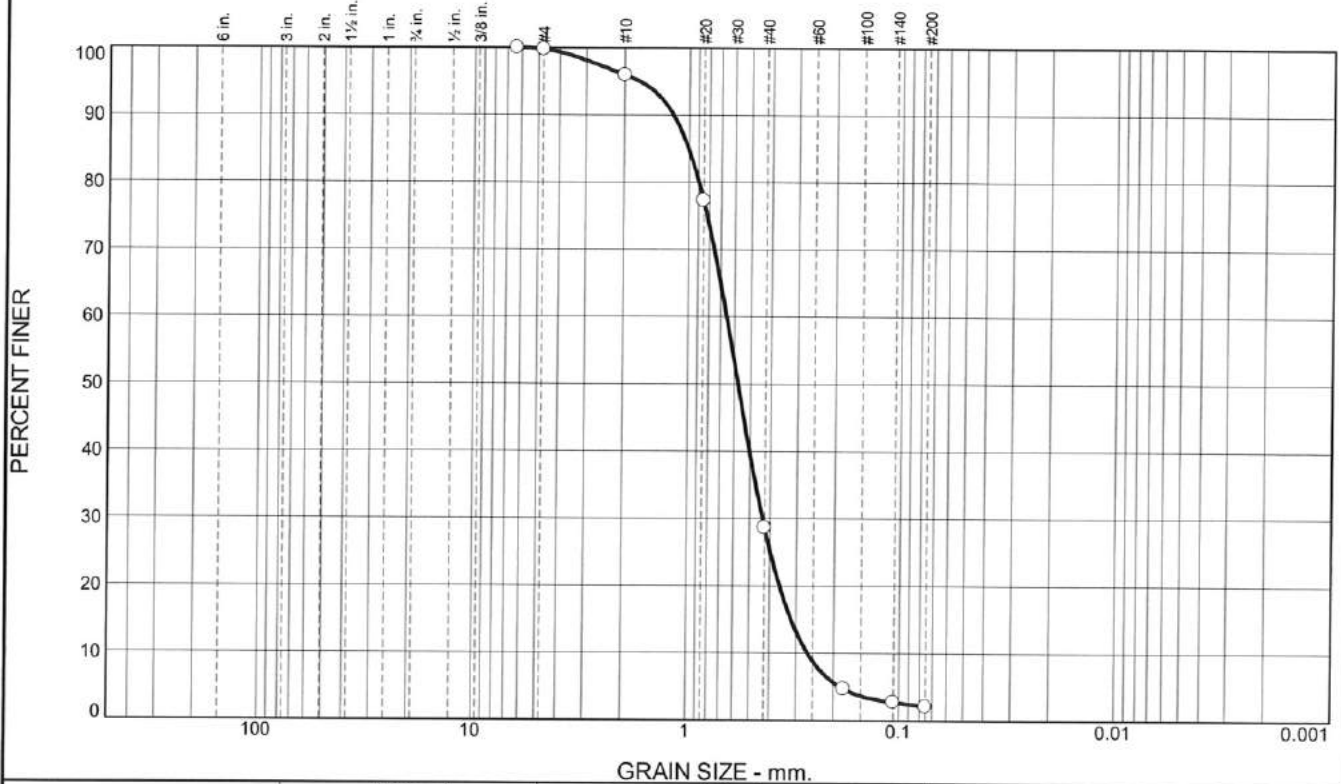
Location: Boring D-8
Sample Number: S-1 Depth: 0.3'-2'

Date: 12-24-2019

| | |
|---|---|
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | Client: Airport Solutions Group, LLC Project: Reconstruct Runway 1-19 Orange, MA Project No: 1229-021 Lab No. 15850-07 |
|---|---|

Tested By: JJB/CAG Checked By: MRG *MRG*

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 0.0 | 0.2 | 3.9 | 67.3 | 26.5 | 2.1 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1/4" | 100.0 | | |
| #4 | 99.8 | | |
| #10 | 95.9 | | |
| #20 | 77.3 | | |
| #40 | 28.6 | | |
| #80 | 4.7 | | |
| #140 | 2.7 | | |
| #200 | 2.1 | | |

Soil Description
poorly graded sand

Atterberg Limits
 PL= LL= PI=

Coefficients
 D₉₀= 1.1874 D₈₅= 1.0057 D₆₀= 0.6556
 D₅₀= 0.5749 D₃₀= 0.4346 D₁₅= 0.3169
 D₁₀= 0.2651 C_u= 2.47 C_c= 1.09

Classification
 USCS= SP AASHTO= A-1-b

Remarks
 Moisture Content: 3.4%

* (no specification provided)

Location: Boring D-8
 Sample Number: S-2 Depth: 5'-7'

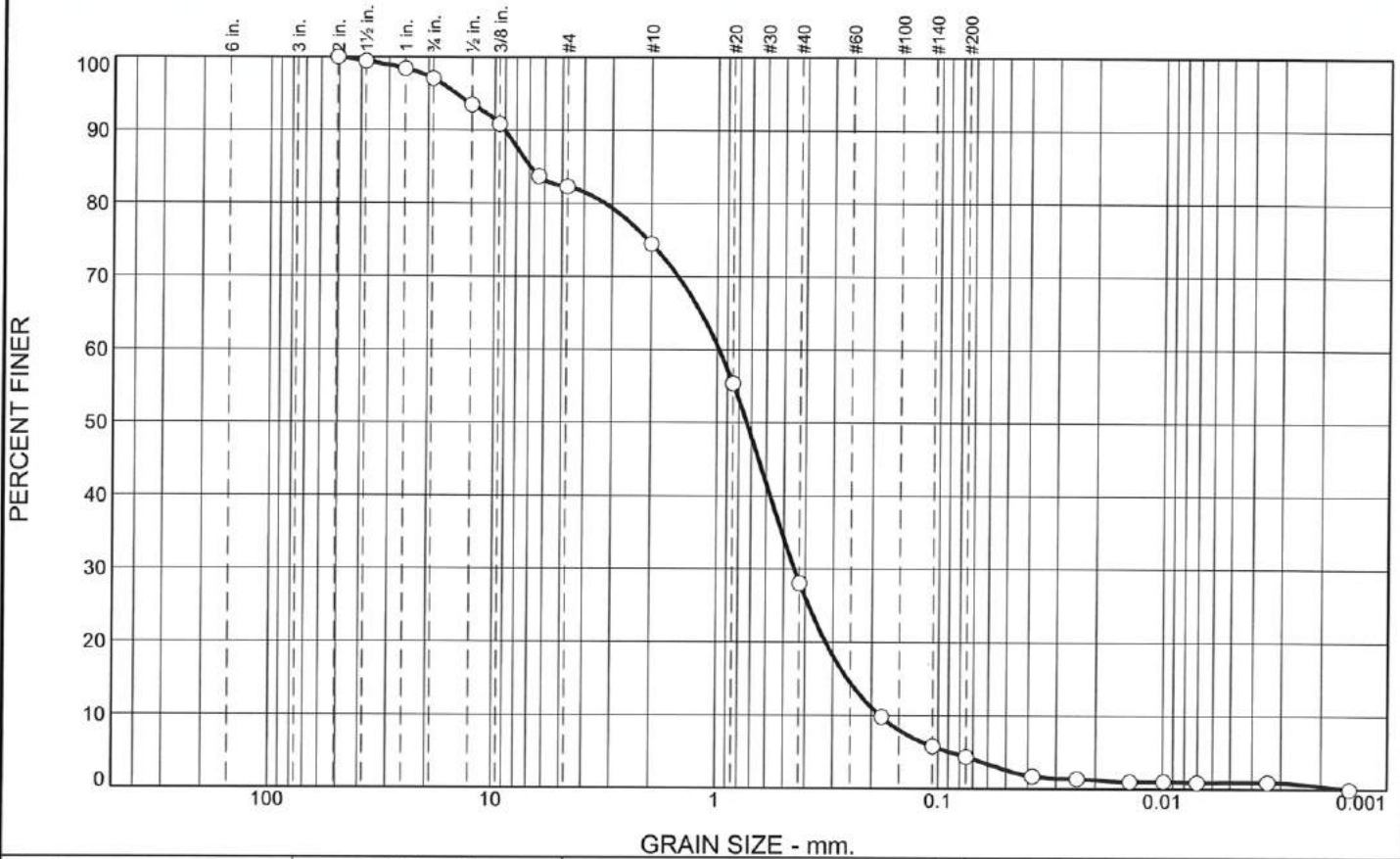
Date: 12-24-2019

| | | |
|---|--|------------------|
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | Client: Airport Solutions Group, LLC Project: Reconstruct Runway 1-19 Orange, MA Project No: 1229-021 | Lab No. 15850-08 |
|---|--|------------------|

Tested By: CAG/JJB

Checked By: MRG

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 2.9 | 14.8 | 7.8 | 46.5 | 23.6 | 4.0 | 0.4 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 2" | 100.0 | | |
| 1 1/2" | 99.4 | | |
| 1" | 98.4 | | |
| 3/4" | 97.1 | | |
| 1/2" | 93.5 | | |
| 3/8" | 90.9 | | |
| 1/4" | 83.7 | | |
| #4 | 82.3 | | |
| #10 | 74.5 | | |
| #20 | 55.4 | | |
| #40 | 28.0 | | |
| #80 | 9.8 | | |
| #140 | 5.8 | | |
| #200 | 4.4 | | |
| 0.0382 mm. | 1.7 | | |
| 0.0242 mm. | 1.4 | | |
| 0.0140 mm. | 1.0 | | |
| 0.0099 mm. | 1.1 | | |
| 0.0070 mm. | 0.9 | | |
| 0.0034 mm. | 1.0 | | |
| 0.0015 mm. | 1.0 | | |

Soil Description

poorly graded sand with gravel

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D₉₀= 9.0207 D₈₅= 6.9335 D₆₀= 0.9816
 D₅₀= 0.7362 D₃₀= 0.4489 D₁₅= 0.2578
 D₁₀= 0.1833 C_u= 5.36 C_c= 1.12

Classification

USCS= SP AASHTO= A-1-b

Remarks

Moisture Content: 3.0%

* (no specification provided)

Location: Boring D-10 Depth: 0.5'-4'
 Sample Number: Bulk

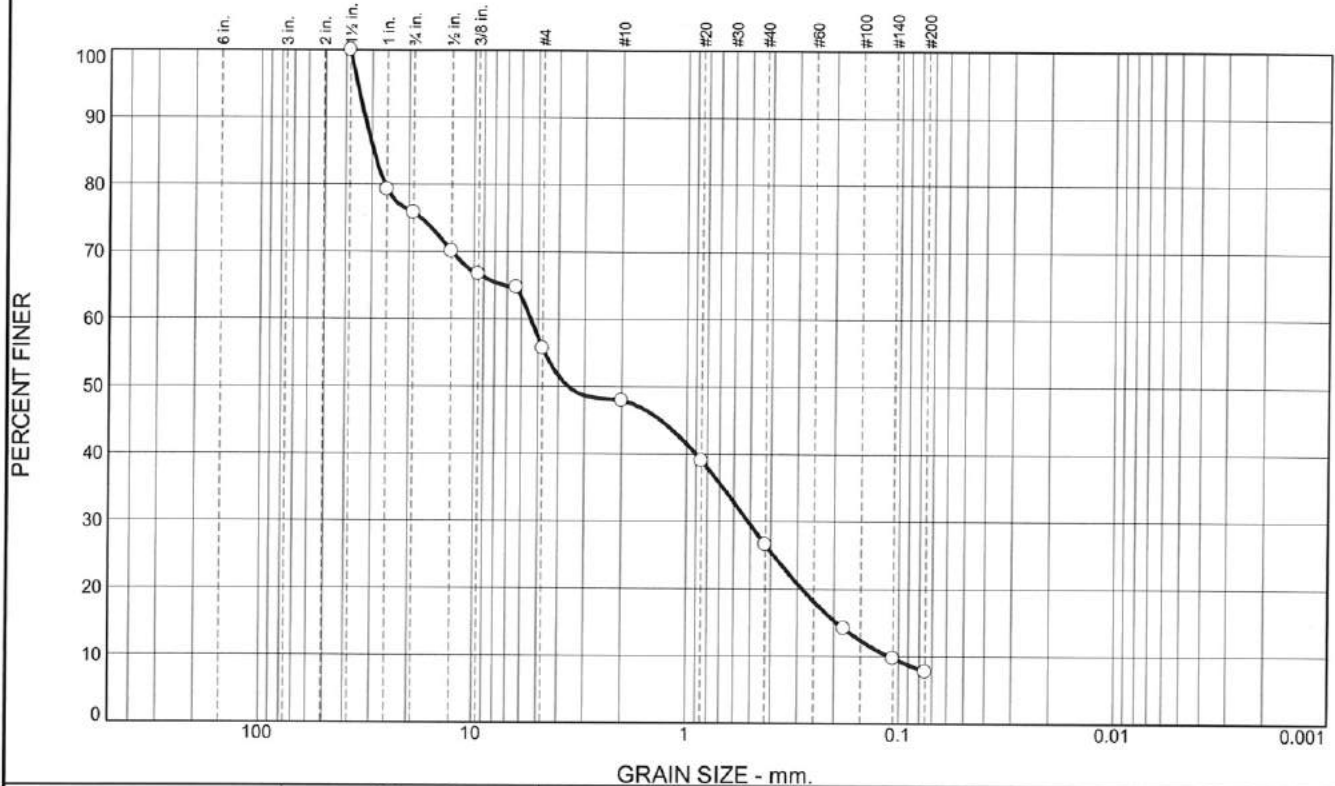
Date: 12-12-2019

| | |
|---|---|
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | <p>Client: Airport Solutions Group, LLC</p> <p>Project: Reconstruct Runway 1-19 Orange, MA</p> <p>Project No: 1229-021</p> |
| <p>Lab No. 15831-05</p> | |

Tested By: JJB

Checked By: MTG *[Signature]*

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 24.2 | 20.2 | 7.7 | 21.4 | 18.8 | 7.7 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1 1/2" | 100.0 | | |
| 1" | 79.3 | | |
| 3/4" | 75.8 | | |
| 1/2" | 70.0 | | |
| 3/8" | 66.7 | | |
| 1/4" | 64.7 | | |
| #4 | 55.6 | | |
| #10 | 47.9 | | |
| #20 | 39.0 | | |
| #40 | 26.5 | | |
| #80 | 14.1 | | |
| #140 | 9.7 | | |
| #200 | 7.7 | | |

Soil Description

poorly graded sand with silt and gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D₉₀= 32.3725 D₈₅= 29.4795 D₆₀= 5.4116
D₅₀= 3.5958 D₃₀= 0.5143 D₁₅= 0.1947
D₁₀= 0.1109 C_u= 48.81 C_c= 0.44

Classification

USCS= SP-SM AASHTO= A-1-a

Remarks

Moisture Content: 4.1%

(no specification provided)

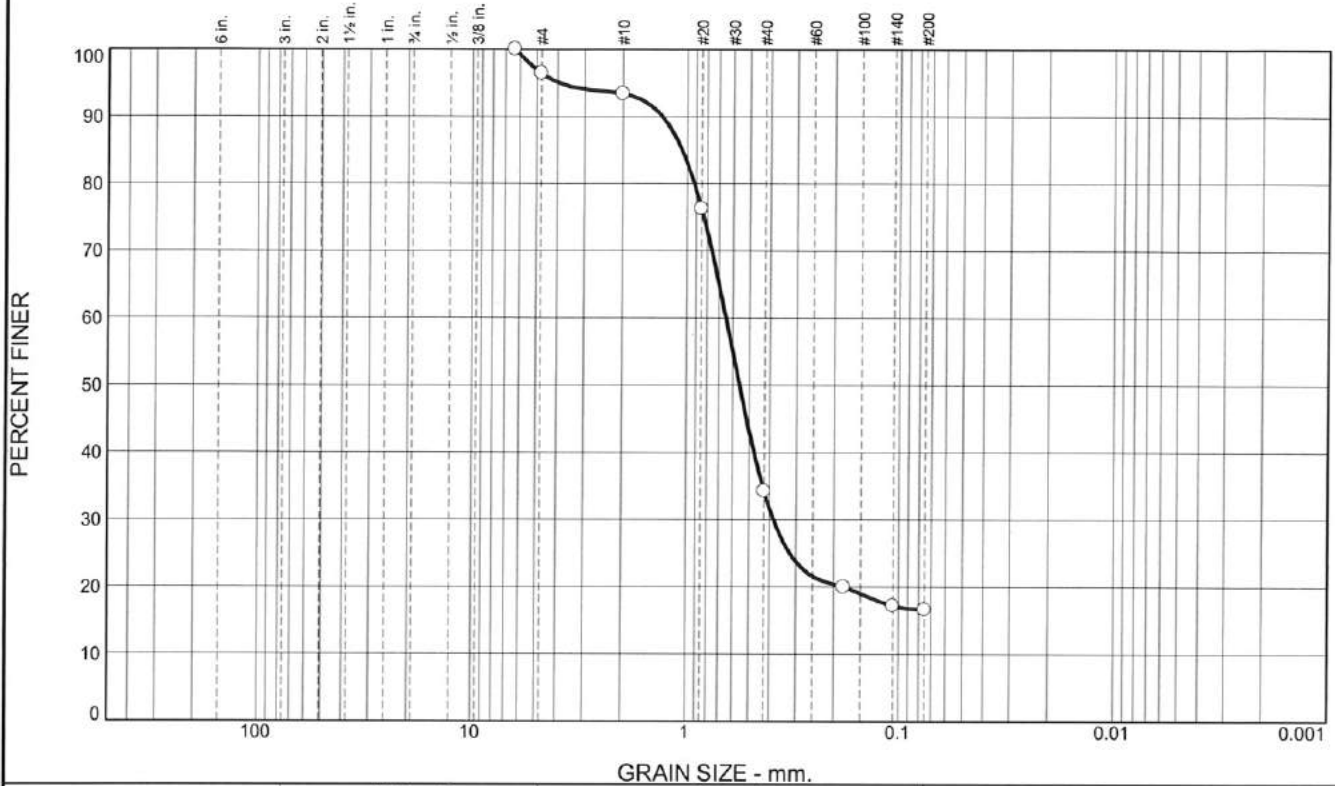
Location: Boring D-10 Sample Number: S-1 Depth: 0.3'-2'

Date: 12-24-2019

| | |
|---|---|
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | Client: Airport Solutions Group, LLC Project: Reconstruct Runway 1-19 Orange, MA Project No: 1229-021 |
| | Lab No. 15850-09 |

Tested By: JJB/CAG Checked By: MRG *MRG*

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 0.0 | 3.6 | 3.0 | 59.2 | 17.6 | 16.6 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1/4" | 100.0 | | |
| #4 | 96.4 | | |
| #10 | 93.4 | | |
| #20 | 76.3 | | |
| #40 | 34.2 | | |
| #80 | 20.0 | | |
| #140 | 17.2 | | |
| #200 | 16.6 | | |

Soil Description
silty sand

Atterberg Limits
 PL= LL= PI=

Coefficients
 D₉₀= 1.3123 D₈₅= 1.0574 D₆₀= 0.6486
 D₅₀= 0.5581 D₃₀= 0.3836 D₁₅=
 D₁₀= C_u= C_c=

Classification
 USCS= SM AASHTO= A-1-b

Remarks
 Moisture Content: 3.5%

* (no specification provided)

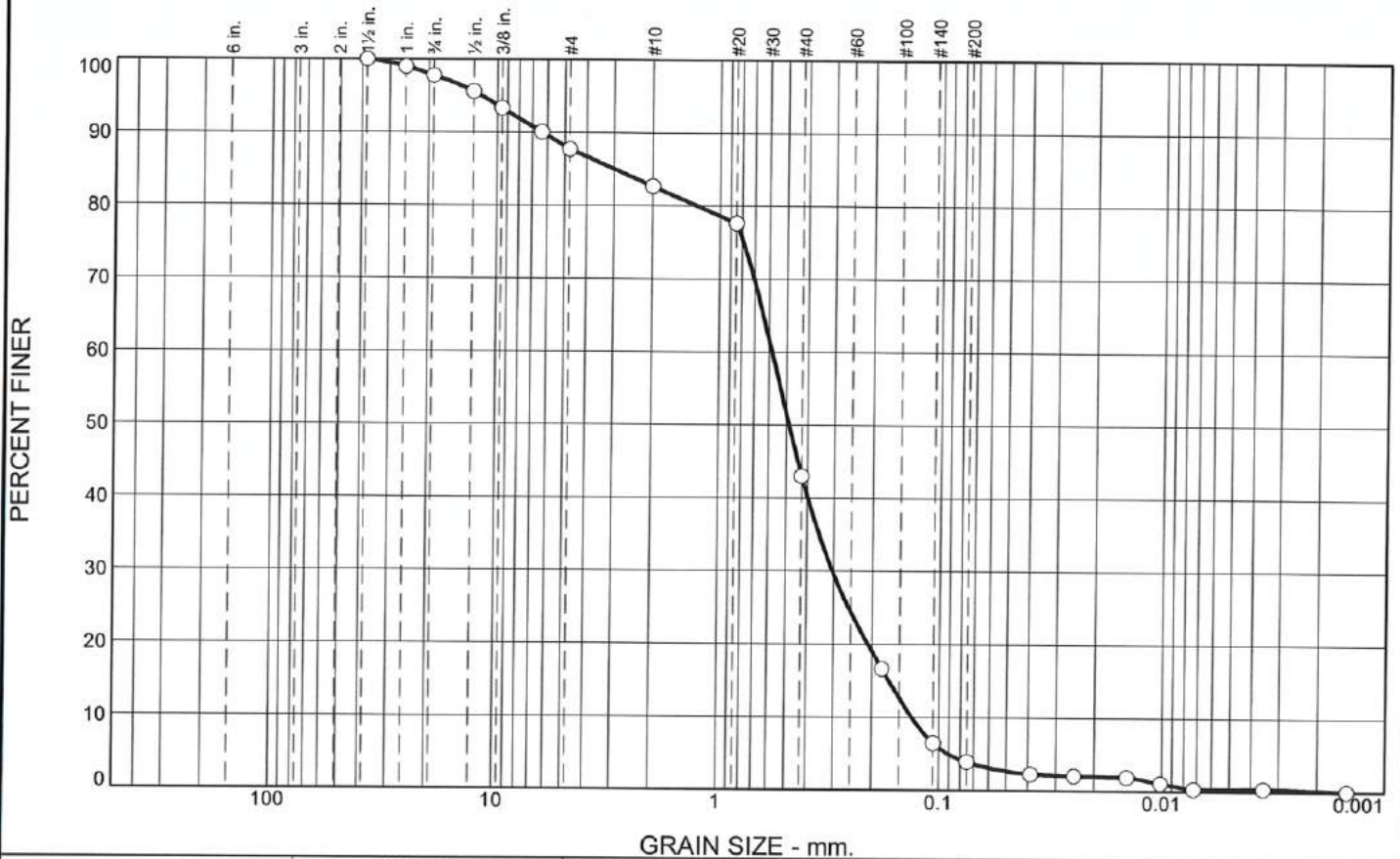
Location: Boring D-11
 Sample Number: S-2 Depth: 5'-7'

Date: 12-24-2019

| | |
|---|---|
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | Client: Airport Solutions Group, LLC Project: Reconstruct Runway 1-19 Orange, MA Project No: 1229-021 |
| Lab No. 15850-10 | |

Tested By: JJB/CAG Checked By: MRG *MRG*

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 2.2 | 10.1 | 5.0 | 39.7 | 39.1 | 3.7 | 0.2 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1 1/2" | 100.0 | | |
| 1" | 99.0 | | |
| 3/4" | 97.8 | | |
| 1/2" | 95.6 | | |
| 3/8" | 93.4 | | |
| 1/4" | 90.1 | | |
| #4 | 87.7 | | |
| #10 | 82.7 | | |
| #20 | 77.7 | | |
| #40 | 43.0 | | |
| #80 | 16.6 | | |
| #140 | 6.5 | | |
| #200 | 3.9 | | |
| 0.0390 mm. | 2.3 | | |
| 0.0247 mm. | 2.1 | | |
| 0.0143 mm. | 1.9 | | |
| 0.0102 mm. | 1.1 | | |
| 0.0072 mm. | 0.3 | | |
| 0.0035 mm. | 0.3 | | |
| 0.0015 mm. | 0.0 | | |

Soil Description

poorly graded sand

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D₉₀= 6.2844 D₈₅= 2.9746 D₆₀= 0.5829
D₅₀= 0.4868 D₃₀= 0.3052 D₁₅= 0.1672
D₁₀= 0.1318 C_u= 4.42 C_c= 1.21

Classification

USCS= SP AASHTO= A-1-b

Remarks

Moisture Content: 1.9%

* (no specification provided)

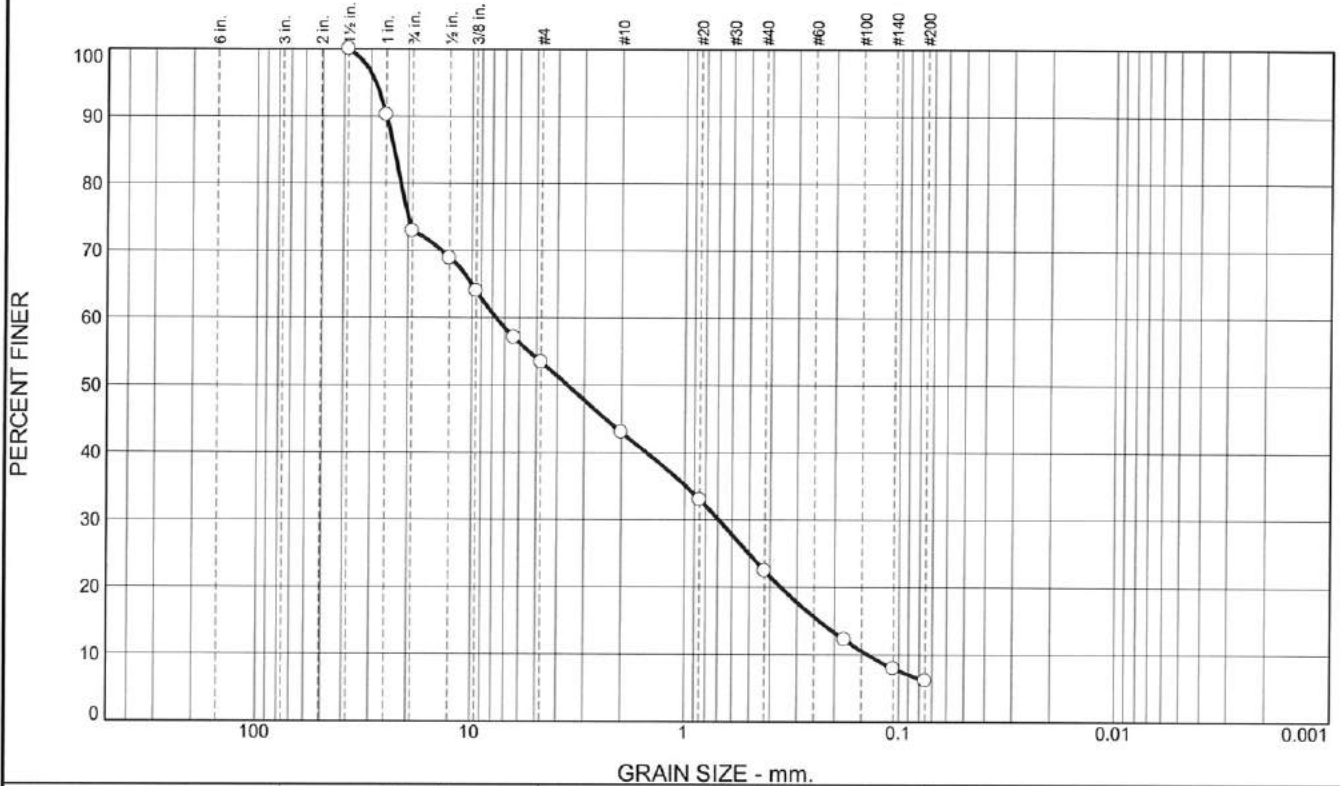
Location: Boring D-12
Sample Number: Bulk **Depth:** 0.5'-4'

Date: 12-10-2019

| | |
|---|---|
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | Client: Airport Solutions Group, LLC Project: Reconstruct Runway 1-19 Orange, MA Project No: 1229-021 |
| Lab No. 15831-06 | |

Tested By: JJB **Checked By:** MTG *MTG*

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 27.1 | 19.5 | 10.4 | 20.6 | 16.3 | 6.1 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1 1/2" | 100.0 | | |
| 1" | 90.2 | | |
| 3/4" | 72.9 | | |
| 1/2" | 68.9 | | |
| 3/8" | 64.0 | | |
| 1/4" | 57.0 | | |
| #4 | 53.4 | | |
| #10 | 43.0 | | |
| #20 | 33.0 | | |
| #40 | 22.4 | | |
| #80 | 12.2 | | |
| #140 | 7.9 | | |
| #200 | 6.1 | | |

Soil Description
poorly graded sand with silt and gravel

Atterberg Limits
 PL= LL= PI=

Coefficients
 D₉₀= 25.3115 D₈₅= 23.3188 D₆₀= 7.7005
 D₅₀= 3.5967 D₃₀= 0.6928 D₁₅= 0.2366
 D₁₀= 0.1409 C_u= 54.67 C_c= 0.44

Classification
 USCS= SP-SM AASHTO= A-1-a

Remarks
 Moisture Content: 6.0%

* (no specification provided)

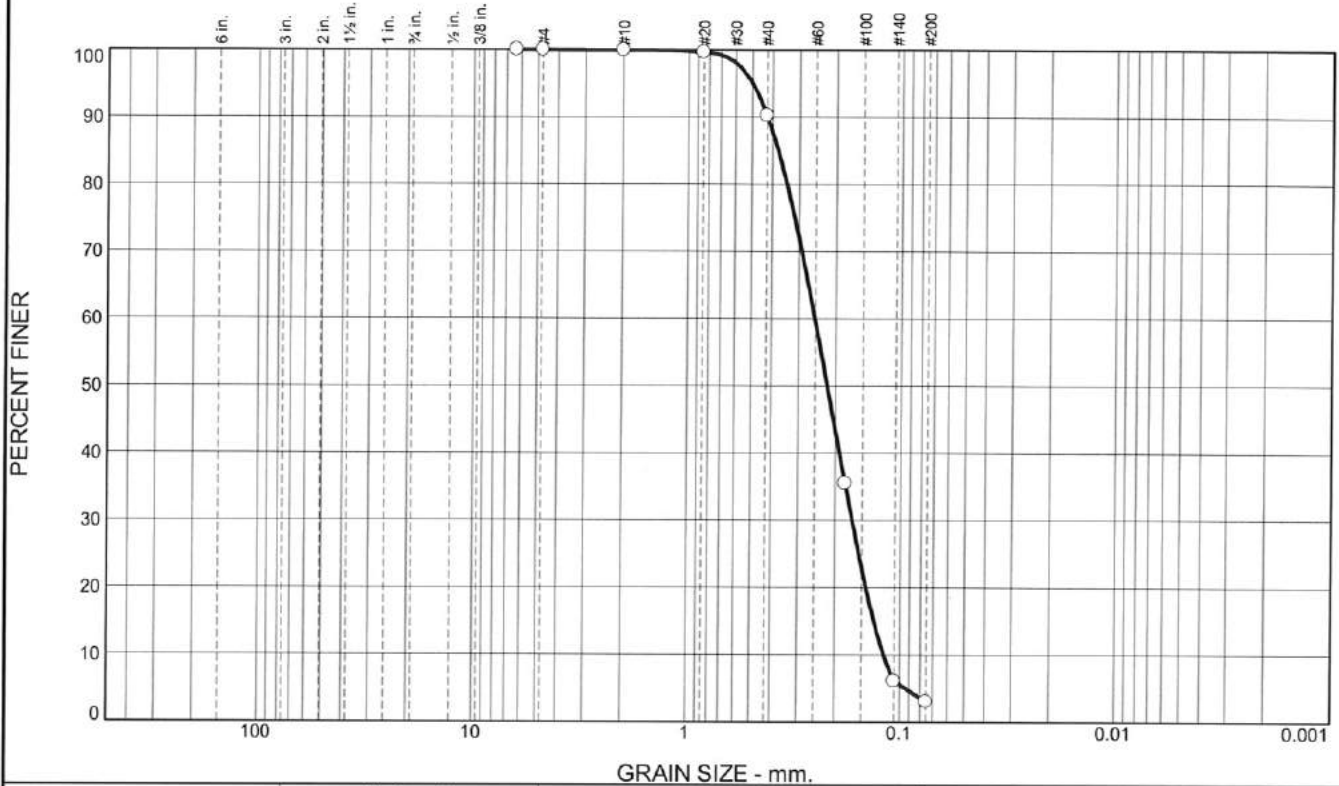
Location: Boring D-12 Sample Number: S-1 Depth: 0.3'-2'

Date: 12-24-2019

| | |
|---|---|
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | Client: Airport Solutions Group, LLC Project: Reconstruct Runway 1-19 Orange, MA Project No: 1229-021 |
| | Lab No. 15850-11 |

Tested By: JJB/CAG Checked By: MRG *MRG*

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 0.0 | 0.0 | 0.1 | 9.6 | 87.3 | 3.0 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1/4" | 100.0 | | |
| #4 | 100.0 | | |
| #10 | 99.9 | | |
| #20 | 99.6 | | |
| #40 | 90.3 | | |
| #80 | 35.5 | | |
| #140 | 6.1 | | |
| #200 | 3.0 | | |

Soil Description
poorly graded sand

Atterberg Limits
 PL= LL= PI=

Coefficients
 D₉₀= 0.4220 D₈₅= 0.3763 D₆₀= 0.2514
 D₅₀= 0.2192 D₃₀= 0.1667 D₁₅= 0.1316
 D₁₀= 0.1187 C_u= 2.12 C_c= 0.93

Classification
 USCS= SP AASHTO= A-3

Remarks
 Moisture Content: 4.2%

* (no specification provided)

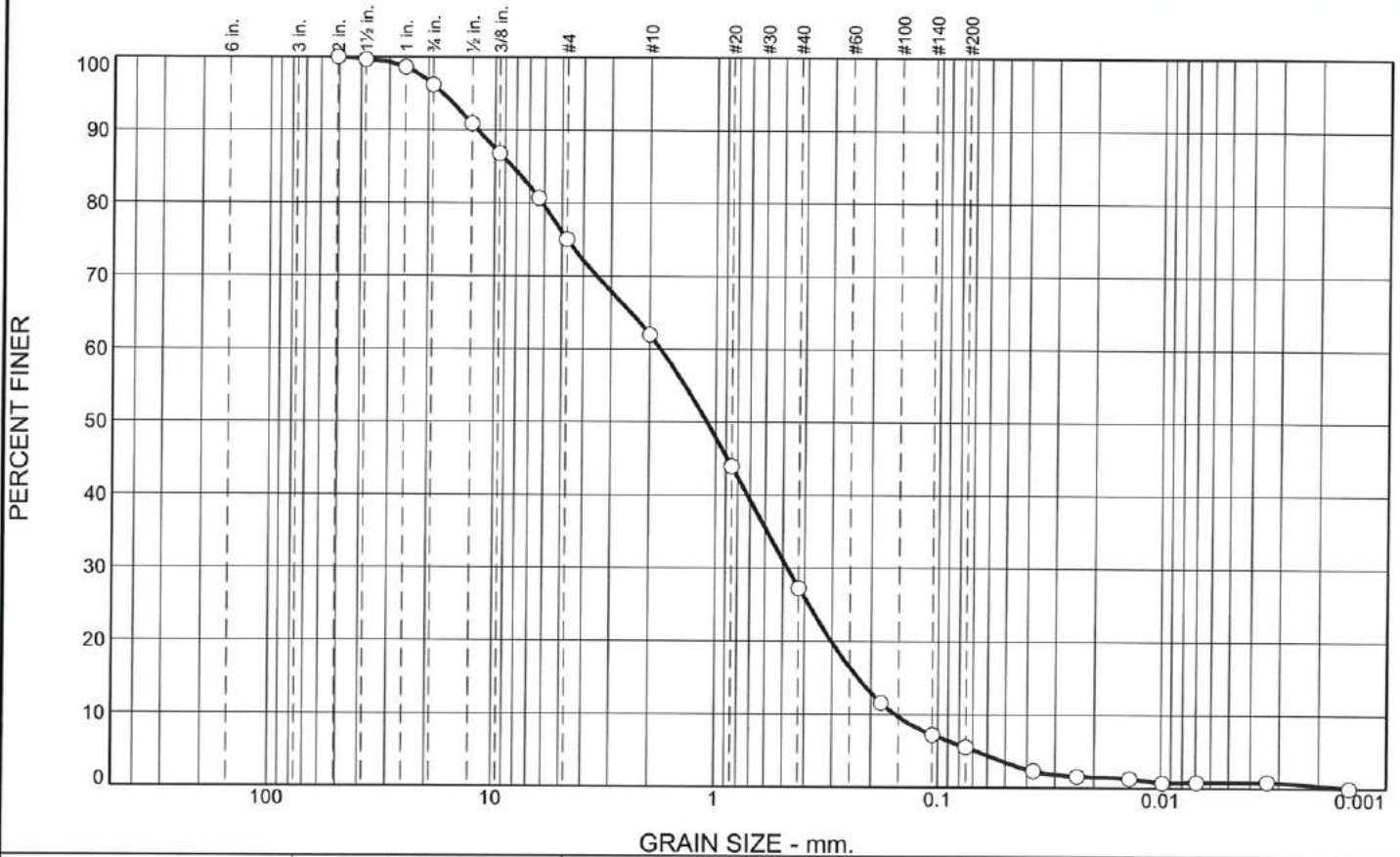
Location: Boring D-12
Sample Number: S-2 **Depth:** 5'-7'

Date: 12-24-2019

| | |
|---|---|
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | Client: Airport Solutions Group, LLC Project: Reconstruct Runway 1-19 Orange, MA Project No: 1229-021 |
| | Lab No. 15850-12 |

Tested By: JJB/CAG **Checked By:** MRG

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 3.8 | 21.2 | 13.0 | 34.7 | 21.8 | 5.1 | 0.4 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 2" | 100.0 | | |
| 1 1/2" | 99.7 | | |
| 1" | 98.6 | | |
| 3/4" | 96.2 | | |
| 1/2" | 90.9 | | |
| 3/8" | 86.8 | | |
| 1/4" | 80.7 | | |
| #4 | 75.0 | | |
| #10 | 62.0 | | |
| #20 | 43.9 | | |
| #40 | 27.3 | | |
| #80 | 11.6 | | |
| #140 | 7.2 | | |
| #200 | 5.5 | | |
| 0.0375 mm. | 2.3 | | |
| 0.0239 mm. | 1.6 | | |
| 0.0139 mm. | 1.3 | | |
| 0.0098 mm. | 0.8 | | |
| 0.0069 mm. | 0.8 | | |
| 0.0034 mm. | 0.8 | | |
| 0.0015 mm. | | | |

Soil Description

poorly graded sand with silt and gravel

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D₉₀= 11.9210 D₈₅= 8.3502 D₆₀= 1.7848
D₅₀= 1.1000 D₃₀= 0.4779 D₁₅= 0.2296
D₁₀= 0.1555 C_u= 11.48 C_c= 0.82

Classification

USCS= SP-SM AASHTO= A-1-b

Remarks

Moisture Content: 2.6%

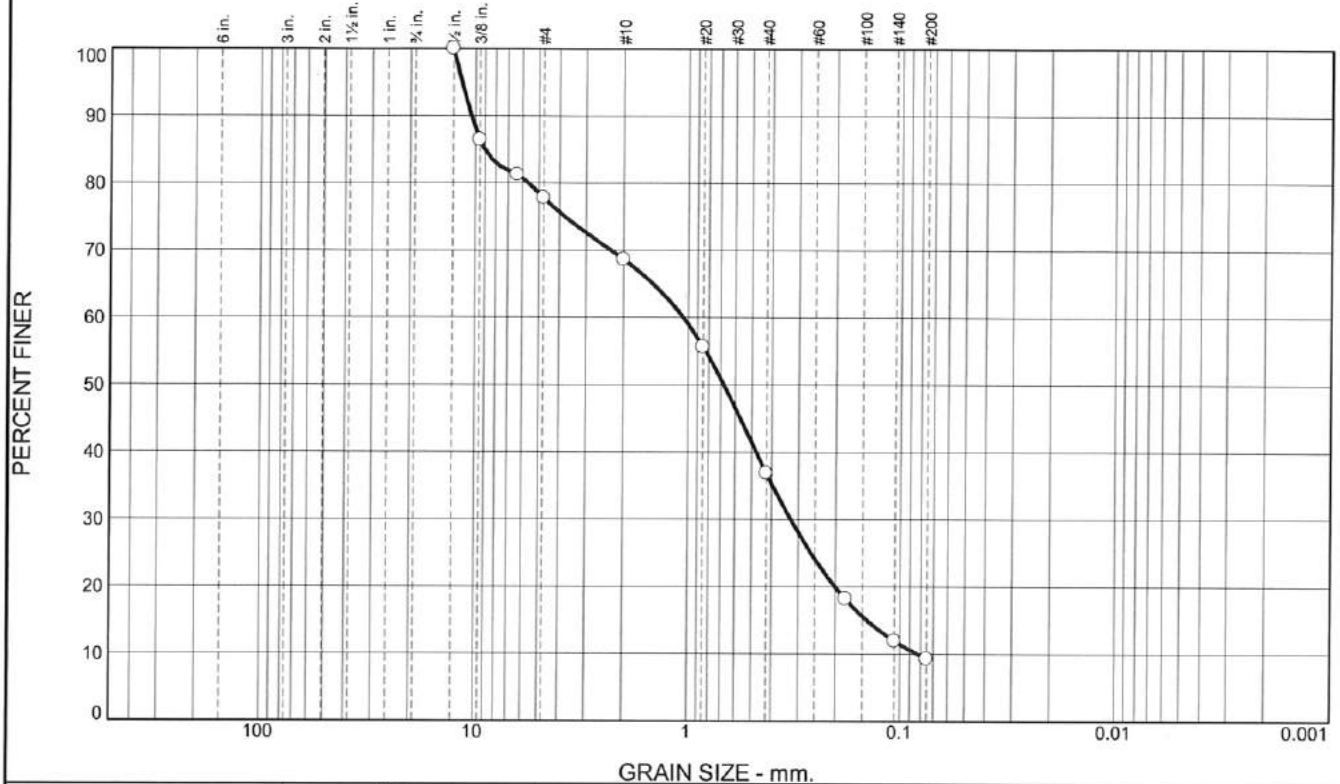
* (no specification provided)

Location: Boring D-14 Sample Number: Bulk Depth: 0.5'-4' Date: 12-10-2019

| | |
|---|---|
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | Client: Airport Solutions Group, LLC Project: Reconstruct Runway 1-19 Orange, MA Project No: 1229-021 Lab No. 15831-07 |
|---|---|

Tested By: JJB Checked By: MTG

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 0.0 | 22.3 | 9.1 | 31.7 | 27.6 | 9.3 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1/2" | 100.0 | | |
| 3/8" | 86.5 | | |
| 1/4" | 81.2 | | |
| #4 | 77.7 | | |
| #10 | 68.6 | | |
| #20 | 55.6 | | |
| #40 | 36.9 | | |
| #80 | 18.2 | | |
| #140 | 11.9 | | |
| #200 | 9.3 | | |

Soil Description
well-graded sand with silt and gravel

Atterberg Limits
 PL= NP LL= NV PI= NP

Coefficients
 D₉₀= 10.4497 D₈₅= 9.0373 D₆₀= 1.0538
 D₅₀= 0.6792 D₃₀= 0.3255 D₁₅= 0.1429
 D₁₀= 0.0830 C_u= 12.70 C_c= 1.21

Classification
 USCS= SW-SM AASHTO= A-1-b

Remarks
 Moisture Content: 9.3%

* (no specification provided)

Location: Boring D-14
 Sample Number: S-1 Depth: 0.3'-2'

Date: 12/24/2019

| | |
|---|---|
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | Client: Airport Solutions Group, LLC Project: Reconstruct Runway 1-19 Orange, MA Project No: 1229-021 |
| | Lab No. 15850-13 |

Tested By: JJB/CAG

Checked By: MRG *MRG*

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 0.0 | 10.3 | 1.7 | 51.9 | 32.4 | 3.7 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 3/4" | 100.0 | | |
| 1/2" | 94.8 | | |
| 3/8" | 92.7 | | |
| 1/4" | 90.3 | | |
| #4 | 89.7 | | |
| #10 | 88.0 | | |
| #20 | 76.1 | | |
| #40 | 36.1 | | |
| #80 | 8.6 | | |
| #140 | 4.9 | | |
| #200 | 3.7 | | |

Soil Description
poorly graded sand

PL= NP **Atterberg Limits** LL= NV PI= NP

Coefficients

D₉₀= 5.7146 D₈₅= 1.1716 D₆₀= 0.6283
D₅₀= 0.5355 D₃₀= 0.3769 D₁₅= 0.2500
D₁₀= 0.1977 C_u= 3.18 C_c= 1.14

Classification
USCS= SP AASHTO= A-1-b

Remarks
Moisture Content: 2.5%

(no specification provided)

Location: Boring D-14
Sample Number: S-2

Depth: 5'-7'

Date: 12/24/2019

R.W. Gillespie & Associates, Inc.
Biddeford, Maine

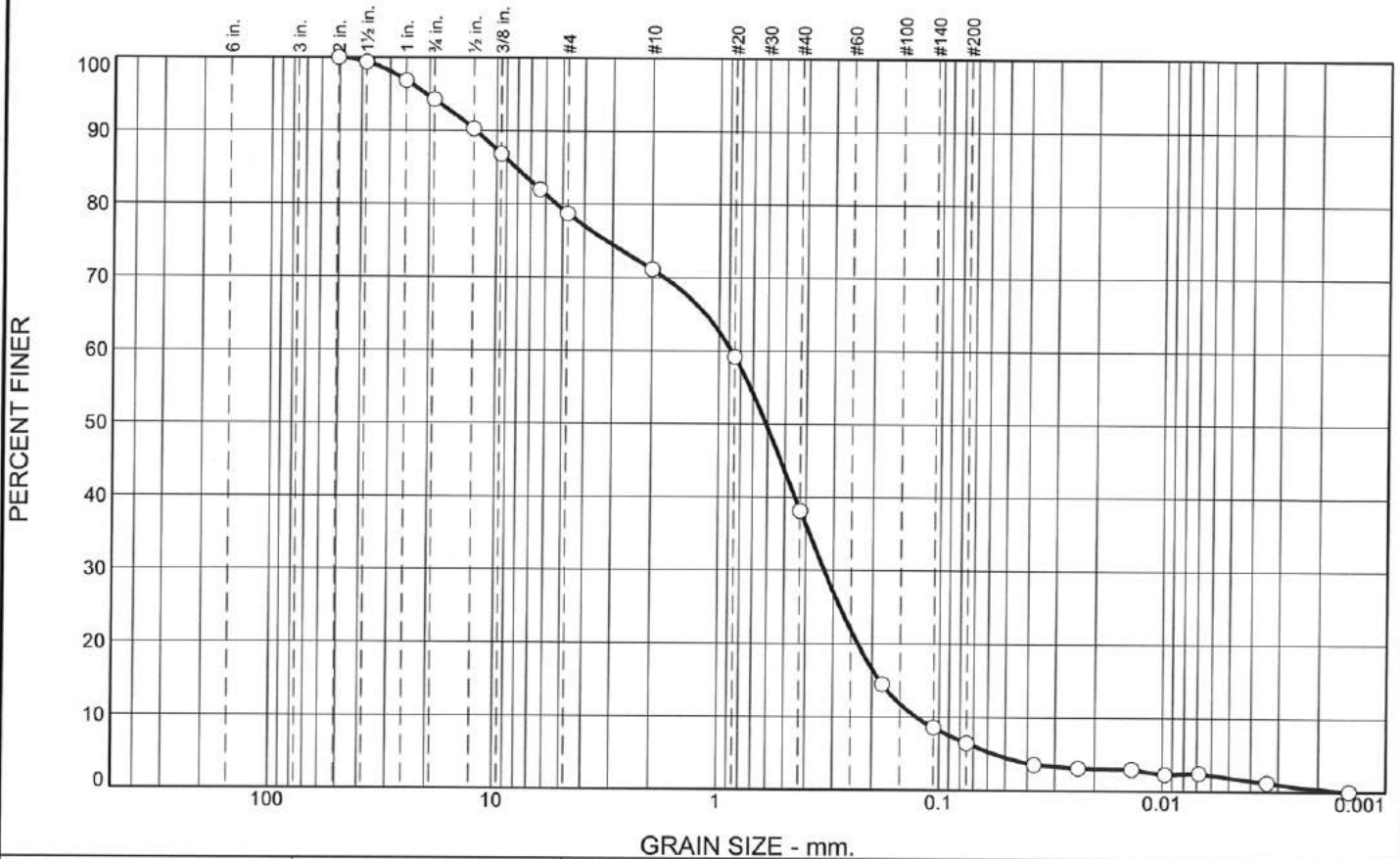
Client: Airport Solutions Group, LLC
Project: Reconstruct Runway 1-19
Orange, MA
Project No: 1229-021

Lab No. 15850-14

Tested By: JJP/CAG

Checked By: MRG

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 5.7 | 15.6 | 7.6 | 33.0 | 31.6 | 6.2 | 0.3 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 2" | 100.0 | | |
| 1 1/2" | 99.4 | | |
| 1" | 96.9 | | |
| 3/4" | 94.3 | | |
| 1/2" | 90.3 | | |
| 3/8" | 86.9 | | |
| 1/4" | 82.0 | | |
| #4 | 78.7 | | |
| #10 | 71.1 | | |
| #20 | 59.2 | | |
| #40 | 38.1 | | |
| #80 | 14.5 | | |
| #140 | 8.6 | | |
| #200 | 6.5 | | |
| 0.0373 mm. | 3.6 | | |
| 0.0237 mm. | 3.1 | | |
| 0.0137 mm. | 3.0 | | |
| 0.0097 mm. | 2.3 | | |
| 0.0068 mm. | 2.4 | | |
| 0.0034 mm. | 1.2 | | |
| 0.0015 mm. | 0.0 | | |

Soil Description

poorly graded sand with silt and gravel

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D₉₀= 12.3784 D₈₅= 8.1726 D₆₀= 0.8812
D₅₀= 0.6106 D₃₀= 0.3308 D₁₅= 0.1853
D₁₀= 0.1266 C_u= 6.96 C_c= 0.98

Classification

USCS= SP-SM AASHTO= A-1-b

Remarks

Moisture Content: 4.0%

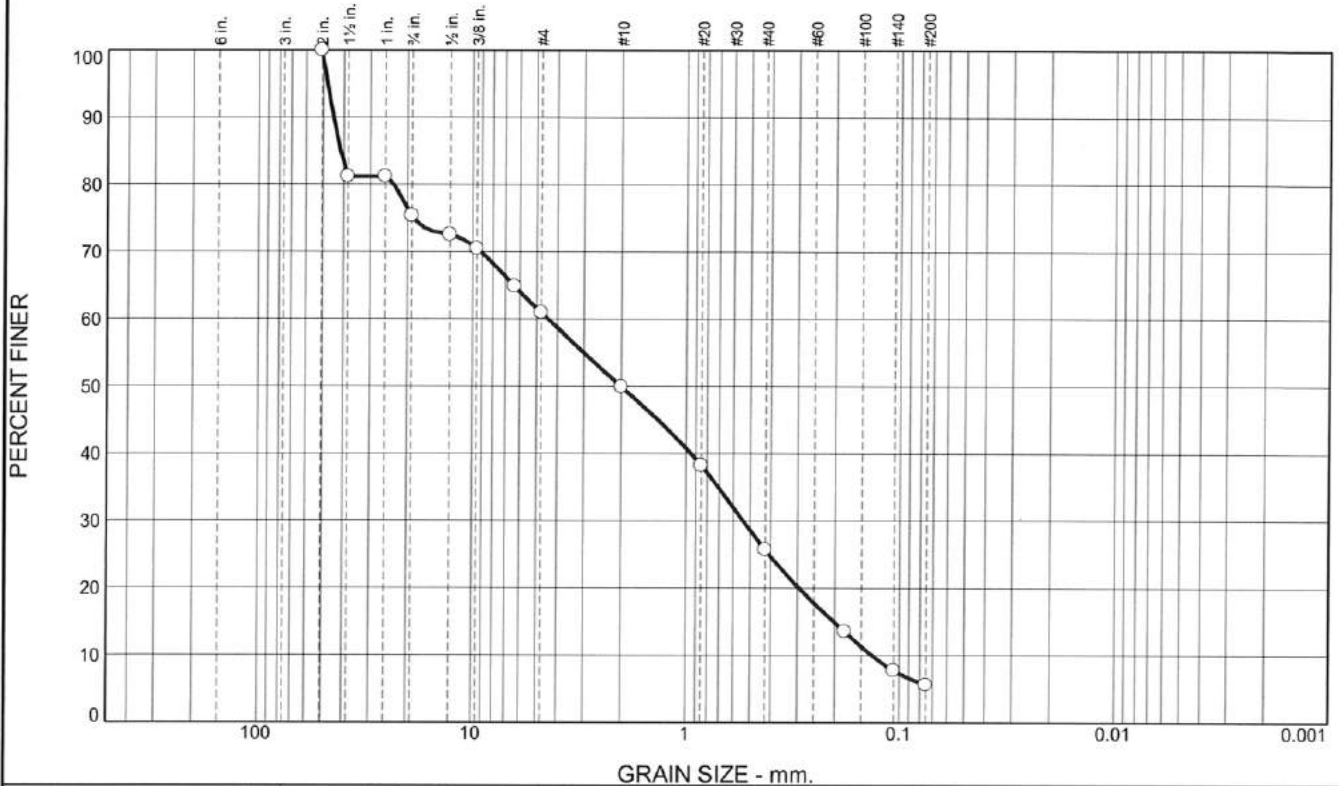
* (no specification provided)

Location: Boring D-16 Sample Number: Bulk Depth: 0.5'-4' Date: 12-10-2019

| | |
|---|---|
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | Client: Airport Solutions Group, LLC Project: Reconstruct Runway 1-19 Orange, MA Project No: 1229-021 Lab No. 15831-08 |
|---|---|

Tested By: JJB Checked By: MTG *MTG*

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 24.7 | 14.4 | 11.0 | 24.2 | 20.1 | 5.6 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 2" | 100.0 | | |
| 1 1/2" | 81.2 | | |
| 1" | 81.2 | | |
| 3/4" | 75.3 | | |
| 1/2" | 72.5 | | |
| 3/8" | 70.5 | | |
| 1/4" | 64.8 | | |
| #4 | 60.9 | | |
| #10 | 49.9 | | |
| #20 | 38.2 | | |
| #40 | 25.7 | | |
| #80 | 13.6 | | |
| #140 | 7.7 | | |
| #200 | 5.6 | | |

Soil Description
poorly graded sand with silt and gravel

Atterberg Limits
 PL= NP LL= NV PI= NP

Coefficients
 D₉₀= 44.7409 D₈₅= 41.4418 D₆₀= 4.4367
 D₅₀= 2.0144 D₃₀= 0.5411 D₁₅= 0.2019
 D₁₀= 0.1338 C_u= 33.15 C_c= 0.49

Classification
 USCS= SP-SM AASHTO= A-1-a

Remarks
 Moisture Content: 6.1%

* (no specification provided)

Location: Boring D-16
 Sample Number: S-1 Depth: 0.3'-2'

Date: 12/23/2019

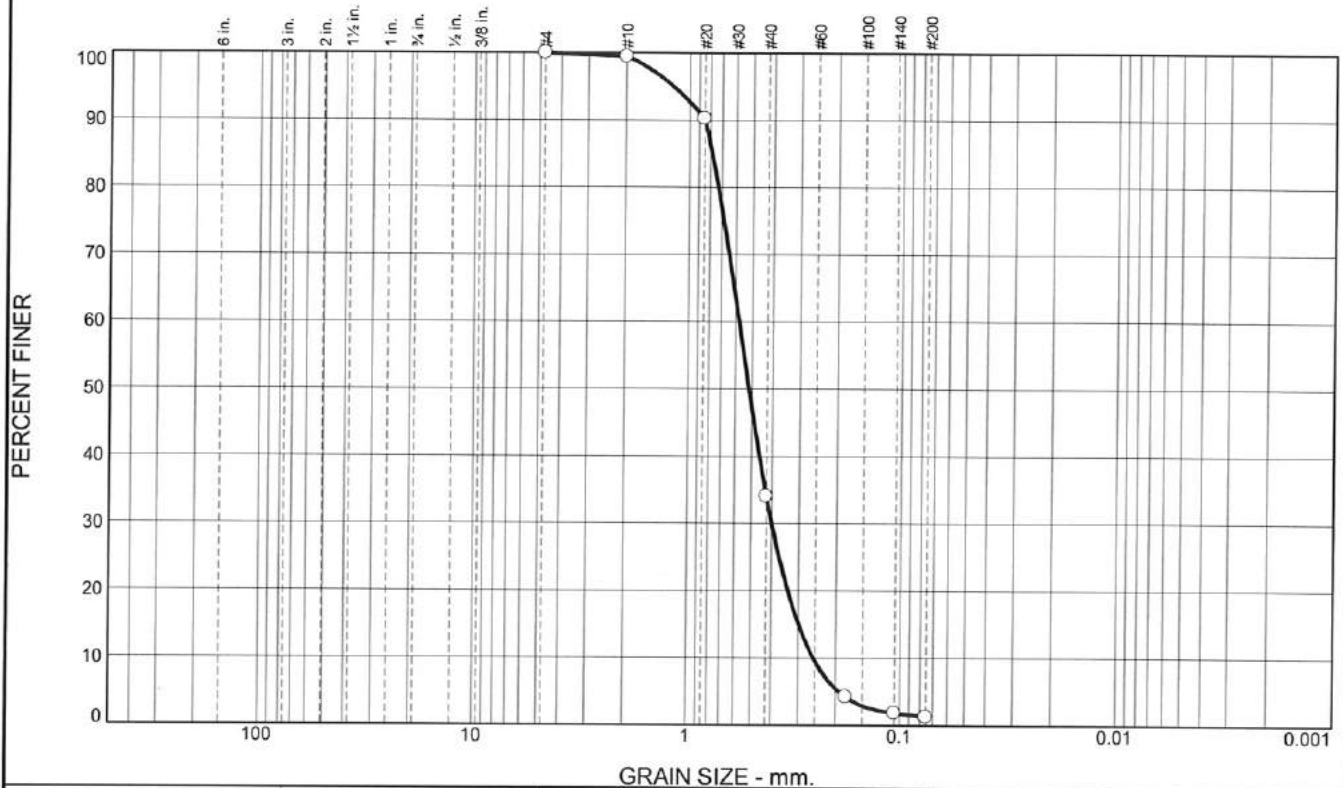
**R.W. Gillespie
 & Associates, Inc.
 Biddeford, Maine**

Client: Airport Solutions Group, LLC
 Project: Reconstruct Runway 1-19
 Orange, MA
 Project No: 1229-021

Lab No. 15850-15

Tested By: JJB Checked By: MRG *MRG*

Particle Size Distribution Report



GRAIN SIZE - mm.

| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 0.0 | 0.0 | 0.6 | 65.4 | 32.7 | 1.3 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| #4 | 100.0 | | |
| #10 | 99.4 | | |
| #20 | 90.3 | | |
| #40 | 34.0 | | |
| #80 | 4.2 | | |
| #140 | 1.8 | | |
| #200 | 1.3 | | |

Soil Description

poorly graded sand

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D₉₀= 0.8461 D₈₅= 0.7813 D₆₀= 0.5771
D₅₀= 0.5163 D₃₀= 0.4011 D₁₅= 0.2992
D₁₀= 0.2553 C_u= 2.26 C_c= 1.09

Classification

USCS= SP AASHTO= A-1-b

Remarks

Moisture content: 4.6%

* (no specification provided)

Location: Boring D-16 Sample Number: S-2 Depth: 5'-7'

Date: 12/24/2019

R.W. Gillespie
& Associates, Inc.
Biddeford, Maine

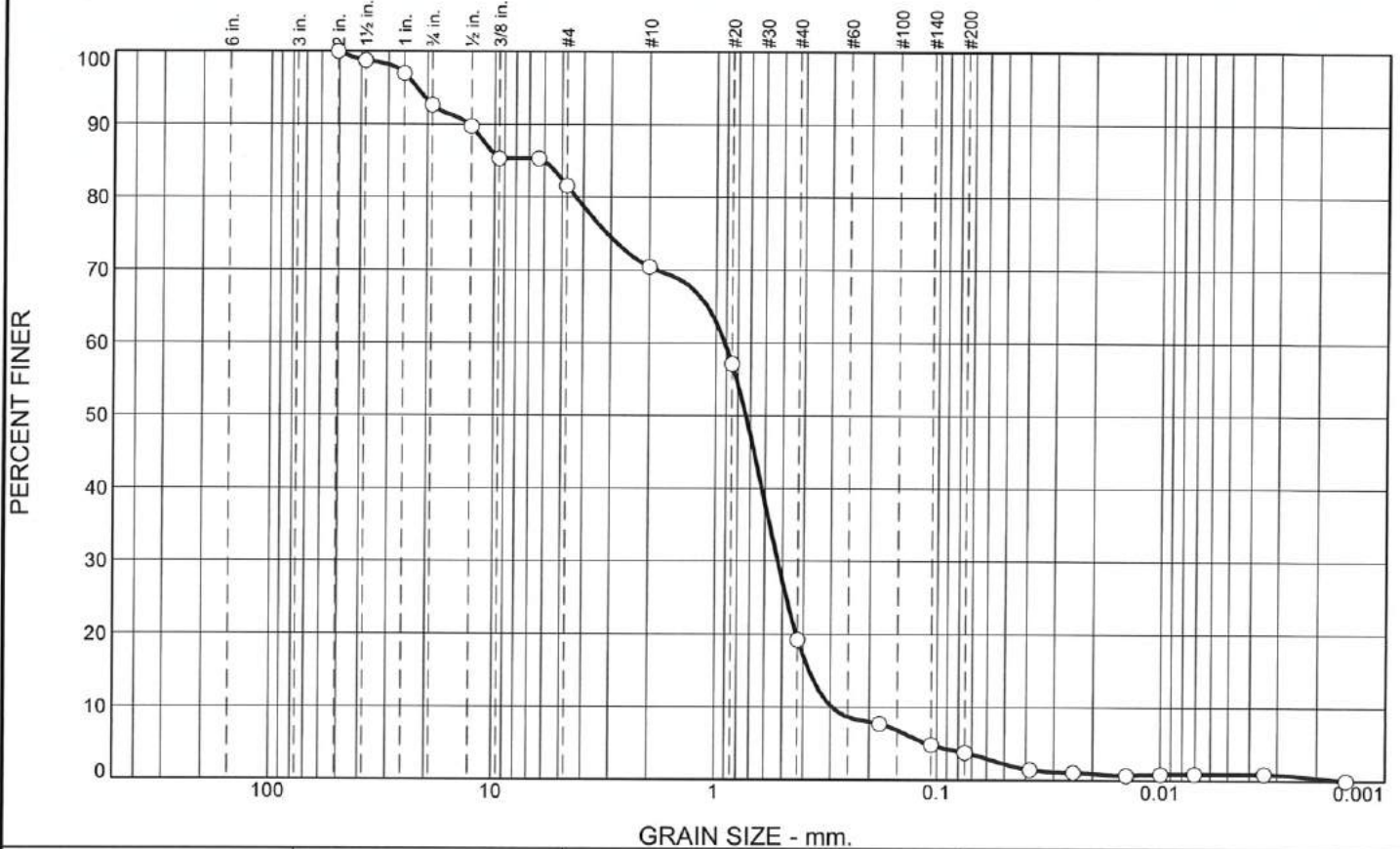
Client: Airport Solutions Group, LLC
Project: Reconstruct Runway 1-19
Orange, MA
Project No: 1229-021

Lab No. 15850-16

Tested By: JJP/CAG

Checked By: MRG

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 7.3 | 11.1 | 11.2 | 51.2 | 15.4 | 3.4 | 0.4 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 2" | 100.0 | | |
| 1 1/2" | 98.8 | | |
| 1" | 97.0 | | |
| 3/4" | 92.7 | | |
| 1/2" | 89.7 | | |
| 3/8" | 85.3 | | |
| 1/4" | 85.3 | | |
| #4 | 81.6 | | |
| #10 | 70.4 | | |
| #20 | 57.1 | | |
| #40 | 19.2 | | |
| #80 | 7.7 | | |
| #140 | 4.9 | | |
| #200 | 3.8 | | |
| 0.0385 mm. | 1.5 | | |
| 0.0245 mm. | 1.1 | | |
| 0.0142 mm. | 0.7 | | |
| 0.0100 mm. | 0.9 | | |
| 0.0070 mm. | 0.9 | | |
| 0.0034 mm. | 0.9 | | |
| 0.0015 mm. | 0.9 | | |

Soil Description

poorly graded sand with gravel

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D₉₀= 12.9703 D₈₅= 6.0501 D₆₀= 0.9159
 D₅₀= 0.7362 D₃₀= 0.5252 D₁₅= 0.3776
 D₁₀= 0.2948 C_u= 3.11 C_c= 1.02

Classification

USCS= SP AASHTO= A-1-b

Remarks

Moisture Content: 3.0%

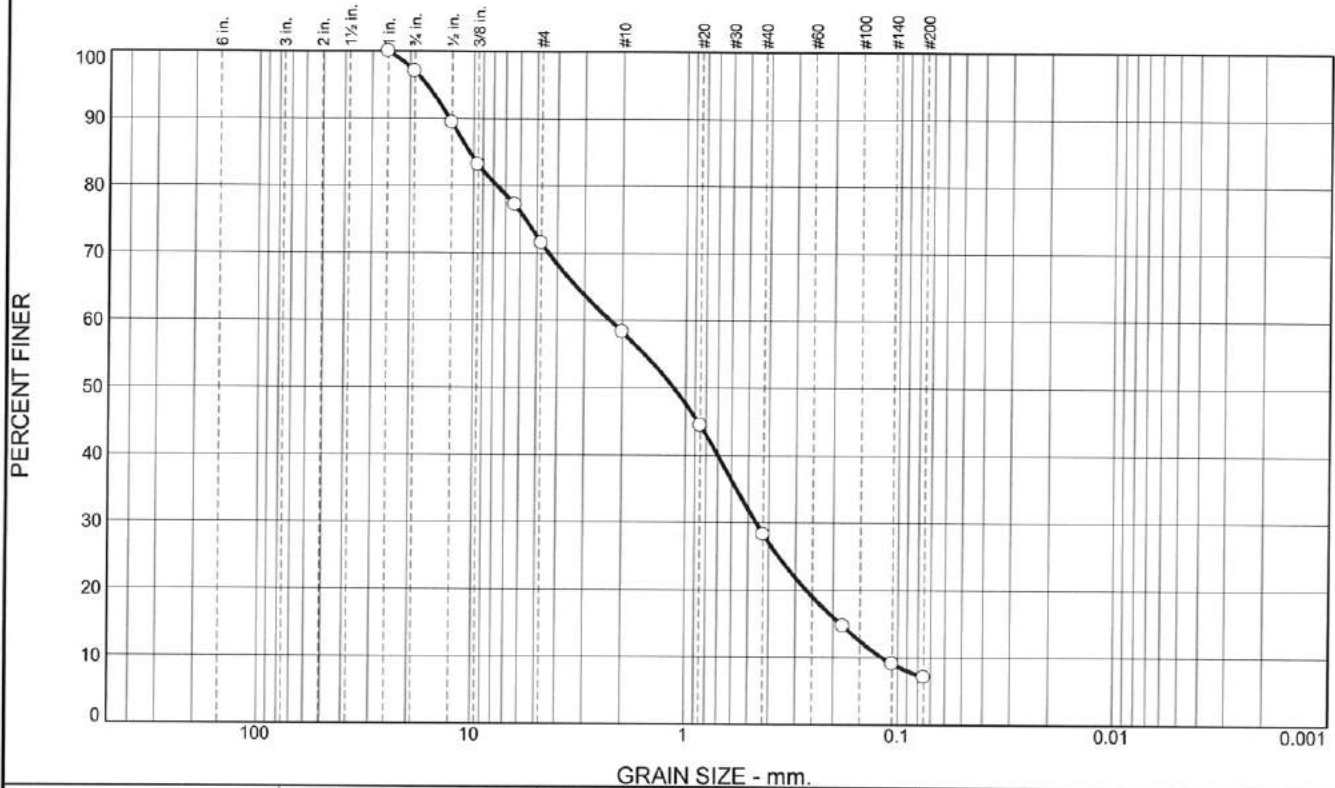
* (no specification provided)

Location: Boring D-18 Sample Number: Bulk Depth: 0.5'-4' Date: 12-10-2019

| | |
|---|---|
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | Client: Airport Solutions Group, LLC Project: Reconstruct Runway 1-19 Orange, MA Project No: 1229-021 Lab No. 15831-09 |
|---|---|

Tested By: JJB Checked By: MTG

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 3.0 | 25.5 | 13.2 | 30.0 | 21.2 | 7.1 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1" | 100.0 | | |
| 3/4" | 97.0 | | |
| 1/2" | 89.4 | | |
| 3/8" | 83.2 | | |
| 1/4" | 77.2 | | |
| #4 | 71.5 | | |
| #10 | 58.3 | | |
| #20 | 44.4 | | |
| #40 | 28.3 | | |
| #80 | 14.7 | | |
| #140 | 9.0 | | |
| #200 | 7.1 | | |

Soil Description

Poorly graded sand with silt and gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D₉₀= 13.0585 D₈₅= 10.4455 D₆₀= 2.2775
D₅₀= 1.1403 D₃₀= 0.4601 D₁₅= 0.1850
D₁₀= 0.1187 C_u= 19.18 C_c= 0.78

Classification

USCS= SP-SM AASHTO= A-1-b

Remarks

Moisture Content: 6.0%

* (no specification provided)

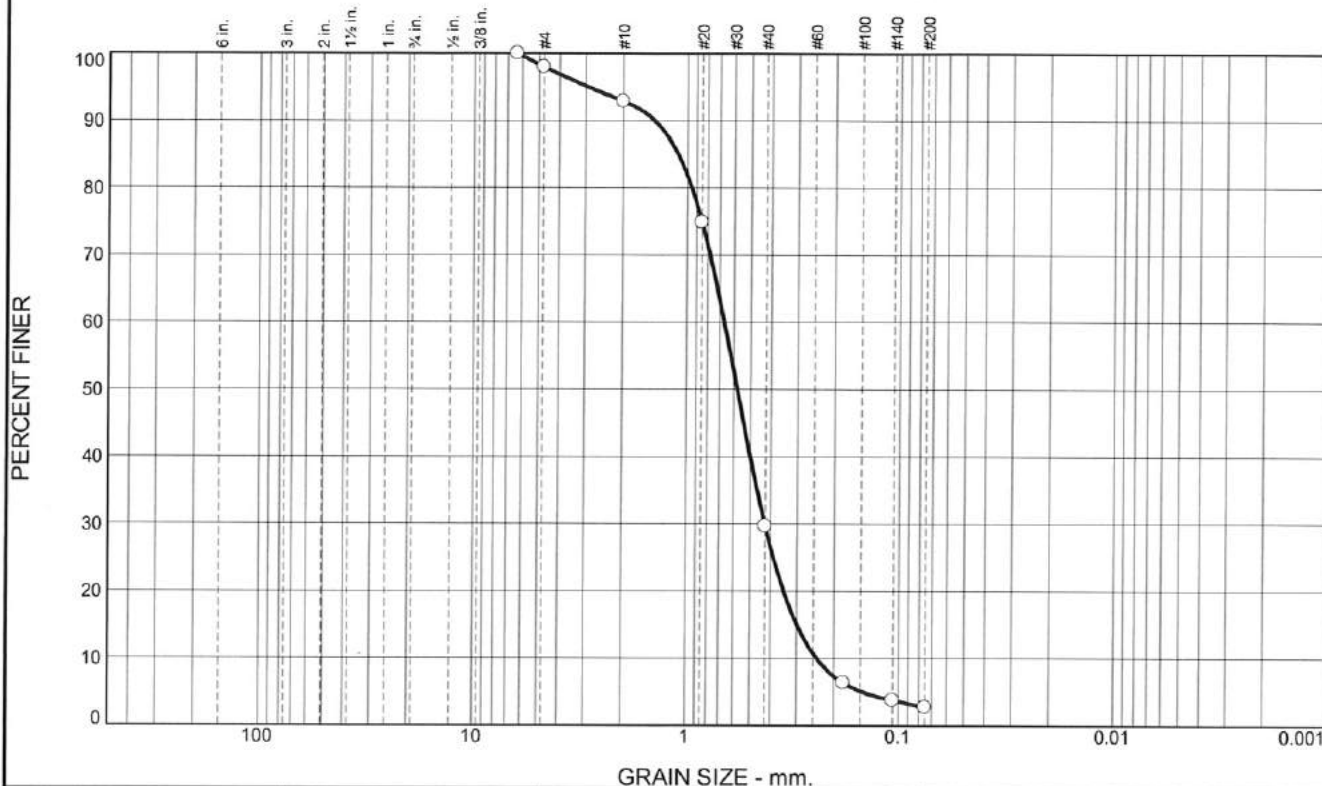
Location: Boring D-18 **Sample Number:** S-1 **Depth:** 0.3'-2'

Date: 12/10/2019

| | |
|---|---|
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | Client: Airport Solutions Group, LLC Project: Reconstruct Runway 1-19 Orange, MA Project No: 1229-021 Lab No. 15850-17 |
|---|---|

Tested By: JJB/CAG **Checked By:** MRG *MRG*

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 0.0 | 2.0 | 5.2 | 63.2 | 26.9 | 2.7 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1/4" | 100.0 | | |
| #4 | 98.0 | | |
| #10 | 92.8 | | |
| #20 | 74.9 | | |
| #40 | 29.6 | | |
| #80 | 6.3 | | |
| #140 | 3.8 | | |
| #200 | 2.7 | | |

Soil Description
Poorly graded sand

Atterberg Limits
 PL= LL= PI=

Coefficients
 D₉₀= 1.4168 D₈₅= 1.1027 D₆₀= 0.6673
 D₅₀= 0.5788 D₃₀= 0.4277 D₁₅= 0.2997
 D₁₀= 0.2415 C_u= 2.76 C_c= 1.14

Classification
 USCS= SP AASHTO= A-1-b

Remarks
 Moisture Content: 3.9%

* (no specification provided)

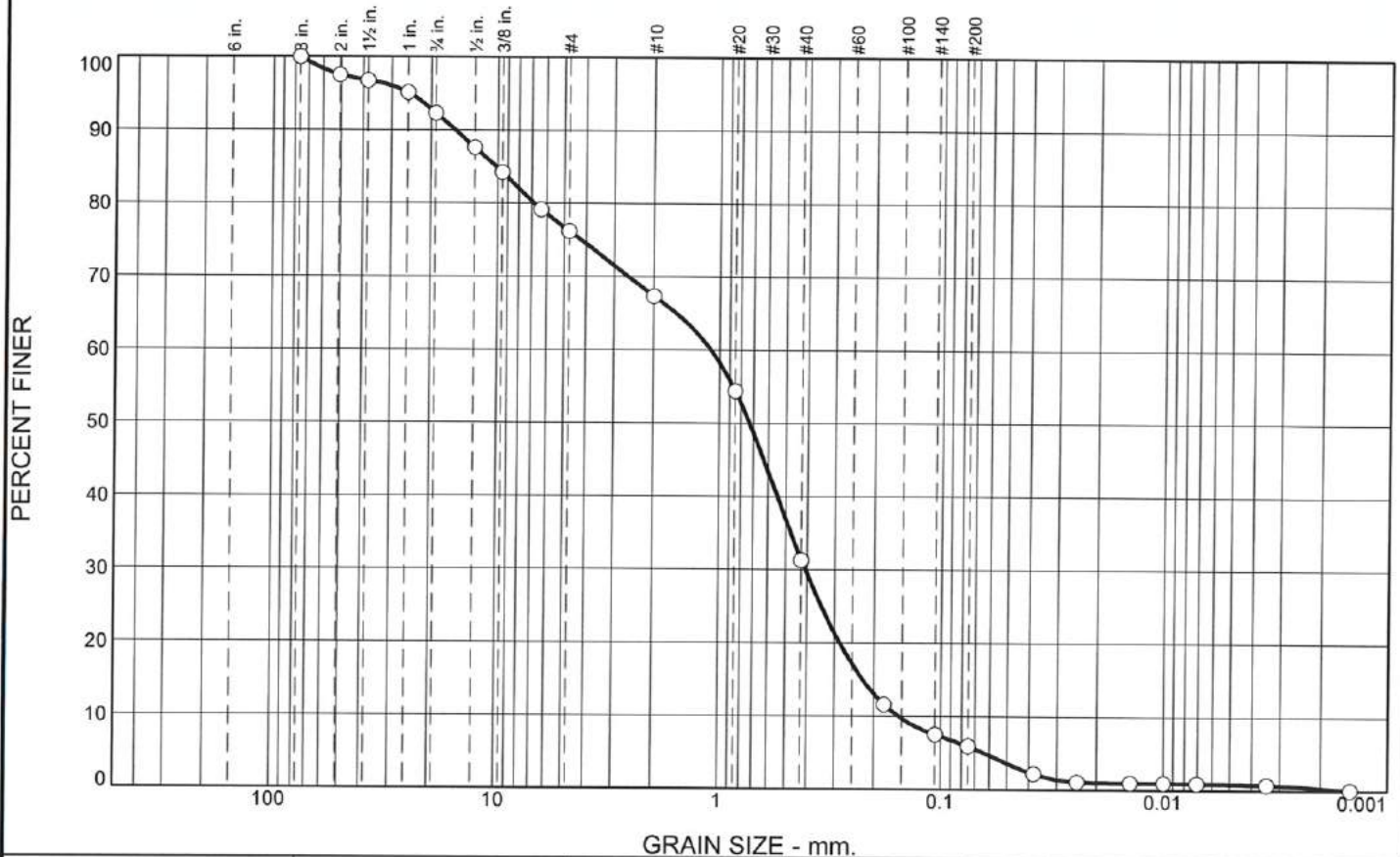
Location: Boring D-18 Depth: 5'-7'
 Sample Number: S-2

Date: 12/24/2019

| | |
|---|---|
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | Client: Airport Solutions Group, LLC Project: Reconstruct Runway 1-19 Orange, MA Project No: 1229-021 |
| | Lab No. 15850-18 |

Tested By: JJB/CAG Checked By: MRG *MRG*

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 7.7 | 16.1 | 8.9 | 36.0 | 25.4 | 5.6 | 0.3 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 3" | 100.0 | | |
| 2" | 97.5 | | |
| 1 1/2" | 96.8 | | |
| 1" | 95.1 | | |
| 3/4" | 92.3 | | |
| 1/2" | 87.6 | | |
| 3/8" | 84.2 | | |
| 1/4" | 79.2 | | |
| #4 | 76.2 | | |
| #10 | 67.3 | | |
| #20 | 54.4 | | |
| #40 | 31.3 | | |
| #80 | 11.6 | | |
| #140 | 7.5 | | |
| #200 | 5.9 | | |
| 0.0382 mm. | 2.2 | | |
| 0.0244 mm. | 1.1 | | |
| 0.0141 mm. | 0.9 | | |
| 0.0100 mm. | 0.9 | | |
| 0.0070 mm. | 0.9 | | |
| 0.0034 mm. | 0.7 | | |
| 0.0015 mm. | 0.1 | | |

Soil Description

Poorly graded sand with silt and gravel

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D₉₀= 15.5796 D₈₅= 10.1436 D₆₀= 1.0990
D₅₀= 0.7308 D₃₀= 0.4081 D₁₅= 0.2244
D₁₀= 0.1549 C_u= 7.09 C_c= 0.98

Classification

USCS= SP-SM AASHTO= A-1-b

Remarks

As Received Moisture Content: 2.6%

* (no specification provided)

Location: Boring D-20
Sample Number: Bulk

Depth: 0.5'-4'

Date: 1/2/2020

**R.W. Gillespie
& Associates, Inc.
Biddeford, Maine**

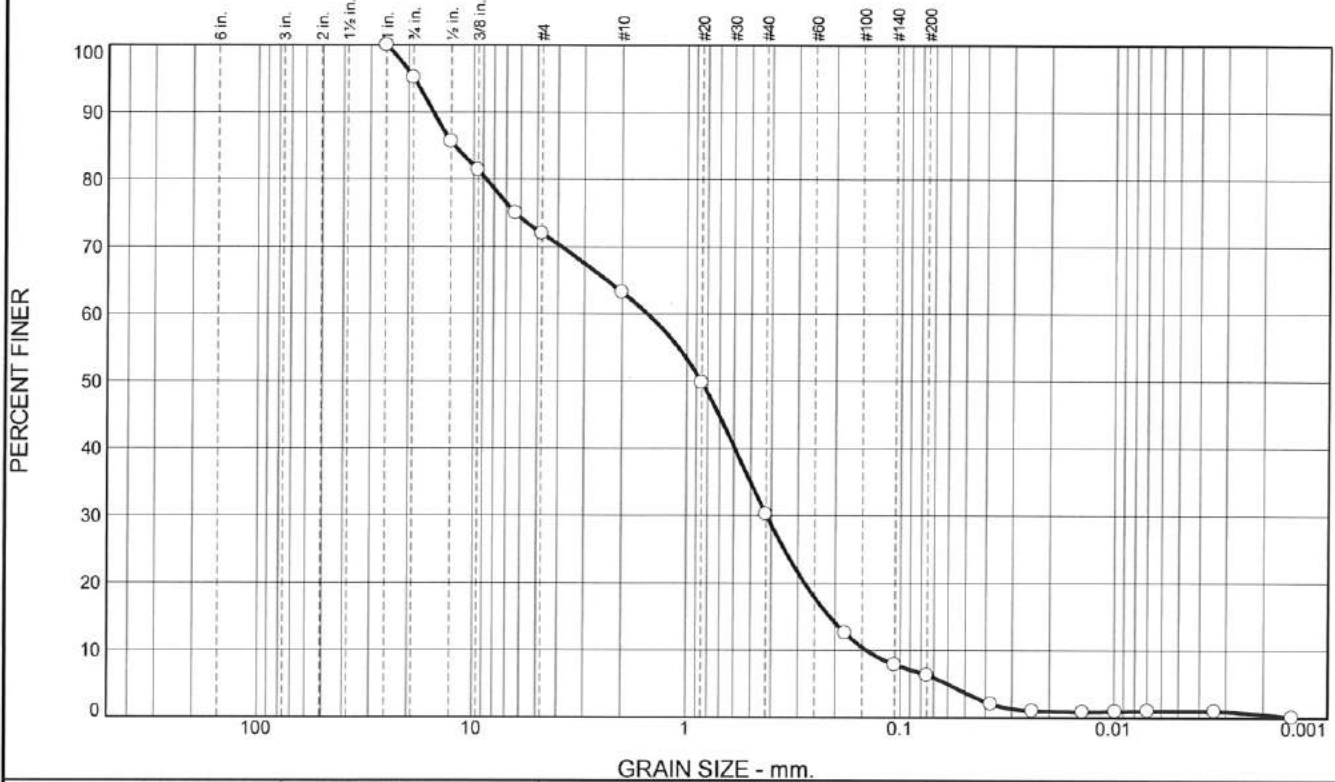
Client: Airport Solutions Group, LLC
Project: Reconstruct Runway 1-19
Orange, MA
Project No: 1229-021

Lab No. 15831-10

Tested By: AGS

Checked By: MTG

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 4.9 | 23.2 | 8.7 | 33.0 | 23.9 | 5.8 | 0.5 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1" | 100.0 | | |
| 3/4" | 95.1 | | |
| 1/2" | 85.6 | | |
| 3/8" | 81.4 | | |
| 1/4" | 75.0 | | |
| #4 | 71.9 | | |
| #10 | 63.2 | | |
| #20 | 49.8 | | |
| #40 | 30.2 | | |
| #80 | 12.6 | | |
| #140 | 7.8 | | |
| #200 | 6.3 | | |
| 0.0377 mm. | 2.0 | | |
| 0.0241 mm. | 1.0 | | |
| 0.0139 mm. | 0.8 | | |
| 0.0098 mm. | 0.9 | | |
| 0.0069 mm. | 1.0 | | |
| 0.0034 mm. | 1.0 | | |
| 0.0015 mm. | 0.1 | | |

Soil Description
poorly graded sand with silt and gravel

Atterberg Limits
 PL= LL= PI=

Coefficients
 D₉₀= 15.3899 D₈₅= 12.2667 D₆₀= 1.5222
 D₅₀= 0.8578 D₃₀= 0.4217 D₁₅= 0.2125
 D₁₀= 0.1432 C_u= 10.63 C_c= 0.82

Classification
 USCS= SP-SM AASHTO= A-1-b

Remarks
 Moisture Content: 5.4%

* (no specification provided)

Location: Boring D-20 Sample Number: S-1 Depth: 0.3'-2' Date: 12-24-2019

| | |
|---|---|
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | Client: Airport Solutions Group, LLC Project: Reconstruct Runway 1-19 Orange, MA Project No: 1229-021 Lab No. 15850-19 |
|---|---|

Tested By: CAG/JJB Checked By: MRG *MRG*

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 0.0 | 0.0 | 0.1 | 33.6 | 60.8 | 5.5 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| #4 | 100.0 | | |
| #10 | 99.9 | | |
| #20 | 95.4 | | |
| #40 | 66.3 | | |
| #80 | 19.0 | | |
| #140 | 8.6 | | |
| #200 | 5.5 | | |

Soil Description
poorly graded sand with silt

Atterberg Limits
 PL= LL= PI=

Coefficients
 D₉₀= 0.7041 D₈₅= 0.6173 D₆₀= 0.3818
 D₅₀= 0.3243 D₃₀= 0.2303 D₁₅= 0.1578
 D₁₀= 0.1197 C_u= 3.19 C_c= 1.16

Classification
 USCS= SP-SM AASHTO= A-3

Remarks
 Moisture Content: 4.6%

(no specification provided)

Location: Boring D-20
 Sample Number: S-2

Depth: 5'-7'

Date: 12-24-2019

**R.W. Gillespie
 & Associates, Inc.
 Biddeford, Maine**

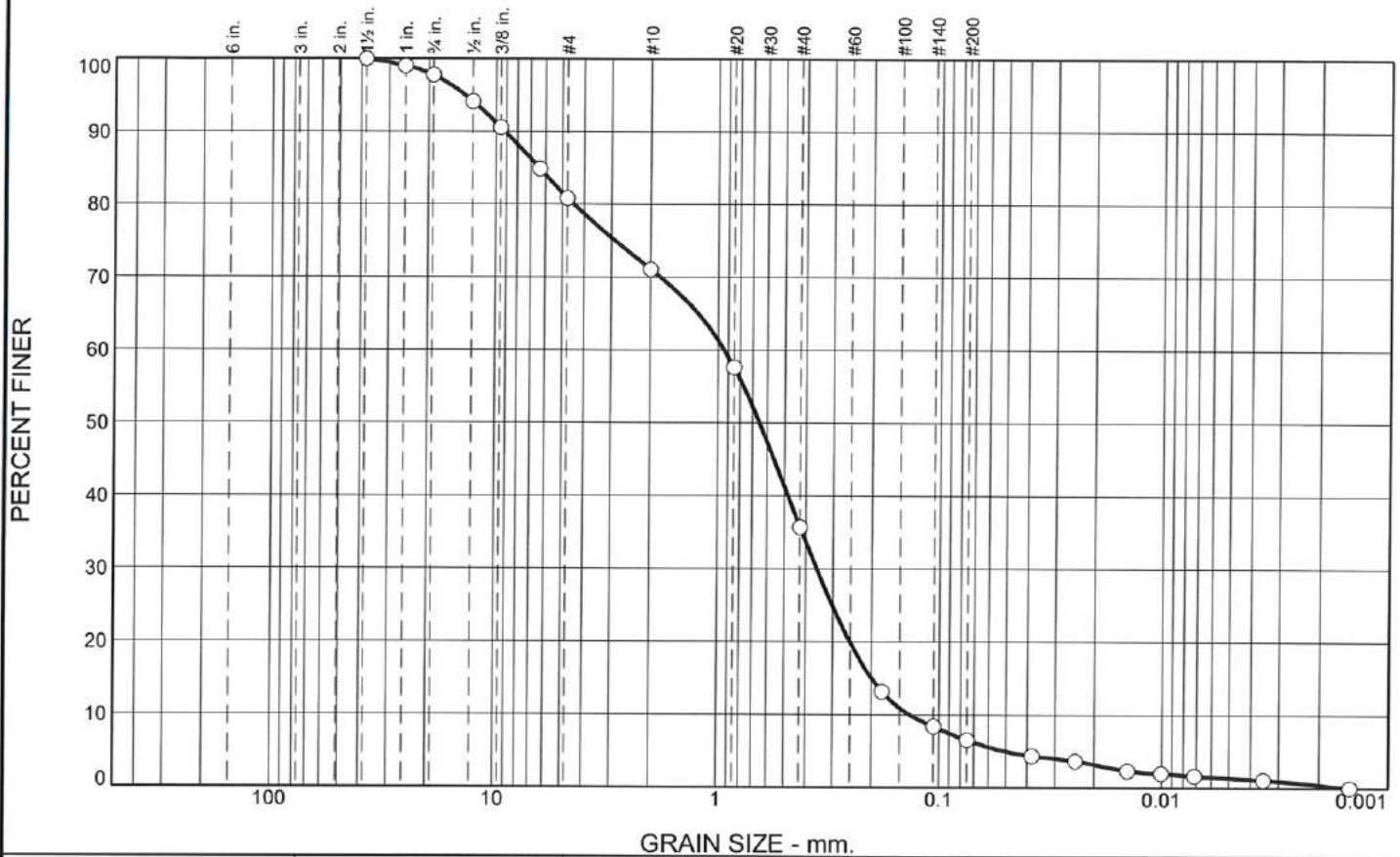
Client: Airport Solutions Group, LLC
 Project: Reconstruct Runway 1-19
 Orange, MA
 Project No: 1229-021

Lab No. 15850-20

Tested By: JJB/CAG

Checked By: MRG

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 2.2 | 16.9 | 9.8 | 35.4 | 29.2 | 6.1 | 0.4 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1 1/2" | 100.0 | | |
| 1" | 99.0 | | |
| 3/4" | 97.8 | | |
| 1/2" | 94.1 | | |
| 3/8" | 90.6 | | |
| 1/4" | 84.9 | | |
| #4 | 80.9 | | |
| #10 | 71.1 | | |
| #20 | 57.6 | | |
| #40 | 35.7 | | |
| #80 | 13.2 | | |
| #140 | 8.4 | | |
| #200 | 6.5 | | |
| 0.0382 mm. | 4.3 | | |
| 0.0243 mm. | 3.7 | | |
| 0.0142 mm. | 2.3 | | |
| 0.0101 mm. | 2.0 | | |
| 0.0071 mm. | 1.6 | | |
| 0.0035 mm. | 1.1 | | |
| 0.0015 mm. | 0.0 | | |

* (no specification provided)

Soil Description

poorly graded sand with silt and gravel

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D₉₀= 9.1316 D₈₅= 6.4006 D₆₀= 0.9407
D₅₀= 0.6523 D₃₀= 0.3571 D₁₅= 0.2004
D₁₀= 0.1354 C_u= 6.95 C_c= 1.00

Classification

USCS= SW-SM AASHTO= A-1-b

Remarks

Moisture Content: 4.5%

Location: Boring D-22
Sample Number: Bulk

Depth: 0.5'-4'

Date: 12-10-2019

**R.W. Gillespie
& Associates, Inc.
Biddeford, Maine**

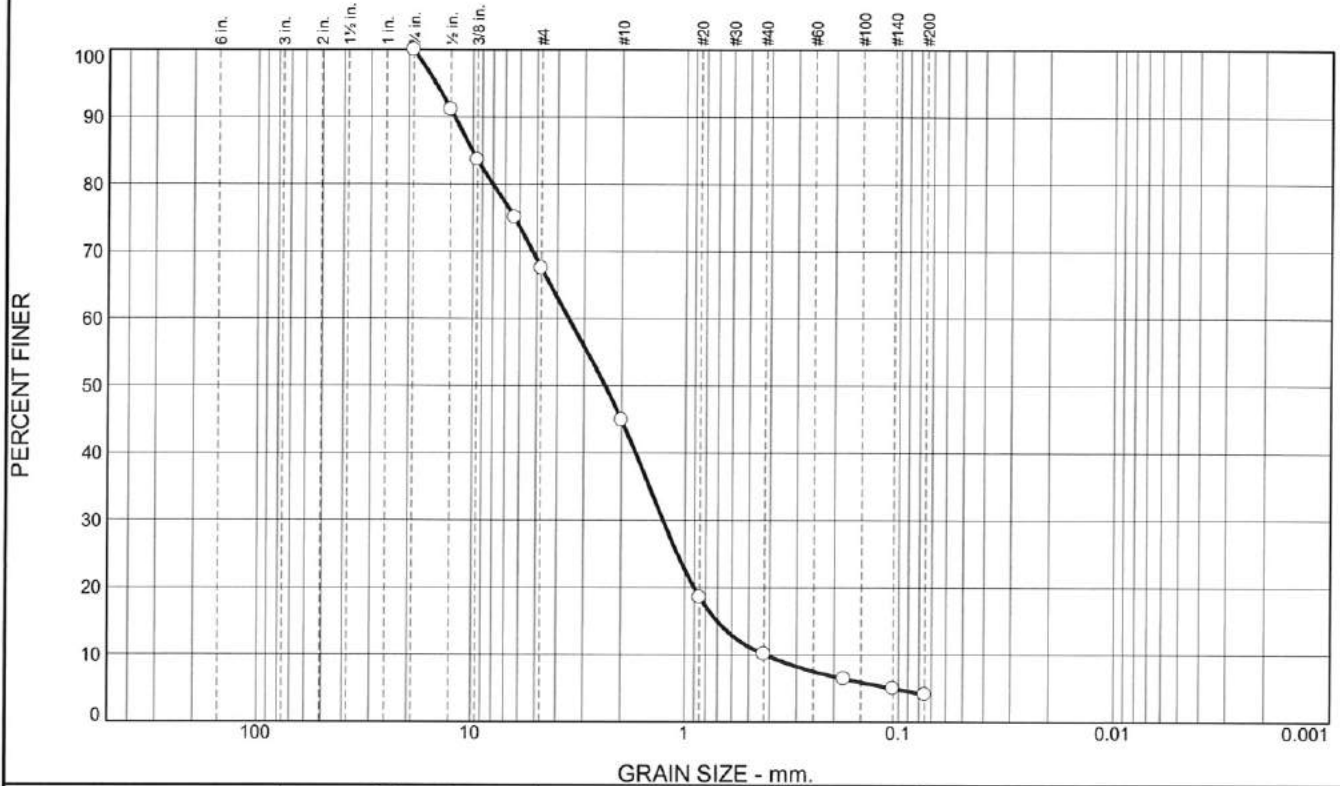
Client: Airport Solutions Group, LLC
Project: Reconstruct Runway 1-19
Orange, MA
Project No: 1229-021

Lab No. 15831-11

Tested By: JJB

Checked By: MTG *MTG*

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 0.0 | 32.5 | 22.6 | 34.8 | 6.0 | 4.1 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 3/4" | 100.0 | | |
| 1/2" | 91.1 | | |
| 3/8" | 83.7 | | |
| 1/4" | 75.1 | | |
| #4 | 67.5 | | |
| #10 | 44.9 | | |
| #20 | 18.5 | | |
| #40 | 10.1 | | |
| #80 | 6.4 | | |
| #140 | 5.0 | | |
| #200 | 4.1 | | |

Soil Description

Well-graded sand with gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D₉₀= 12.1527 D₈₅= 10.0576 D₆₀= 3.5414
D₅₀= 2.3893 D₃₀= 1.2709 D₁₅= 0.7036
D₁₀= 0.4194 C_u= 8.44 C_c= 1.09

Classification

USCS= SW AASHTO= A-1-a

Remarks

Moisture Content: 8.4%

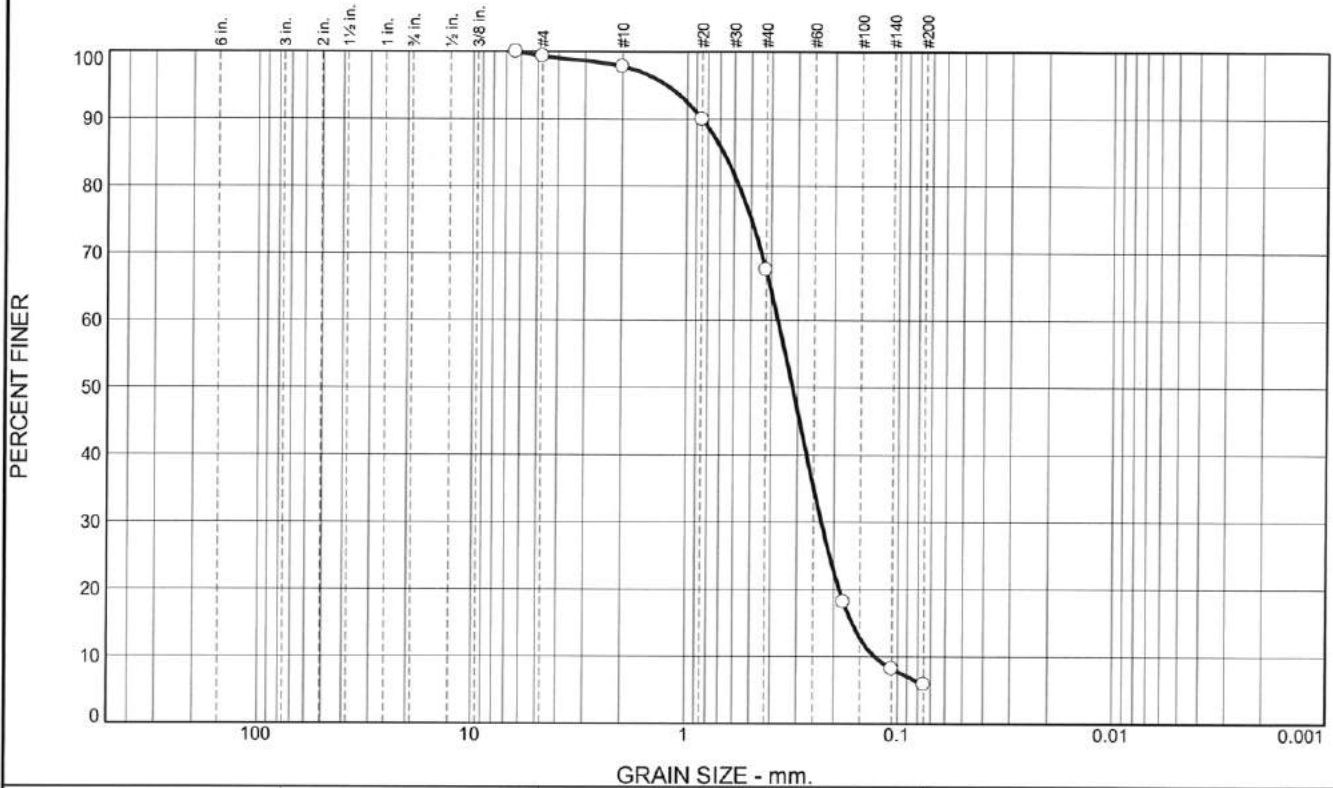
(no specification provided)

Location: Boring D-22 Sample Number: S-1 Depth: 0.3'-2' Date: 12/23/2019

| | |
|---|---|
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | Client: Airport Solutions Group, LLC Project: Reconstruct Runway 1-19 Orange, MA Project No: 1229-021 Lab No. 15850-21 |
|---|---|

Tested By: AGS/JJB Checked By: MTG *MTG*

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 0.0 | 0.7 | 1.5 | 30.3 | 61.6 | 5.9 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1/4" | 100.0 | | |
| #4 | 99.3 | | |
| #10 | 97.8 | | |
| #20 | 89.9 | | |
| #40 | 67.5 | | |
| #80 | 18.1 | | |
| #140 | 8.2 | | |
| #200 | 5.9 | | |

Soil Description
Poorly graded sand with silt

Atterberg Limits
 PL= LL= PI=

Coefficients
 D₉₀= 0.8528 D₈₅= 0.6757 D₆₀= 0.3716
 D₅₀= 0.3165 D₃₀= 0.2297 D₁₅= 0.1639
 D₁₀= 0.1277 C_u= 2.91 C_c= 1.11

Classification
 USCS= SP-SM AASHTO= A-3

Remarks
 Moisture Content: 4.1%

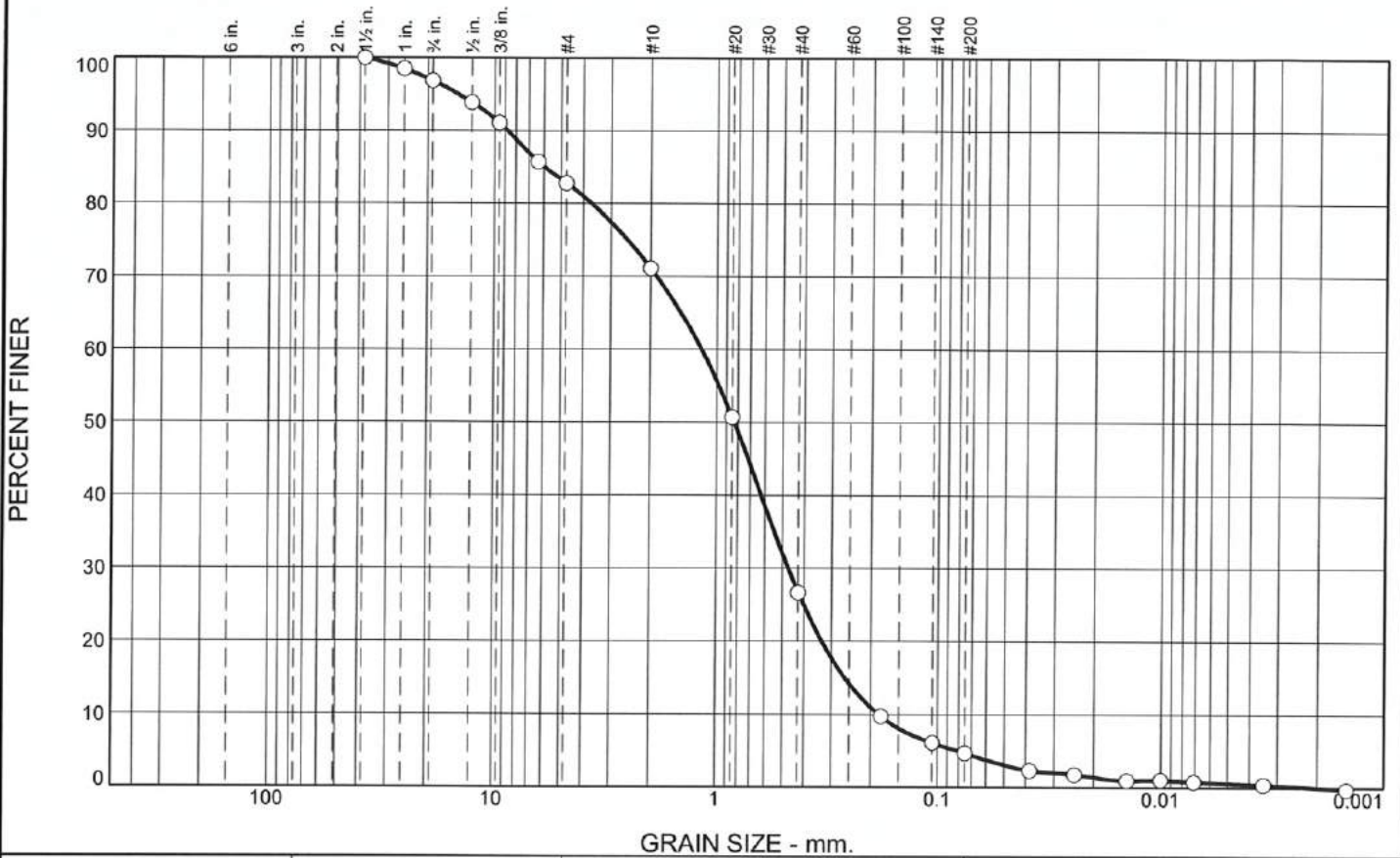
* (no specification provided)

Location: Boring D-22 Depth: 5'-7' Date: 12/23/2019
 Sample Number: S-2

| | | |
|---|---|-------------------------|
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | Client: Airport Solutions Group, LLC Project: Reconstruct Runway 1-19 Orange, MA Project No: 1229-021 | Lab No. 15850-22 |
|---|---|-------------------------|

Tested By: AGS/JJB Checked By: MRG *MRG*

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 3.1 | 14.1 | 11.7 | 44.4 | 22.0 | 4.7 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1 1/2" | 100.0 | | |
| 1" | 98.5 | | |
| 3/4" | 96.9 | | |
| 1/2" | 93.9 | | |
| 3/8" | 91.1 | | |
| 1/4" | 85.7 | | |
| #4 | 82.8 | | |
| #10 | 71.1 | | |
| #20 | 50.7 | | |
| #40 | 26.7 | | |
| #80 | 9.7 | | |
| #140 | 6.1 | | |
| #200 | 4.7 | | |
| 0.0385 mm. | 2.3 | | |
| 0.0244 mm. | 1.8 | | |
| 0.0142 mm. | 0.9 | | |
| 0.0100 mm. | 1.0 | | |
| 0.0071 mm. | 0.8 | | |
| 0.0035 mm. | 0.4 | | |
| 0.0015 mm. | 0.4 | | |

Soil Description

well-graded sand with gravel

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D₉₀= 8.7509 D₈₅= 5.9353 D₆₀= 1.1771
D₅₀= 0.8323 D₃₀= 0.4713 D₁₅= 0.2619
D₁₀= 0.1848 C_u= 6.37 C_c= 1.02

Classification

USCS= SW AASHTO= A-1-b

Remarks

Moisture Content: 3.4%

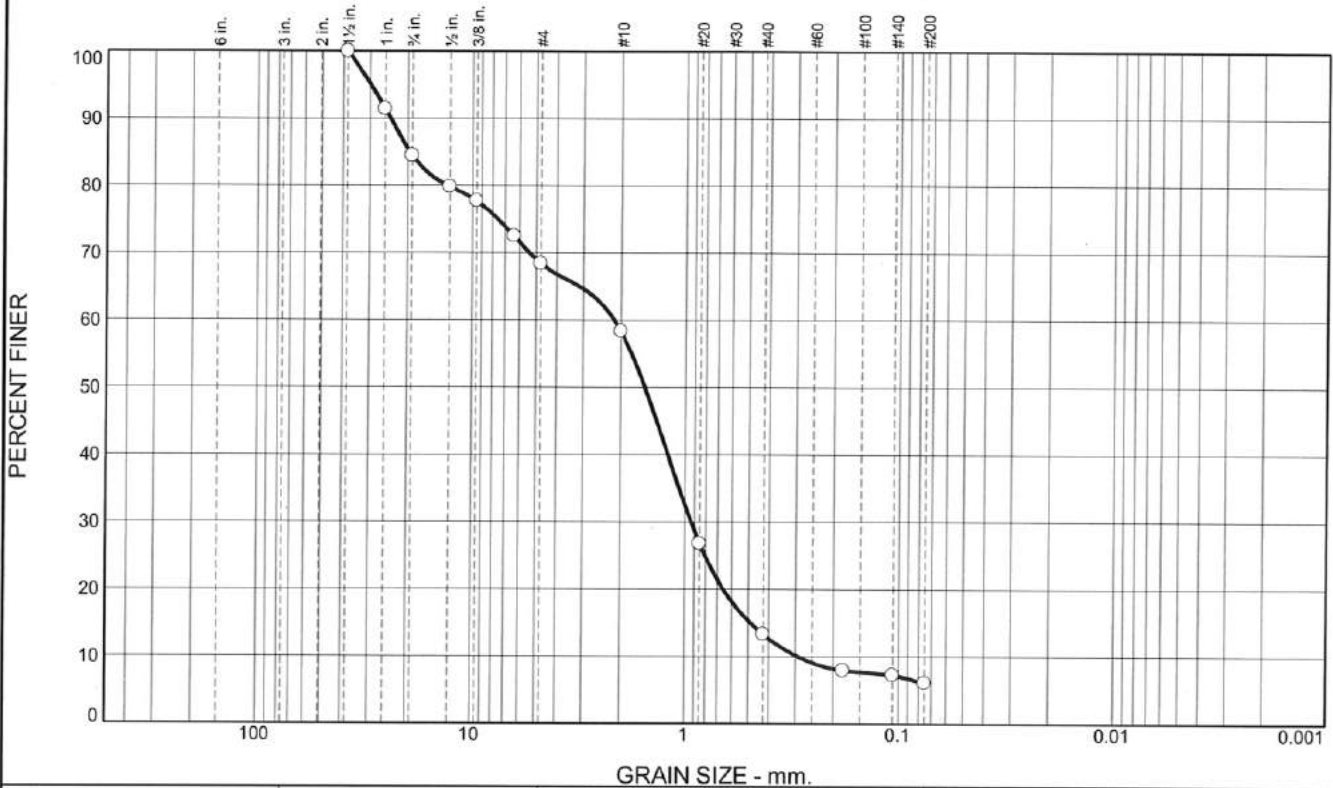
* (no specification provided)

Location: Boring D-24 **Sample Number:** Bulk **Depth:** 0.5'-4' **Date:** 12-10-2019

| | |
|---|---|
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | Client: Airport Solutions Group, LLC Project: Reconstruct Runway 1-19 Orange, MA Project No: 1229-021 Lab No. 15831-12 |
|---|---|

Tested By: JJB **Checked By:** MTG *MTG*

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 15.6 | 16.0 | 10.1 | 45.0 | 7.2 | 6.1 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1 1/2" | 100.0 | | |
| 1" | 91.4 | | |
| 3/4" | 84.4 | | |
| 1/2" | 79.8 | | |
| 3/8" | 77.7 | | |
| 1/4" | 72.5 | | |
| #4 | 68.4 | | |
| #10 | 58.3 | | |
| #20 | 26.7 | | |
| #40 | 13.3 | | |
| #80 | 7.9 | | |
| #140 | 7.2 | | |
| #200 | 6.1 | | |

Soil Description

Well-graded sand with silt and gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D₉₀= 24.0419 D₈₅= 19.5867 D₆₀= 2.1502
D₅₀= 1.5471 D₃₀= 0.9347 D₁₅= 0.4908
D₁₀= 0.2932 C_u= 7.33 C_c= 1.39

Classification

USCS= SW-SM AASHTO= A-1-b

Remarks

Moisture Content: 4.1%

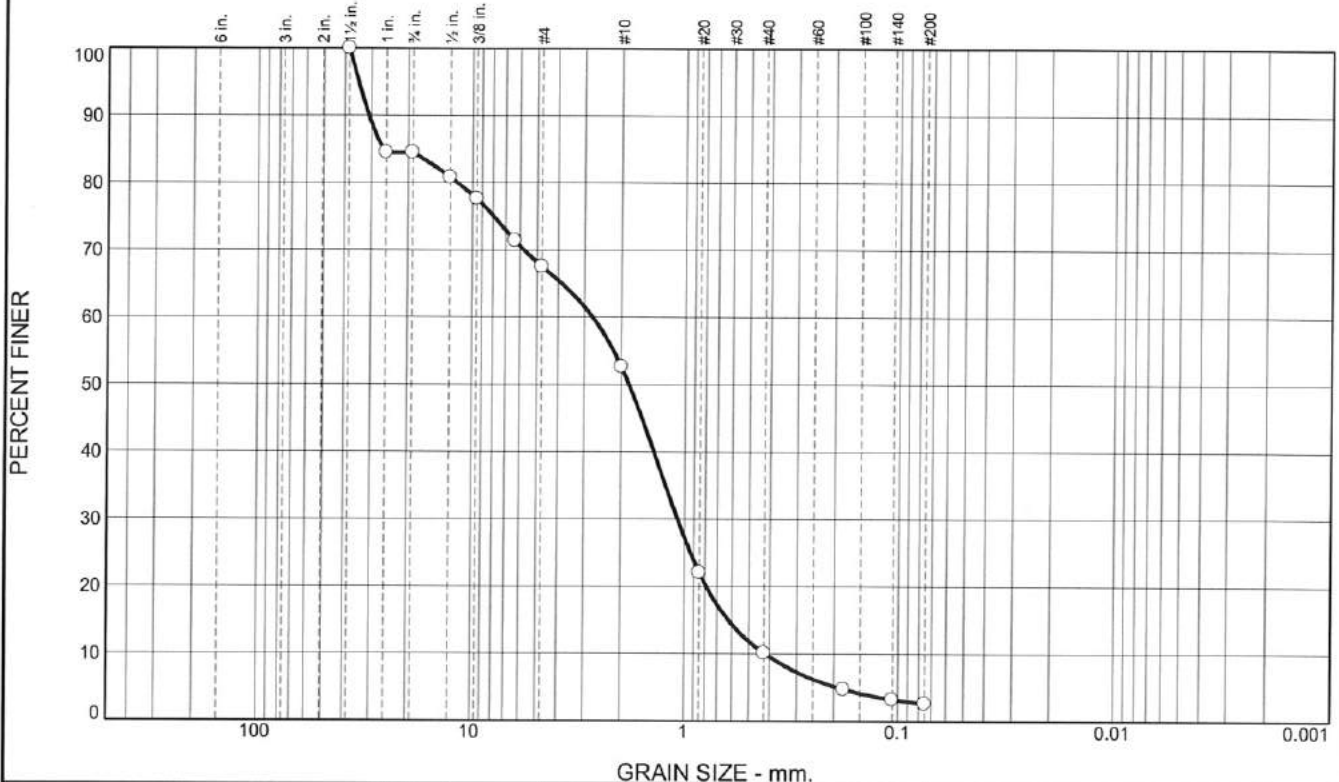
* (no specification provided)

Location: Boring D-24 Sample Number: S-1 Depth: 0.3'-2' Date: 12/23/2019

| | |
|---|---|
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | Client: Airport Solutions Group, LLC Project: Reconstruct Runway 1-19 Orange, MA Project No: 1229-021 Lab No. 15850-23 |
|---|---|

Tested By: JJB Checked By: MRG *MRG*

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 15.5 | 17.0 | 14.9 | 42.5 | 7.5 | 2.6 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1 1/2" | 100.0 | | |
| 1" | 84.5 | | |
| 3/4" | 84.5 | | |
| 1/2" | 80.8 | | |
| 3/8" | 77.6 | | |
| 1/4" | 71.4 | | |
| #4 | 67.5 | | |
| #10 | 52.6 | | |
| #20 | 22.1 | | |
| #40 | 10.1 | | |
| #80 | 4.7 | | |
| #140 | 3.2 | | |
| #200 | 2.6 | | |

Soil Description

Well-graded sand with gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D₉₀= 30.8420 D₈₅= 26.2332 D₆₀= 2.7443
D₅₀= 1.8391 D₃₀= 1.0778 D₁₅= 0.6231
D₁₀= 0.4205 C_u= 6.53 C_c= 1.01

Classification

USCS= SW AASHTO= A-1-b

Remarks

Moisture Content: 2.7%

* (no specification provided)

Location: Boring D-24 Sample Number: S-2 Depth: 5'-7' Date: 12/24/2019

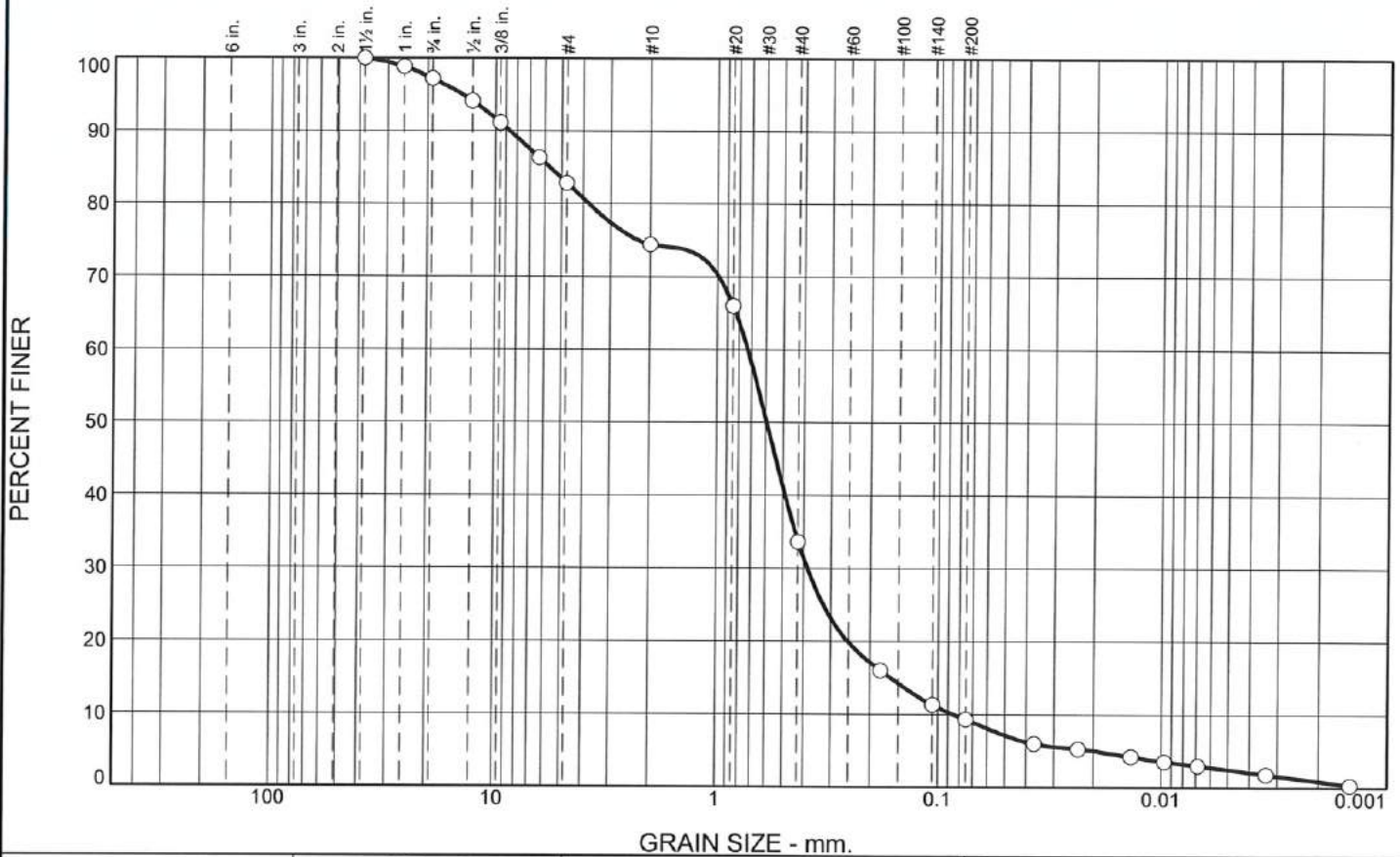
R.W. Gillespie & Associates, Inc.
Biddeford, Maine

Client: Airport Solutions Group, LLC
Project: Reconstruct Runway 1-19
Orange, MA
Project No: 1229-021

Lab No. 15850-24

Tested By: AGS/JJB Checked By: MRG *MRG*

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 2.8 | 14.3 | 8.5 | 40.8 | 24.3 | 8.4 | 0.9 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1 1/2" | 100.0 | | |
| 1" | 98.8 | | |
| 3/4" | 97.2 | | |
| 1/2" | 94.1 | | |
| 3/8" | 91.1 | | |
| 1/4" | 86.3 | | |
| #4 | 82.9 | | |
| #10 | 74.4 | | |
| #20 | 66.0 | | |
| #40 | 33.6 | | |
| #80 | 16.0 | | |
| #140 | 11.3 | | |
| #200 | 9.3 | | |
| 0.0368 mm. | 6.0 | | |
| 0.0234 mm. | 5.3 | | |
| 0.0136 mm. | 4.2 | | |
| 0.0097 mm. | 3.5 | | |
| 0.0069 mm. | 3.0 | | |
| 0.0034 mm. | 1.8 | | |
| 0.0015 mm. | 0.3 | | |

Soil Description

well-graded sand with silt and gravel

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D₉₀= 8.6331 D₈₅= 5.6815 D₆₀= 0.7298
D₅₀= 0.5951 D₃₀= 0.3860 D₁₅= 0.1625
D₁₀= 0.0855 C_u= 8.53 C_c= 2.39

Classification

USCS= SW-SM AASHTO= A-1-b

Remarks

Moisture Content: 6.4%

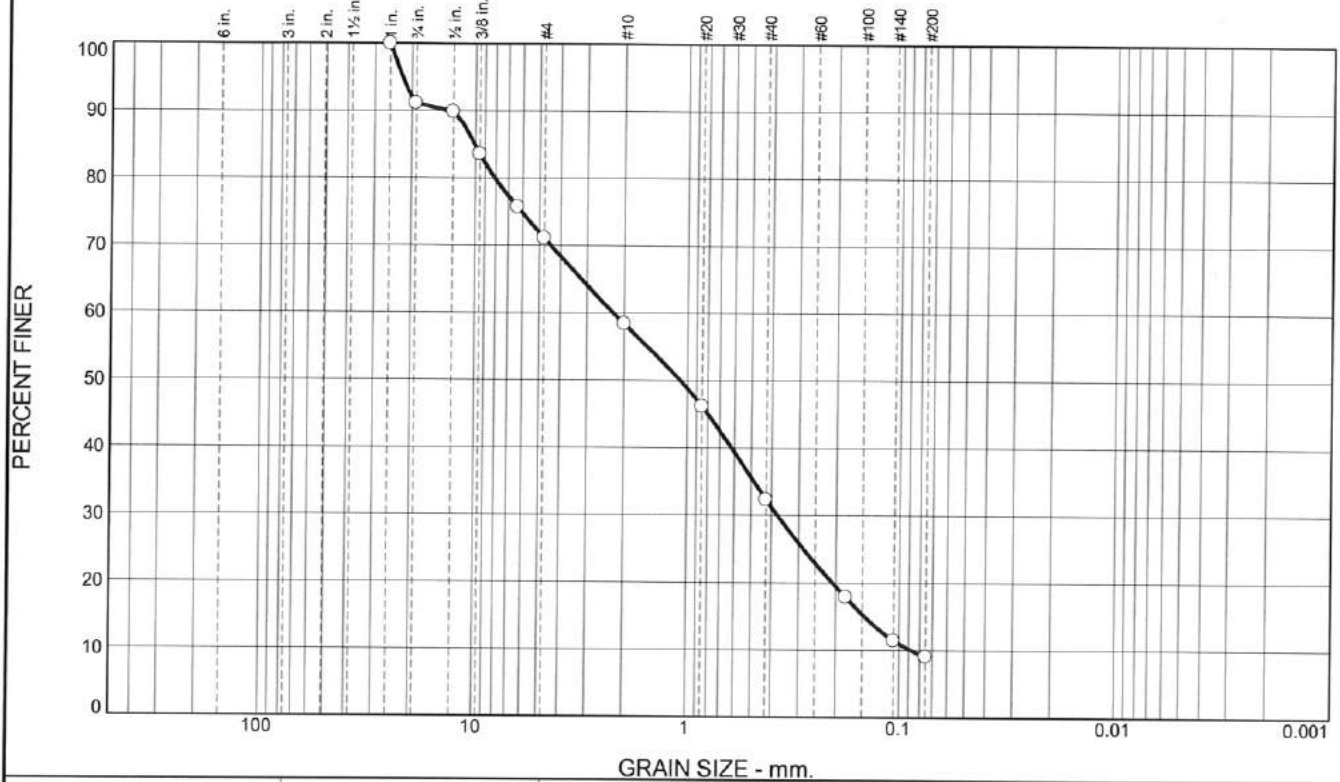
* (no specification provided)

Location: Boring D-26 **Sample Number:** Bulk **Depth:** 0.5-4' **Date:** 12-10-2019

| | |
|---|---|
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | Client: Airport Solutions Group, LLC Project: Reconstruct Runway 1-19 Orange, MA Project No: 1229-021 Lab No. 15831-13 |
|---|---|

Tested By: JJB **Checked By:** MTG *MTG*

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 8.9 | 20.1 | 12.7 | 26.0 | 23.3 | 9.0 | |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1" | 100.0 | | |
| 3/4" | 91.1 | | |
| 1/2" | 89.8 | | |
| 3/8" | 83.6 | | |
| 1/4" | 75.7 | | |
| #4 | 71.0 | | |
| #10 | 58.3 | | |
| #20 | 46.1 | | |
| #40 | 32.3 | | |
| #80 | 17.9 | | |
| #140 | 11.4 | | |
| #200 | 9.0 | | |

Soil Description
Poorly graded sand with silt and gravel

Atterberg Limits
 PL= LL= PI=

Coefficients
 D₉₀= 13.4043 D₈₅= 10.0810 D₆₀= 2.2591
 D₅₀= 1.0790 D₃₀= 0.3764 D₁₅= 0.1462
 D₁₀= 0.0880 C_u= 25.68 C_c= 0.71

Classification
 USCS= SP-SM AASHTO= A-1-b

Remarks
 Moisture Content: 7.5%

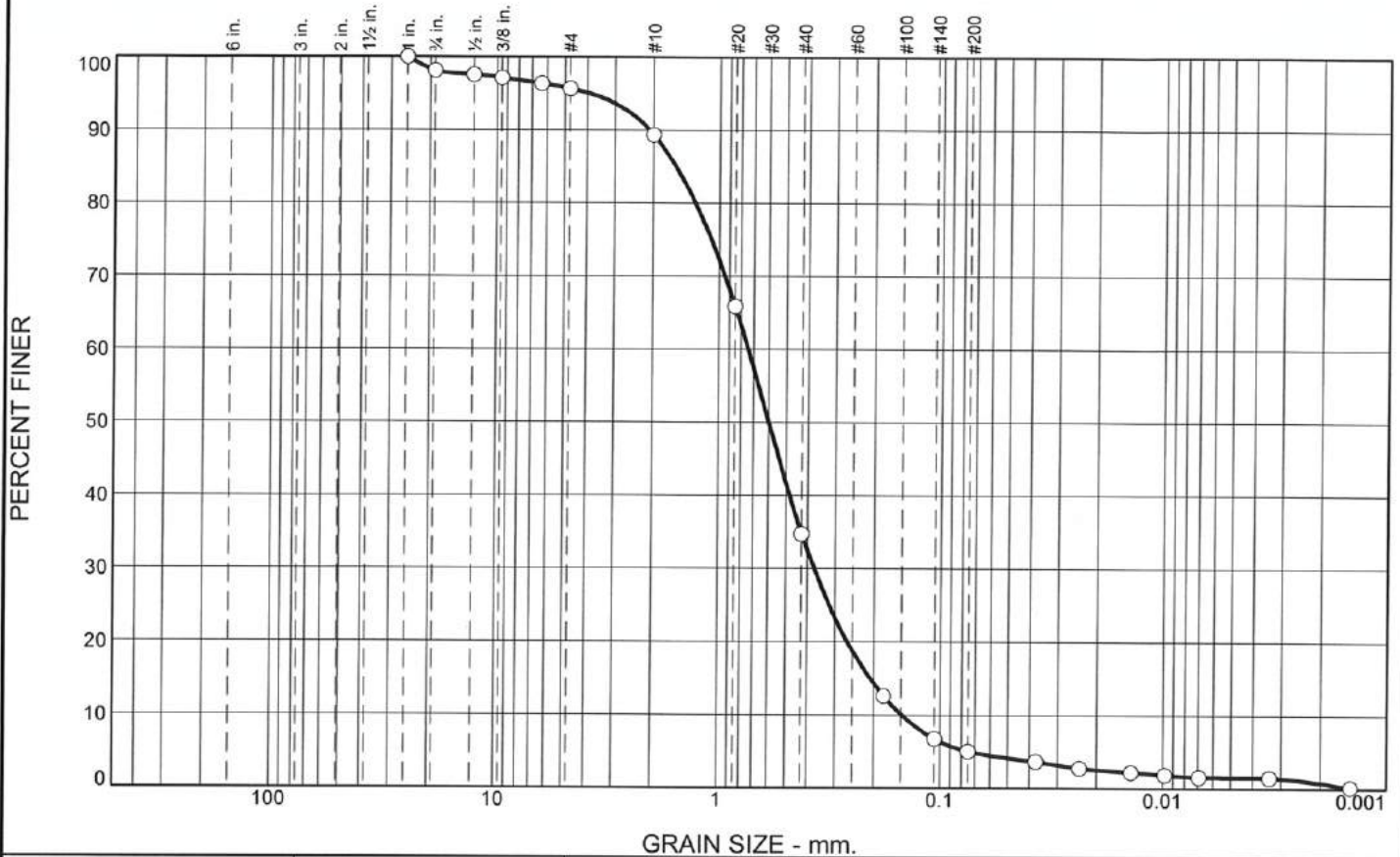
* (no specification provided)

Location: Boring D-26 Sample Number: S-1 Depth: 0.3'-2' Date: 12/23/2019

| | |
|---|---|
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | Client: Airport Solutions Group, LLC Project: Reconstruct Runway 1-19 Orange, MA Project No: 1229-021 |
| Lab No. 15850-25 | |

Tested By: AGS/JJB Checked By: MRG *MRG*

Particle Size Distribution Report



| % +3" | % Gravel | | % Sand | | | % Fines | |
|-------|----------|------|--------|--------|------|---------|------|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 1.9 | 2.4 | 6.3 | 54.6 | 29.8 | 4.2 | 0.8 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1" | 100.0 | | |
| 3/4" | 98.1 | | |
| 1/2" | 97.6 | | |
| 3/8" | 97.1 | | |
| 1/4" | 96.4 | | |
| #4 | 95.7 | | |
| #10 | 89.4 | | |
| #20 | 65.9 | | |
| #40 | 34.8 | | |
| #80 | 12.6 | | |
| #140 | 6.8 | | |
| #200 | 5.0 | | |
| 0.0376 mm. | 3.6 | | |
| 0.0239 mm. | 2.8 | | |
| 0.0139 mm. | 2.2 | | |
| 0.0098 mm. | 1.9 | | |
| 0.0069 mm. | 1.6 | | |
| 0.0034 mm. | 1.5 | | |
| 0.0015 mm. | 0.2 | | |

* (no specification provided)

Soil Description

poorly graded sand with silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D₉₀= 2.0917 D₈₅= 1.5752 D₆₀= 0.7424
D₅₀= 0.5988 D₃₀= 0.3739 D₁₅= 0.2079
D₁₀= 0.1487 C_u= 4.99 C_c= 1.27

Classification

USCS= SP-SM AASHTO= A-1-b

Remarks

Moisture Content: 5.4%

Location: Boring D-27 **Depth:** 0.5'-4'

Sample Number: Bulk

Date: 12-10-2019

| | |
|---|---|
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | Client: Airport Solutions Group, LLC Project: Reconstruct Runway 1-19 Orange, MA Project No: 1229-021 Lab No. 15831-14 |
|---|---|

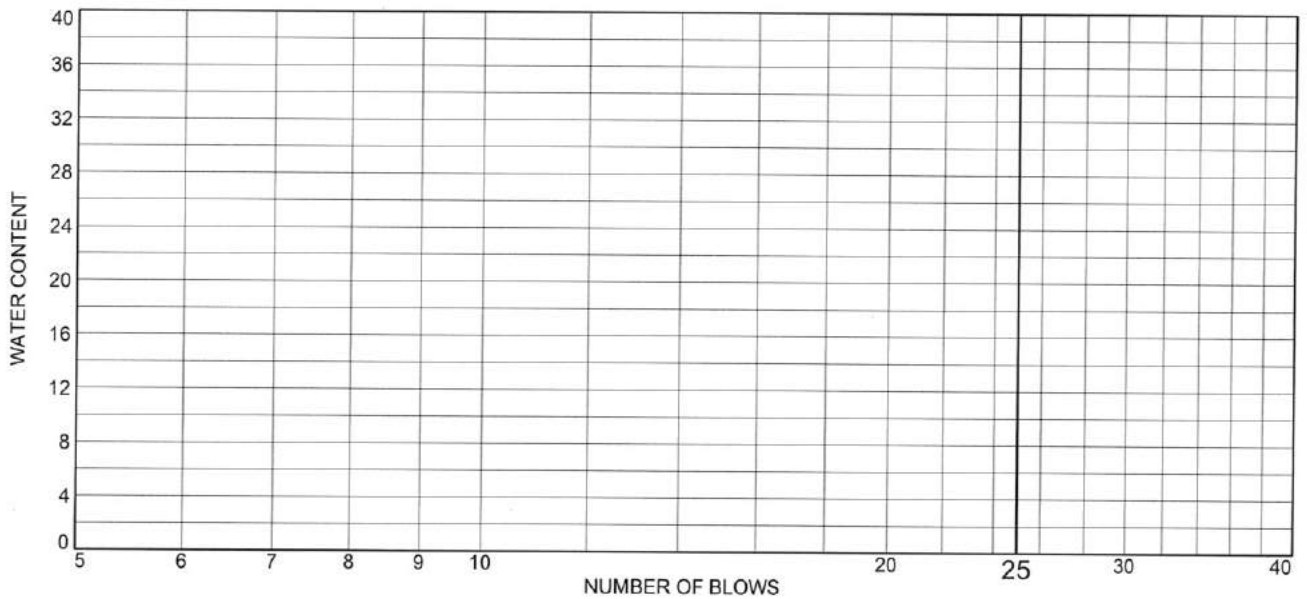
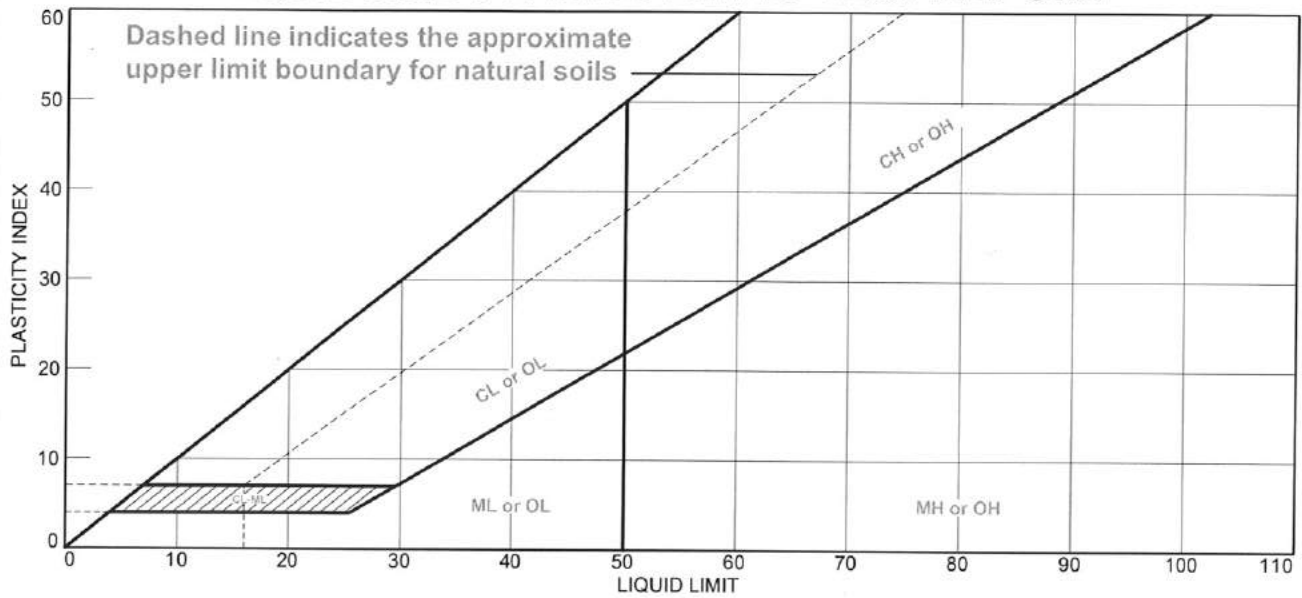
Tested By: JJB Checked By: MTG *MTG*

APPENDIX C

LABORATORY CBR TEST RESULTS

Geotechnical Engineering Evaluation
Reconstruct Runway 1-19
Orange Municipal Airport
Orange, Massachusetts

LIQUID AND PLASTIC LIMITS TEST REPORT



| MATERIAL DESCRIPTION | LL | PL | PI | %<#40 | %<#200 | USCS |
|--------------------------------|----|----|----|-------|--------|------|
| poorly graded sand with gravel | NV | NP | NP | 32.9 | 4.9 | SP |

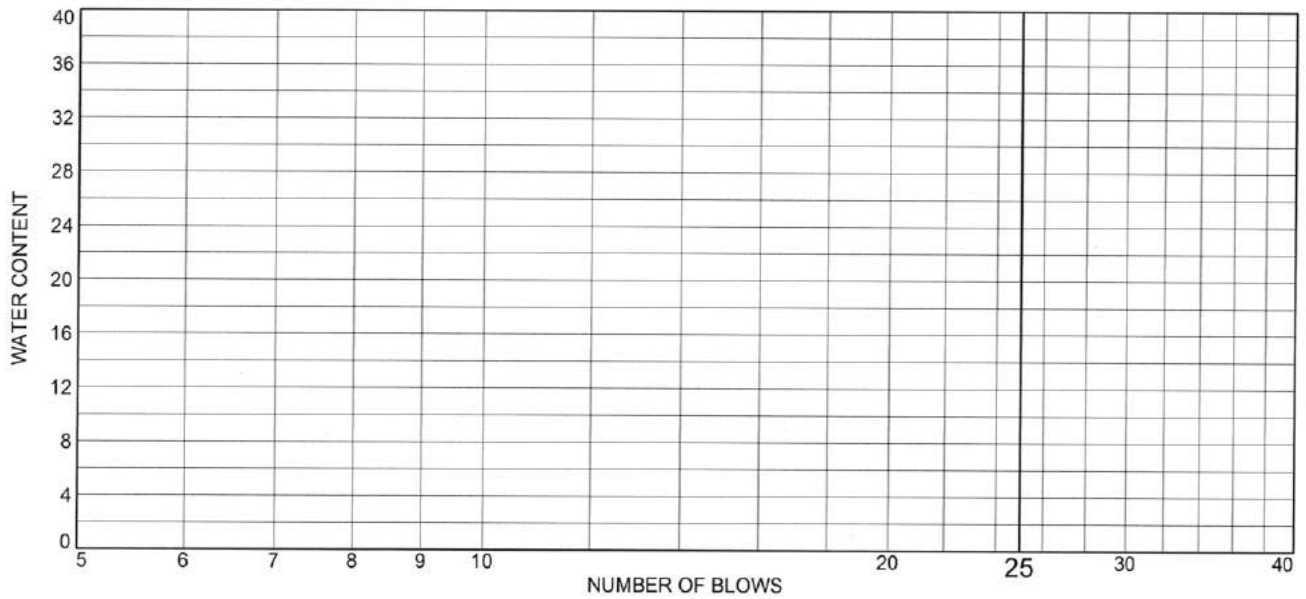
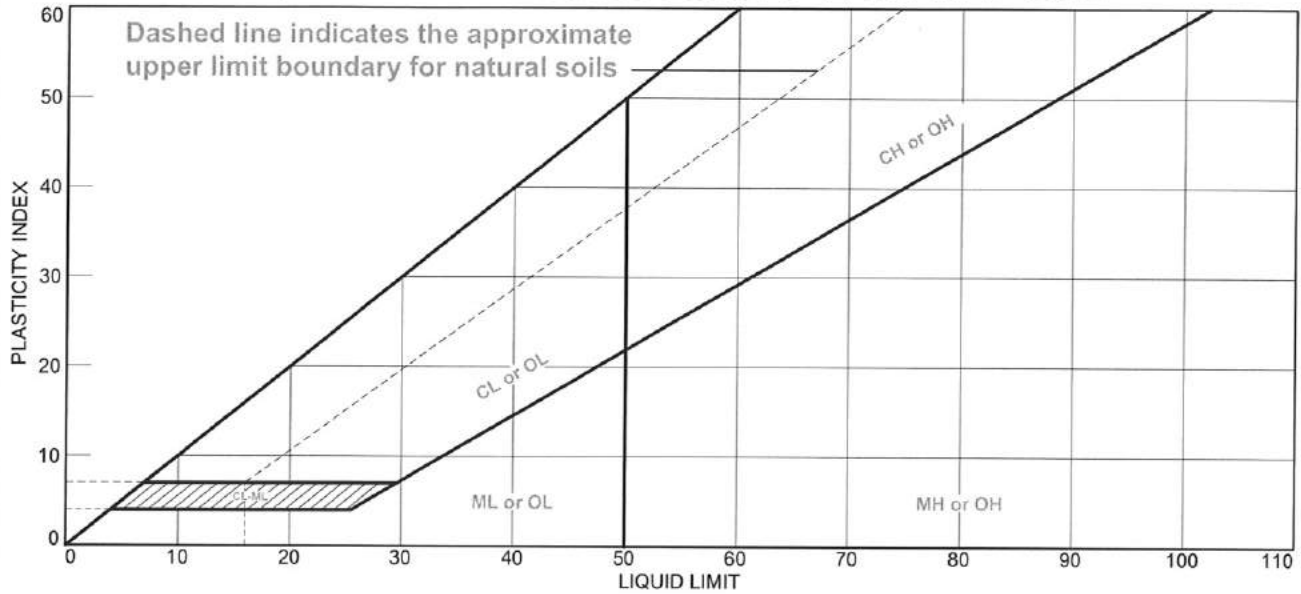
Project No. 1229-021 **Client:** Airport Solutions Group, LLC
Project: Reconstruct Runway 1-19
 Orange, MA
Location: Boring D-2
Sample Number: Bulk **Depth:** 0.5'-4'
R.W. Gillespie & Associates, Inc.
 Biddeford, Maine

Remarks:

Lab No. 15831-01

Tested By: AGS Checked By: MTG *MTG*

LIQUID AND PLASTIC LIMITS TEST REPORT



| MATERIAL DESCRIPTION | LL | PL | PI | %<#40 | %<#200 | USCS |
|---------------------------------------|----|----|----|-------|--------|-------|
| Well-graded sand with silt and gravel | NV | NP | NP | 30.2 | 6.3 | SW-SM |

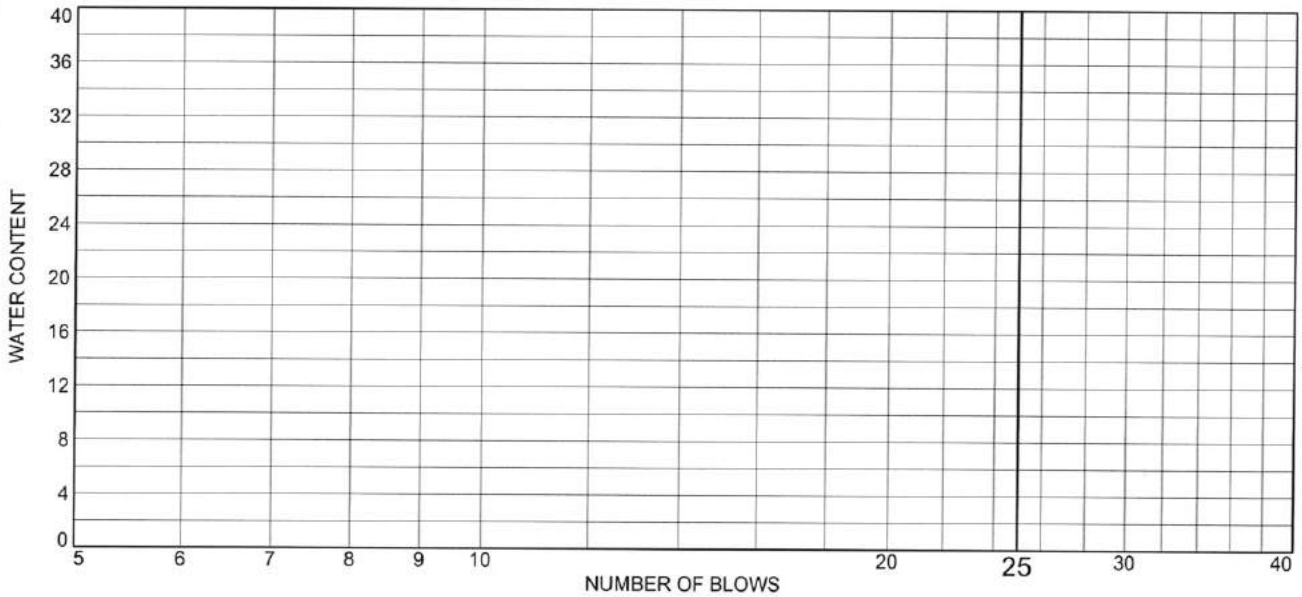
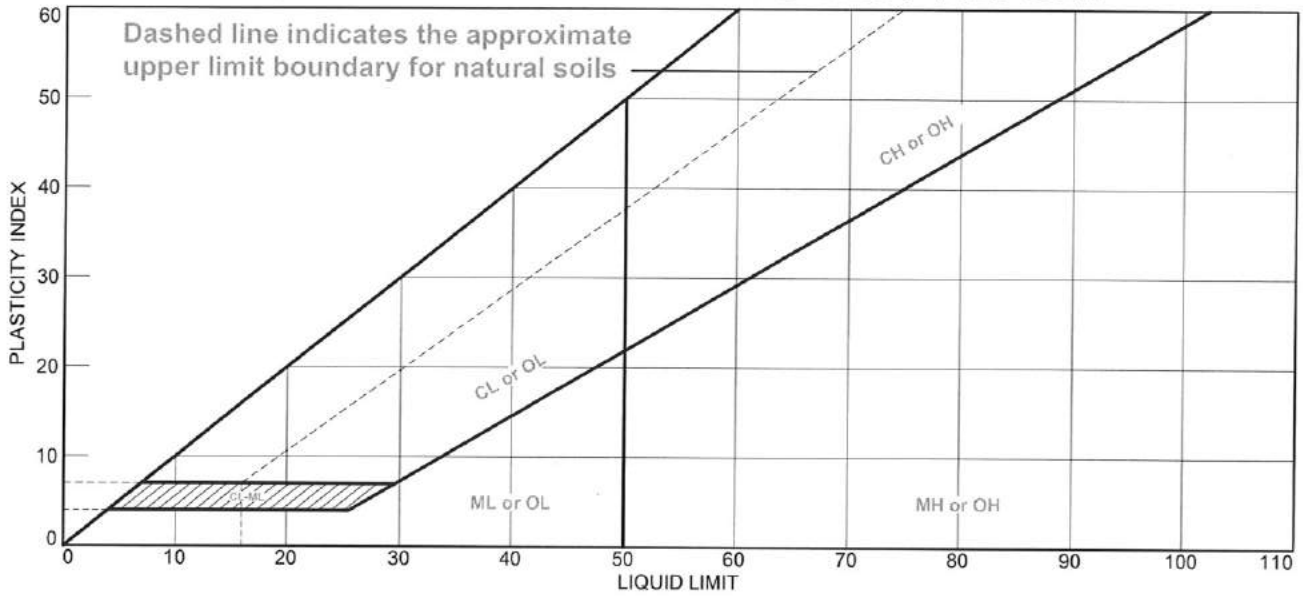
Project No. 1229-021 **Client:** Airport Solutions Group, LLC
Project: Reconstruct Runway 1-19
 Orange, MA
Location: Boring D-4
Sample Number: Bulk **Depth:** 0.5'-4'
R.W. Gillespie & Associates, Inc.
 Biddeford, Maine

Remarks:

Lab No. 15831-02

Tested By: AGS **Checked By:** MTG *MTG*

LIQUID AND PLASTIC LIMITS TEST REPORT



| MATERIAL DESCRIPTION | LL | PL | PI | %<#40 | %<#200 | USCS |
|----------------------|----|----|----|-------|--------|------|
| ● well-graded sand | NV | NP | NP | 34.0 | 4.9 | SW |

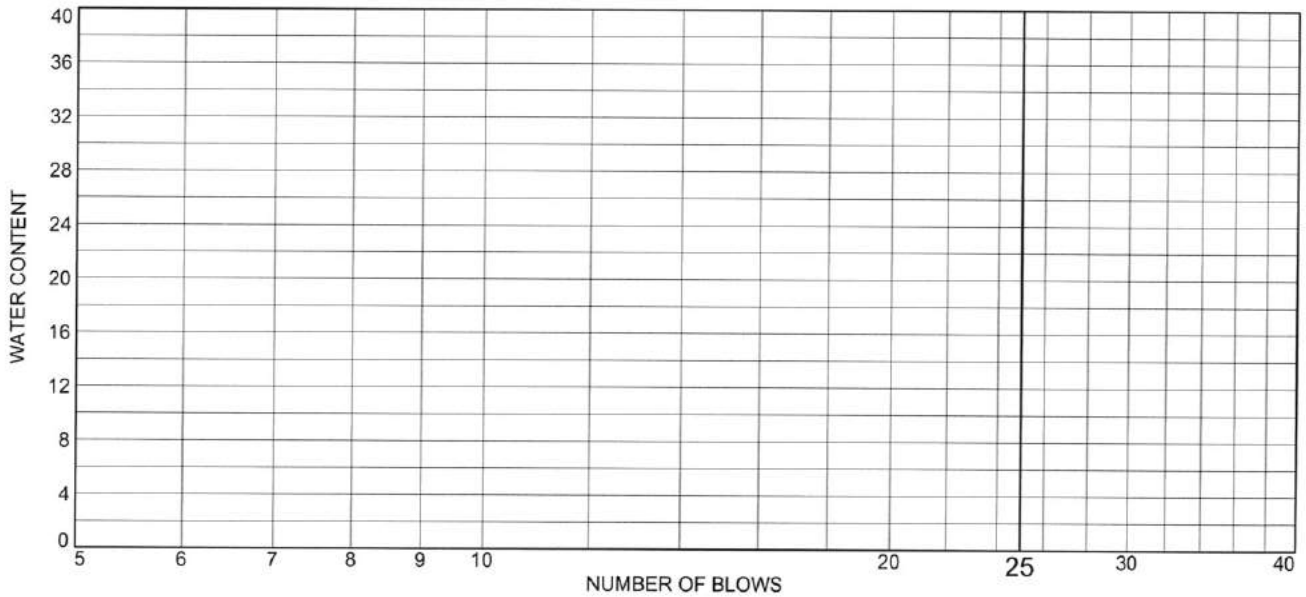
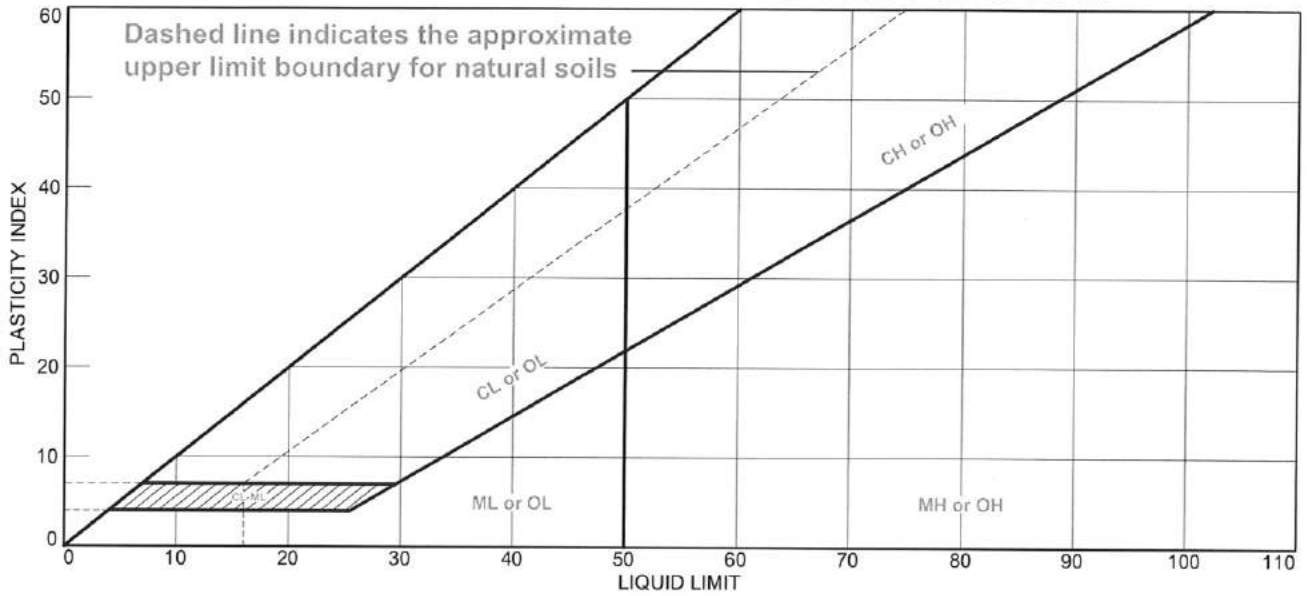
Project No. 1229-021 **Client:** Airport Solutions Group, LLC
Project: Reconstruct Runway 1-19
 Orange, MA
Location: Boring D-6
Sample Number: Bulk **Depth:** 0.5'-4'
R.W. Gillespie & Associates, Inc.
 Biddeford, Maine

Remarks:

Lab No. 15831-03

Tested By: AGS Checked By: MTG *MR*

LIQUID AND PLASTIC LIMITS TEST REPORT



| MATERIAL DESCRIPTION | LL | PL | PI | %<#40 | %<#200 | USCS |
|----------------------------|----|----|----|-------|--------|-------|
| Well-graded sand with silt | NV | NP | NP | 45.6 | 8.8 | SW-SM |

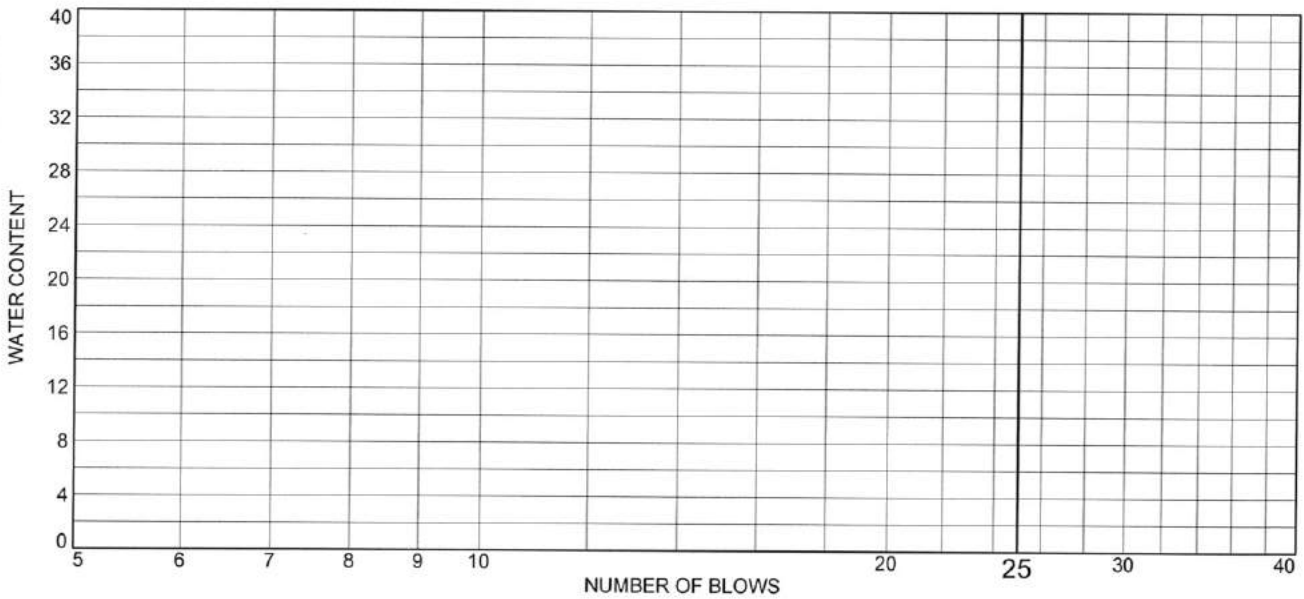
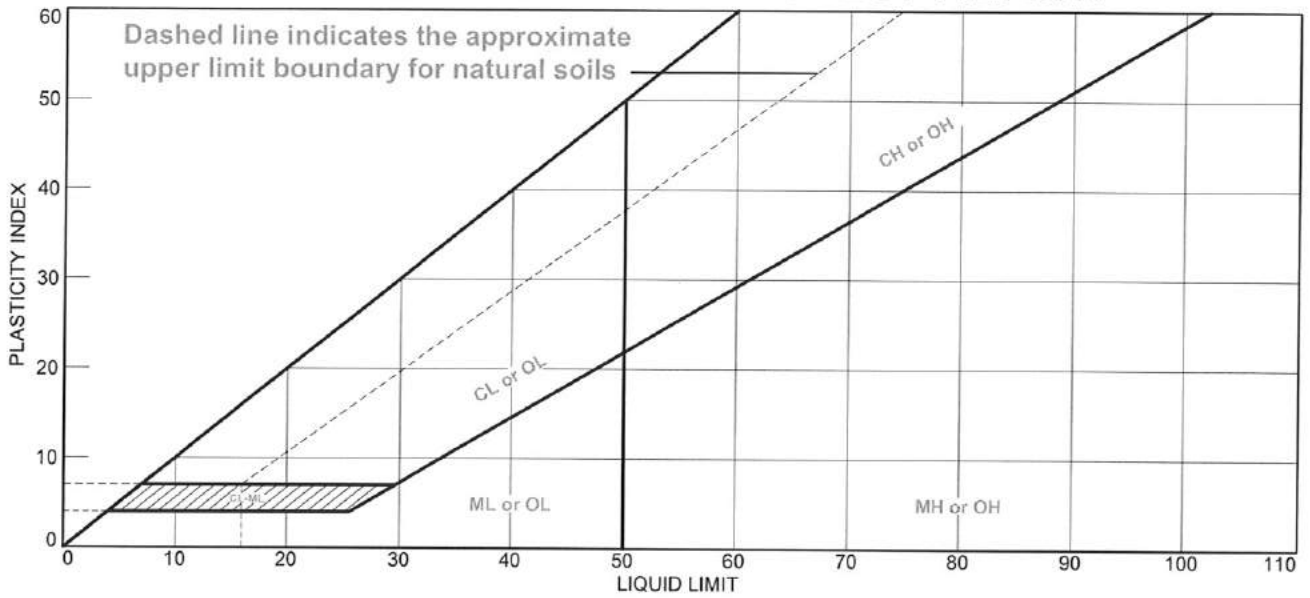
Project No. 1229-021 **Client:** Airport Solutions Group, LLC
Project: Reconstruct Runway 1-19
 Orange, MA
Location: Boring D-8
Sample Number: Bulk **Depth:** 0.5'-4'
R.W. Gillespie & Associates, Inc.
 Biddeford, Maine

Remarks:

Lab No. 15831-04

Tested By: AGS **Checked By:** MTG *MB*

LIQUID AND PLASTIC LIMITS TEST REPORT



| MATERIAL DESCRIPTION | LL | PL | PI | %<#40 | %<#200 | USCS |
|----------------------------------|----|----|----|-------|--------|------|
| ● poorly graded sand with gravel | NV | NP | NP | 28.0 | 4.4 | SP |

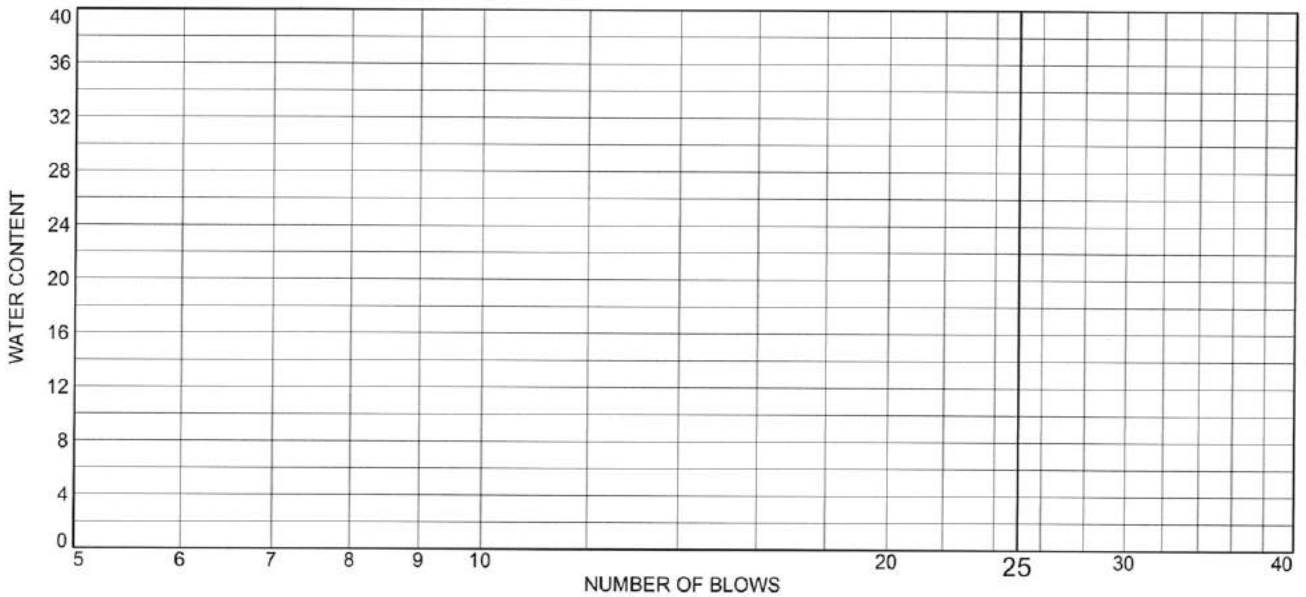
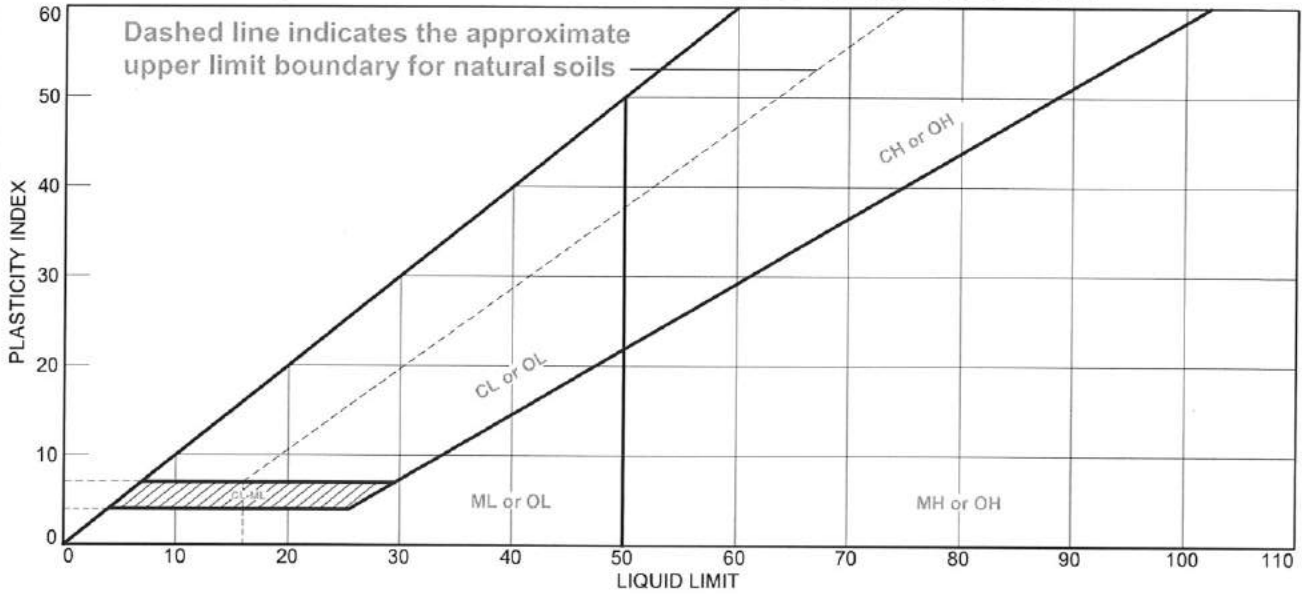
Project No. 1229-021 **Client:** Airport Solutions Group, LLC
Project: Reconstruct Runway 1-19
 Orange, MA
Location: Boring D-10
Sample Number: Bulk **Depth:** 0.5'-4'
R.W. Gillespie & Associates, Inc.
 Biddeford, Maine

Remarks:

Lab No. 15831-05

Tested By: AGS **Checked By:** MTG *MTG*

LIQUID AND PLASTIC LIMITS TEST REPORT



| MATERIAL DESCRIPTION | LL | PL | PI | %<#40 | %<#200 | USCS |
|----------------------|----|----|----|-------|--------|------|
| poorly graded sand | NV | NP | NP | 43.0 | 3.9 | SP |

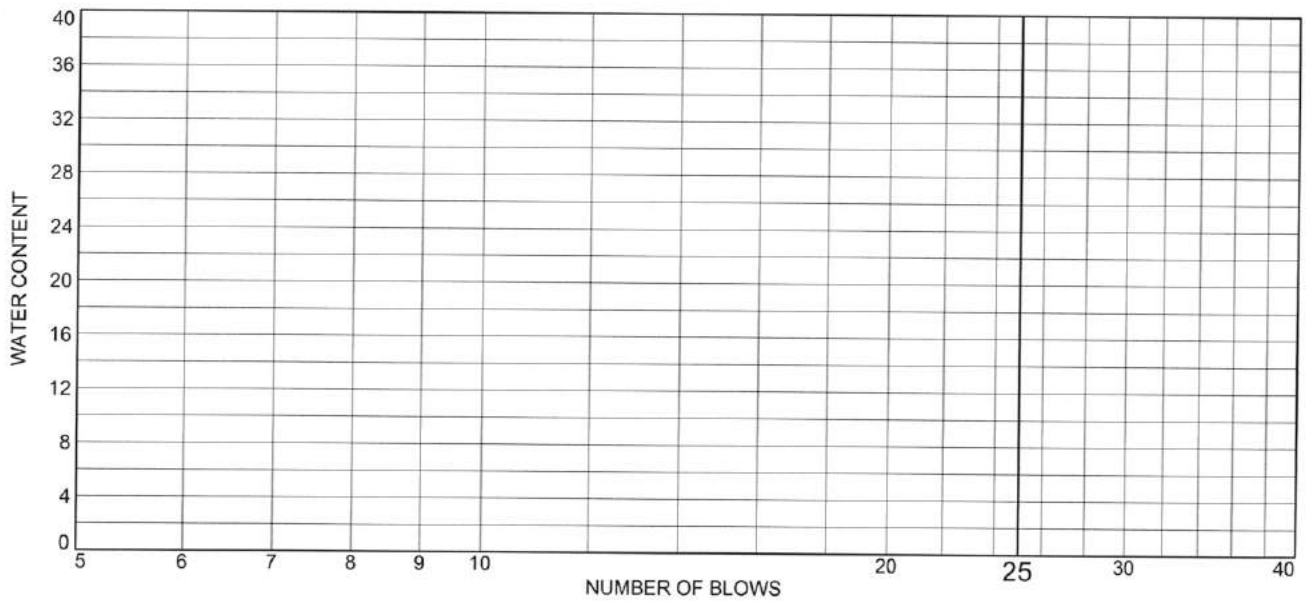
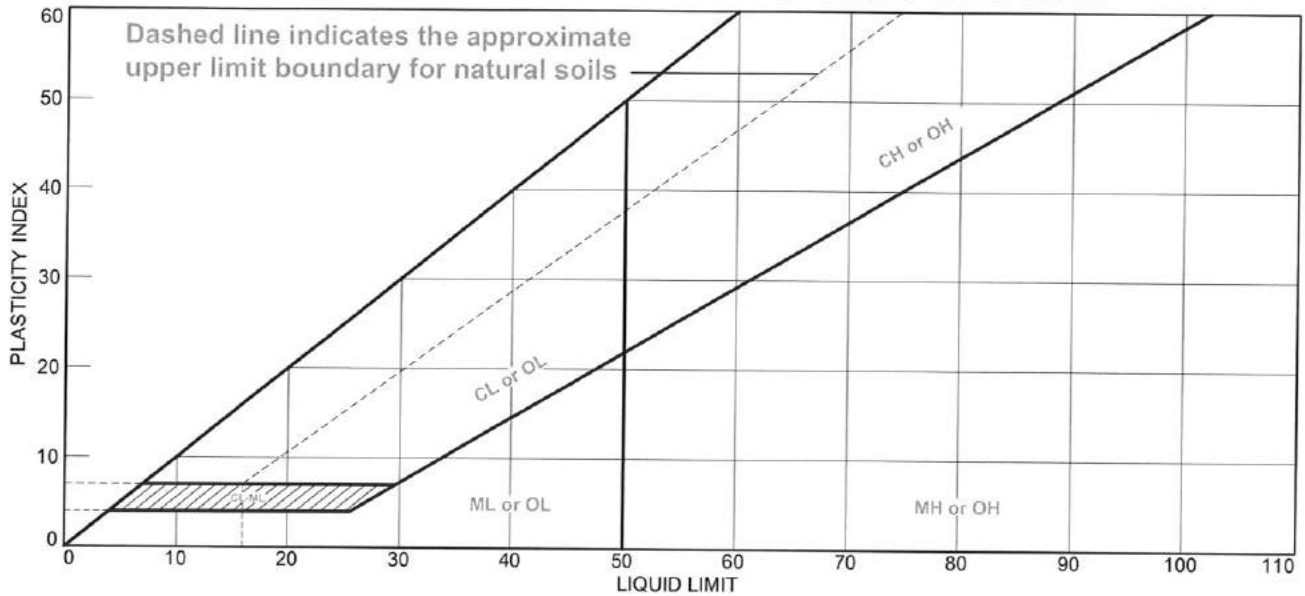
Project No. 1229-021 **Client:** Airport Solutions Group, LLC
Project: Reconstruct Runway 1-19
 Orange, MA
Location: Boring D-12
Sample Number: Bulk **Depth:** 0.5'-4'
R.W. Gillespie & Associates, Inc.
 Biddeford, Maine

Remarks:

Lab No. 15831-06

Tested By: JSB **Checked By:** MTG

LIQUID AND PLASTIC LIMITS TEST REPORT



| MATERIAL DESCRIPTION | LL | PL | PI | %<#40 | %<#200 | USCS |
|---|----|----|----|-------|--------|-------|
| poorly graded sand with silt and gravel | NV | NP | NP | 27.3 | 5.5 | SP-SM |

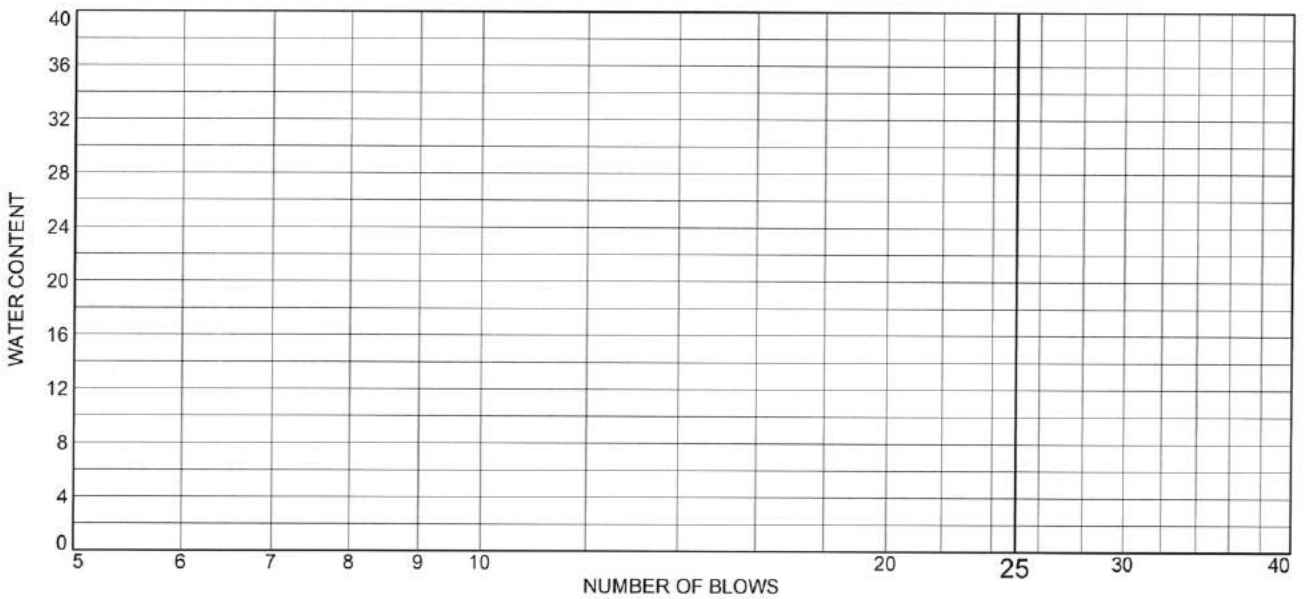
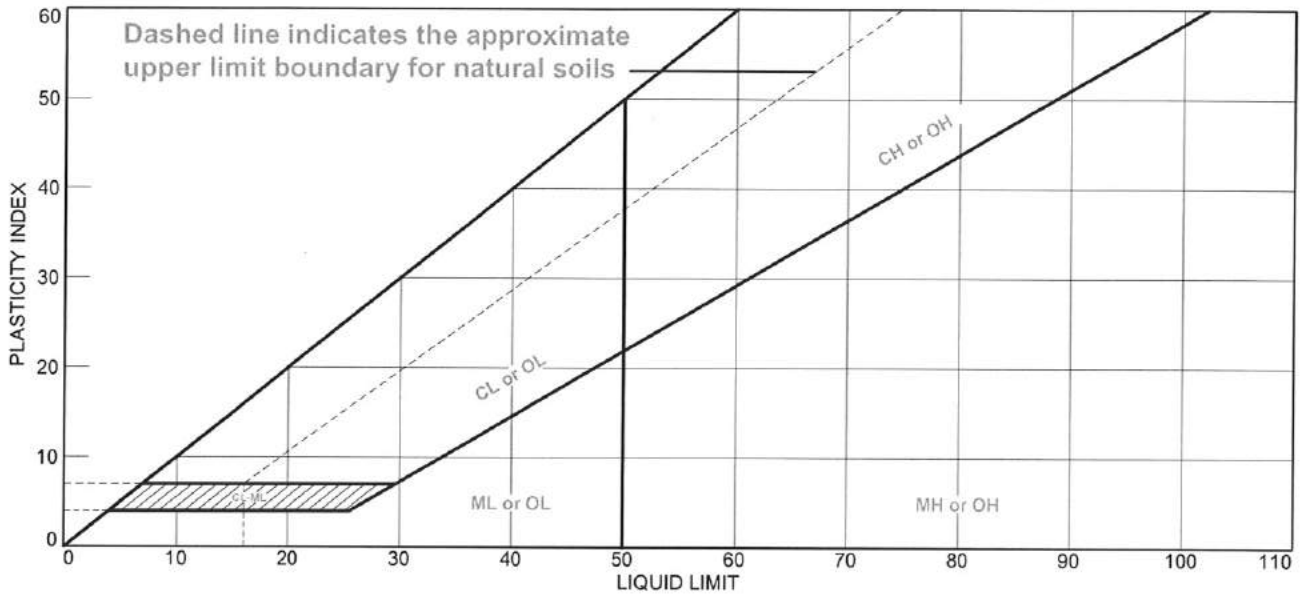
Project No. 1229-021 **Client:** Airport Solutions Group, LLC
Project: Reconstruct Runway 1-19
 Orange, MA
Location: Boring D-14
Sample Number: Bulk **Depth:** 0.5'-4'
R.W. Gillespie & Associates, Inc.
 Biddeford, Maine

Remarks:

Lab No. 15831-07

Tested By: AGS **Checked By:** MTG *MTG*

LIQUID AND PLASTIC LIMITS TEST REPORT



| MATERIAL DESCRIPTION | LL | PL | PI | %<#40 | %<#200 | USCS |
|---|----|----|----|-------|--------|-------|
| ● poorly graded sand with silt and gravel | NV | NP | NP | 38.1 | 6.5 | SP-SM |

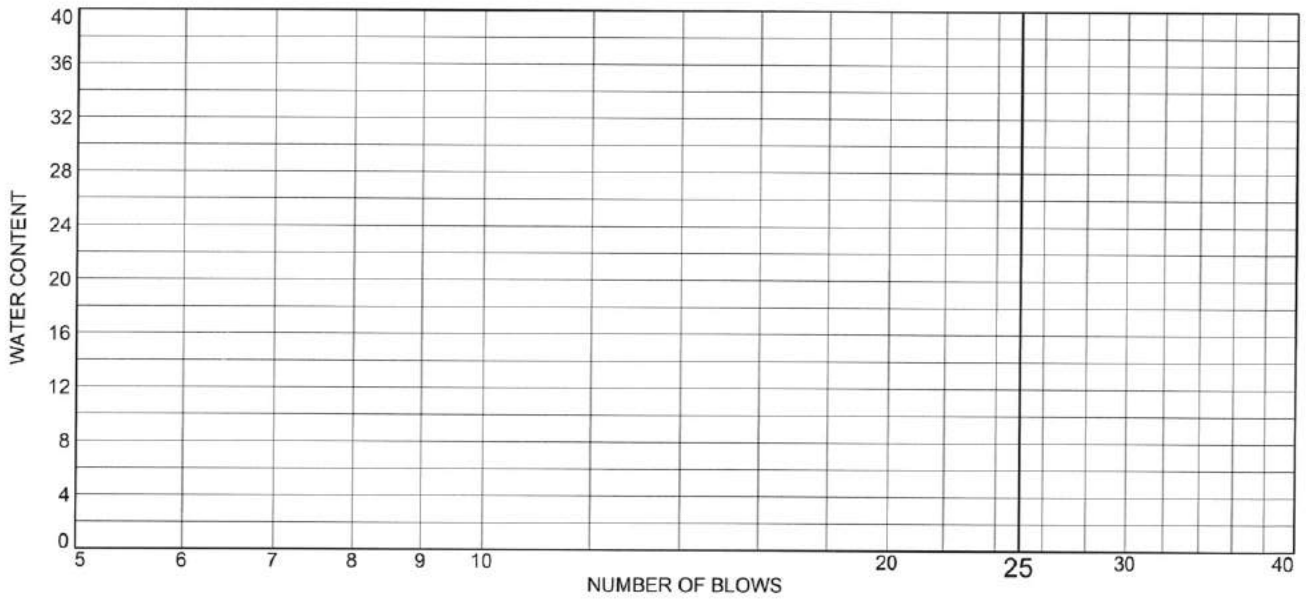
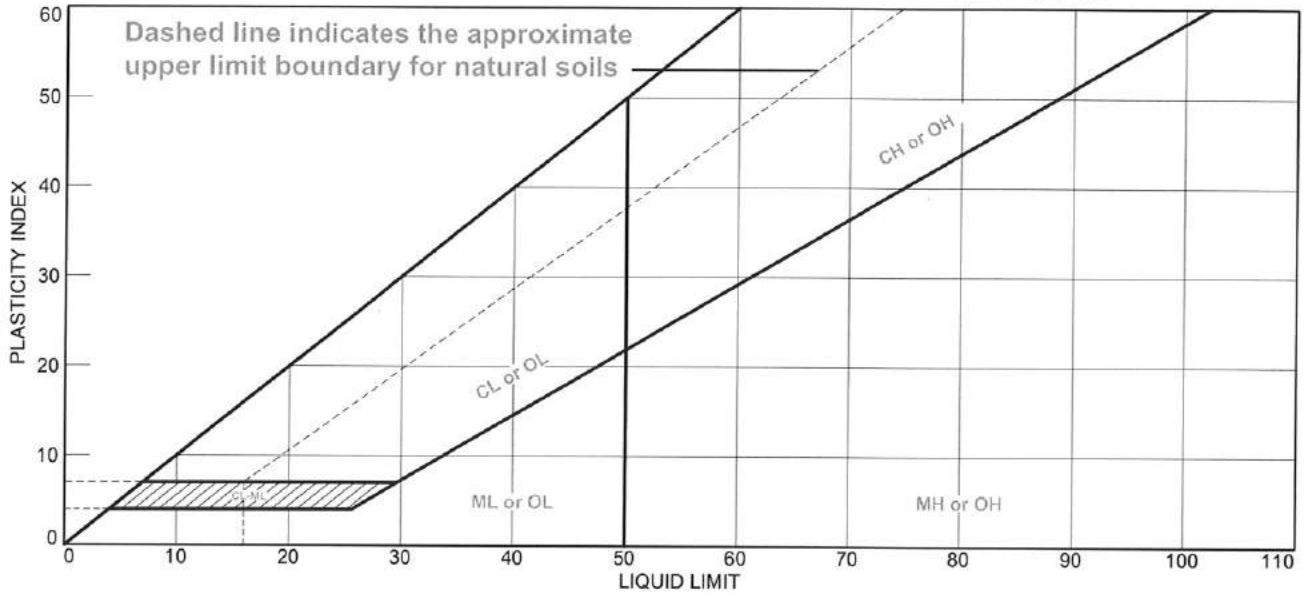
Project No. 1229-021 **Client:** Airport Solutions Group, LLC
Project: Reconstruct Runway 1-19
 Orange, MA
Location: Boring D-16
Sample Number: Bulk **Depth:** 0.5'-4'
R.W. Gillespie & Associates, Inc.
 Biddeford, Maine

Remarks:

Lab No. 15831-08

Tested By: AGS _____ Checked By: MTG *MTG* _____

LIQUID AND PLASTIC LIMITS TEST REPORT



| MATERIAL DESCRIPTION | LL | PL | PI | %<#40 | %<#200 | USCS |
|--------------------------------|----|----|----|-------|--------|------|
| poorly graded sand with gravel | NV | NP | NP | 19.2 | 3.8 | SP |

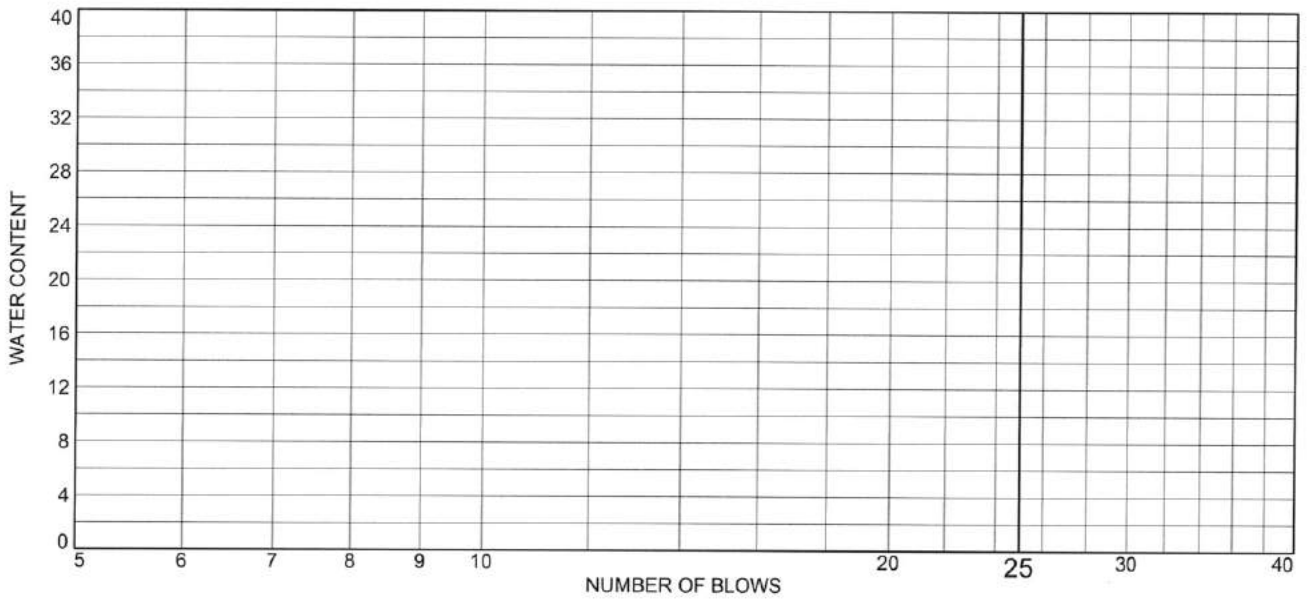
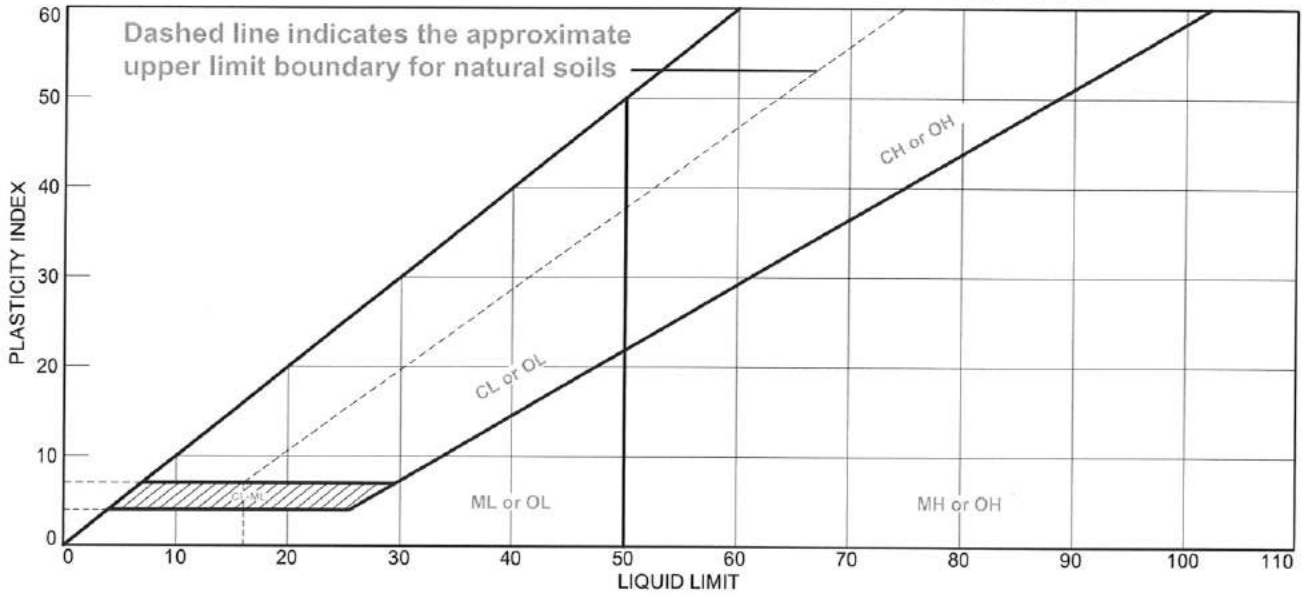
Project No. 1229-021 **Client:** Airport Solutions Group, LLC
Project: Reconstruct Runway 1-19
 Orange, MA
Location: Boring D-18
Sample Number: Bulk **Depth:** 0.5'-4'
R.W. Gillespie & Associates, Inc.
 Biddeford, Maine

Remarks:

Lab No. 15831-09

Tested By: AGS Checked By: MTG *MTG*

LIQUID AND PLASTIC LIMITS TEST REPORT



| MATERIAL DESCRIPTION | LL | PL | PI | %<#40 | %<#200 | USCS |
|---|----|----|----|-------|--------|-------|
| ● Poorly graded sand with silt and gravel | NV | NP | NP | 44.8 | 5.9 | SP-SM |

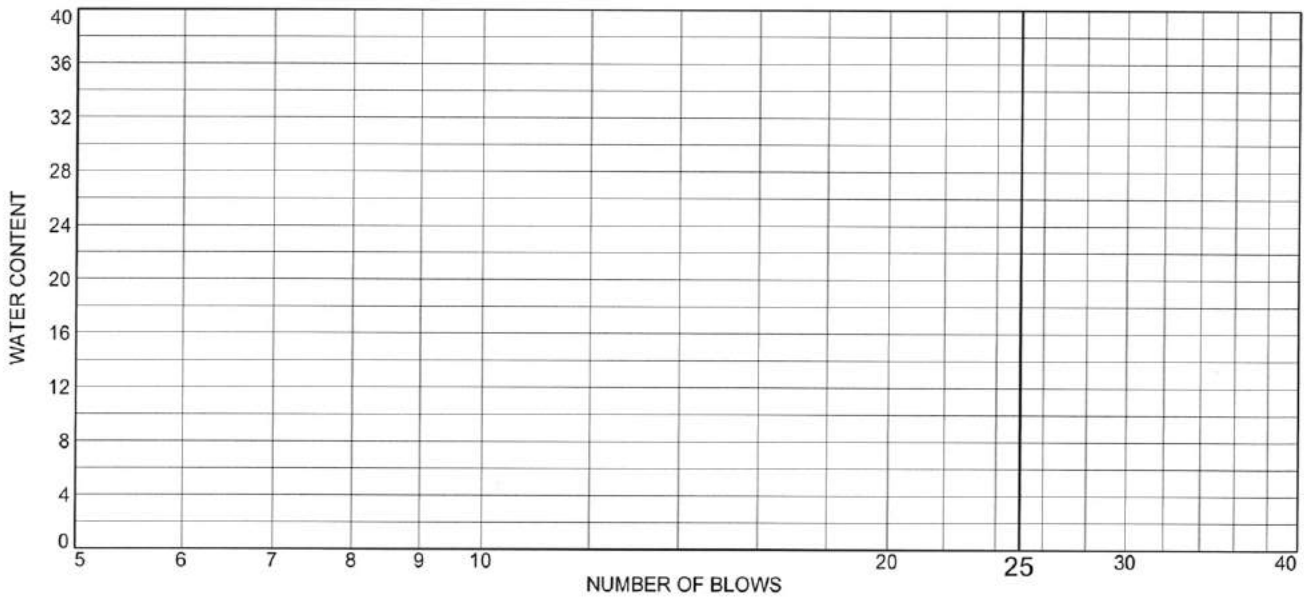
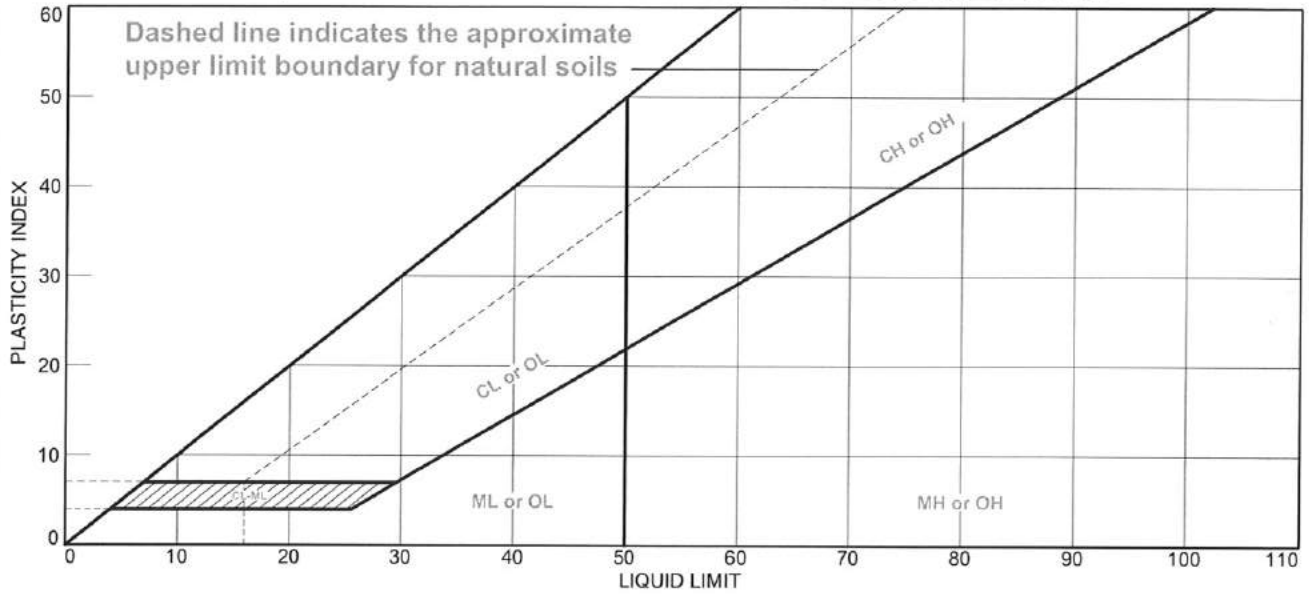
Project No. 1229-021 **Client:** Airport Solutions Group, LLC
Project: Reconstruct Runway 1-19
 Orange, MA
Location: Boring D-20
Sample Number: Bulk **Depth:** 0.5'-4'
R.W. Gillespie & Associates, Inc.
 Biddeford, Maine

Remarks:

Lab No. 15831-10

Tested By: AGS **Checked By:** MTG *MTG*

LIQUID AND PLASTIC LIMITS TEST REPORT



| MATERIAL DESCRIPTION | LL | PL | PI | %<#40 | %<#200 | USCS |
|---|----|----|----|-------|--------|-------|
| ● poorly graded sand with silt and gravel | NV | NP | NP | 35.7 | 6.5 | SW-SM |

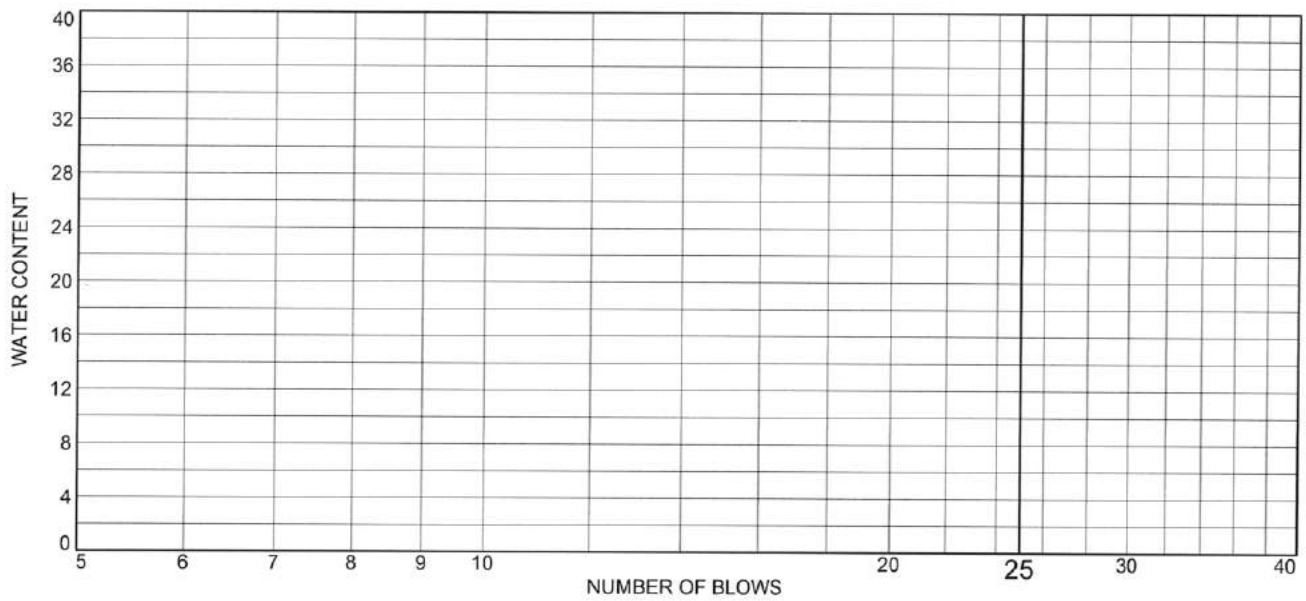
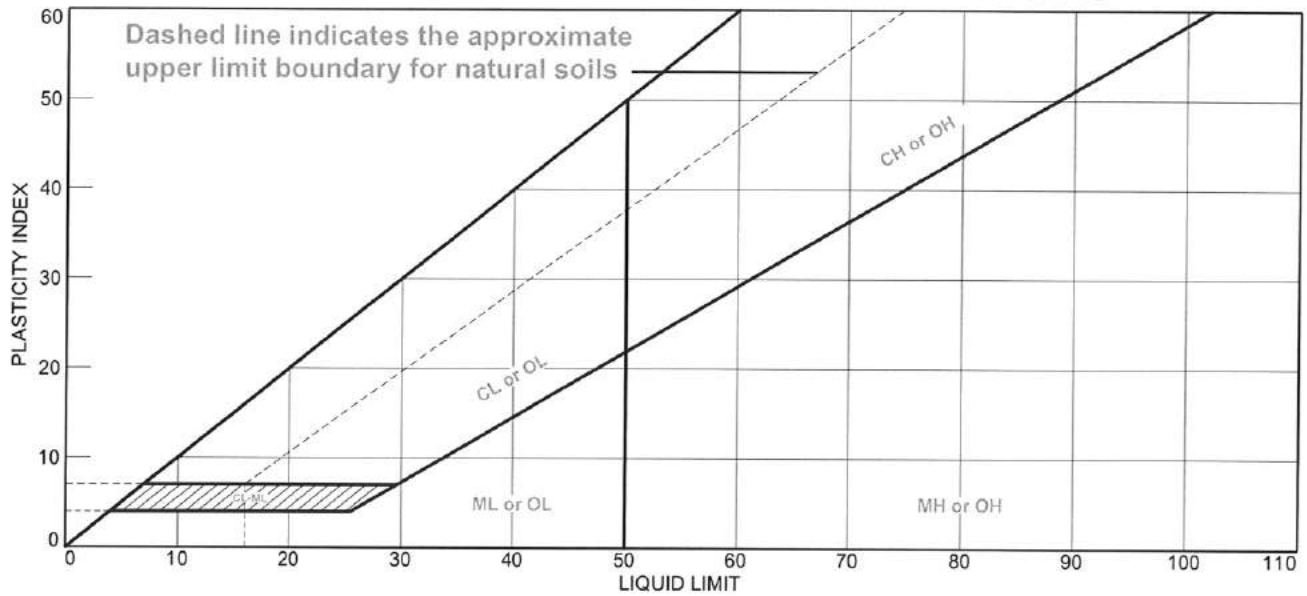
Project No. 1229-021 **Client:** Airport Solutions Group, LLC
Project: Reconstruct Runway 1-19
 Orange, MA
Location: Boring D-22
Sample Number: Bulk **Depth:** 0.5'-4'
R.W. Gillespie & Associates, Inc.
 Biddeford, Maine

Remarks:

Lab No. 15831-11

Tested By: AGS **Checked By:** MTG *MTG*

LIQUID AND PLASTIC LIMITS TEST REPORT



| MATERIAL DESCRIPTION | LL | PL | PI | %<#40 | %<#200 | USCS |
|--------------------------------|----|----|----|-------|--------|------|
| ● well-graded sand with gravel | NV | NP | NP | 26.7 | 4.7 | SW |

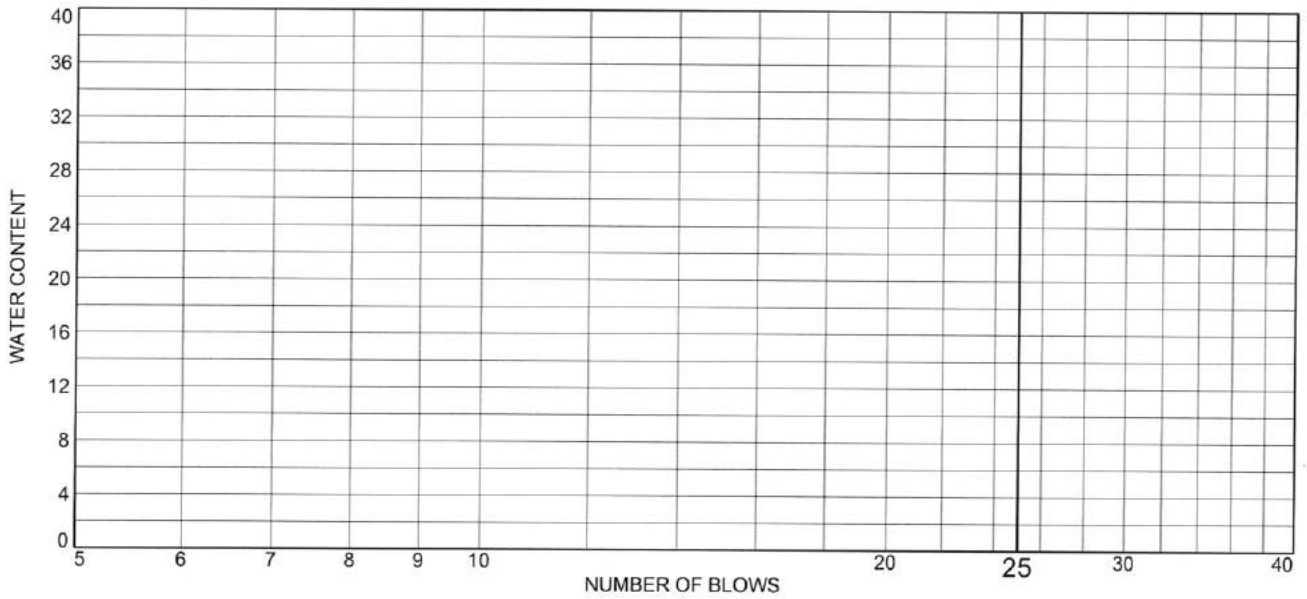
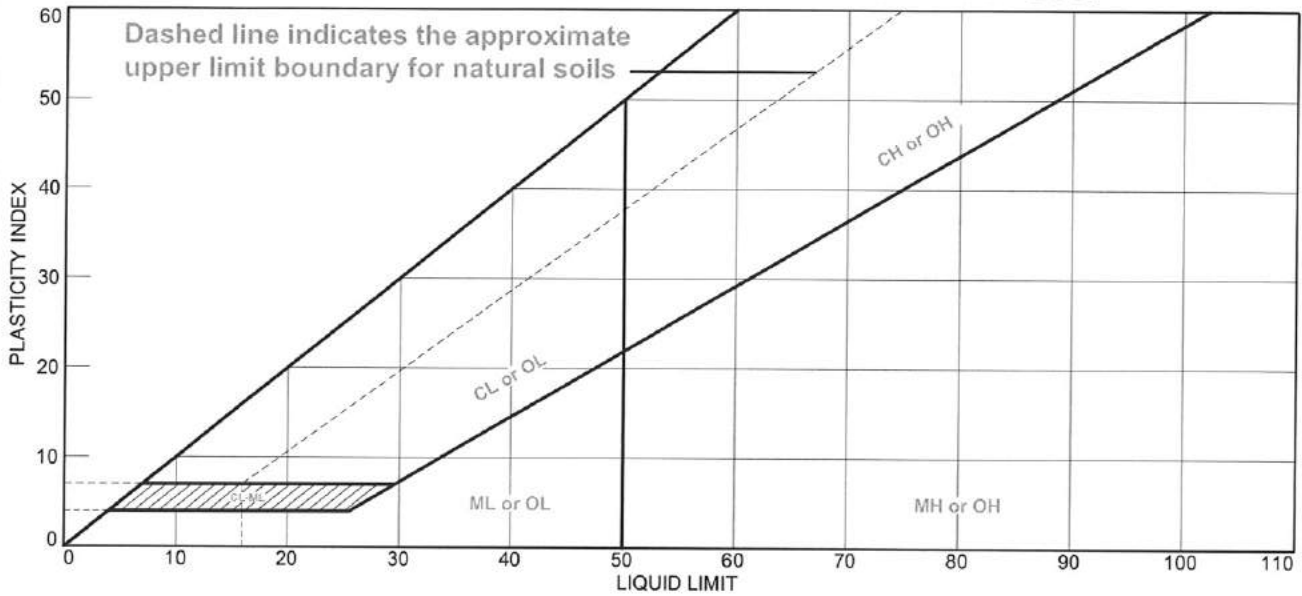
Project No. 1229-021 **Client:** Airport Solutions Group, LLC
Project: Reconstruct Runway 1-19
 Orange, MA
Location: Boring D-24
Sample Number: Bulk **Depth:** 0.5'-4'
R.W. Gillespie & Associates, Inc.
 Biddeford, Maine

Remarks:

Lab No. 15831-12

Tested By: AGS **Checked By:** MTG *MTG*

LIQUID AND PLASTIC LIMITS TEST REPORT



| MATERIAL DESCRIPTION | LL | PL | PI | %<#40 | %<#200 | USCS |
|---------------------------------------|----|----|----|-------|--------|-------|
| well-graded sand with silt and gravel | NV | NP | NP | 33.6 | 9.3 | SW-SM |

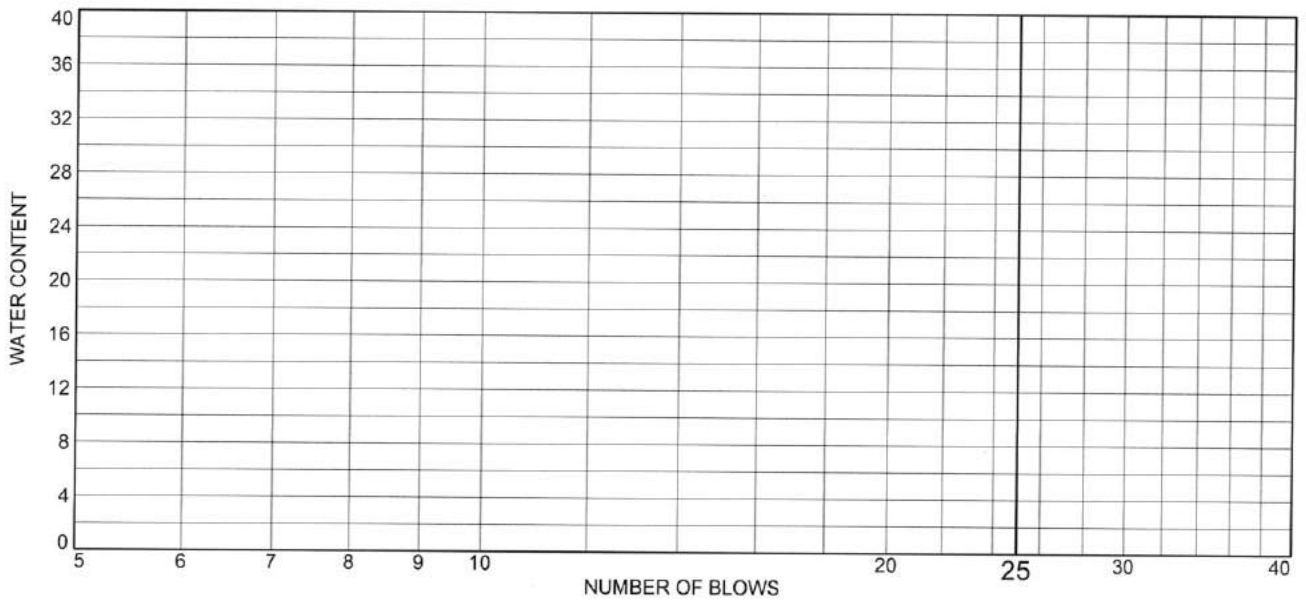
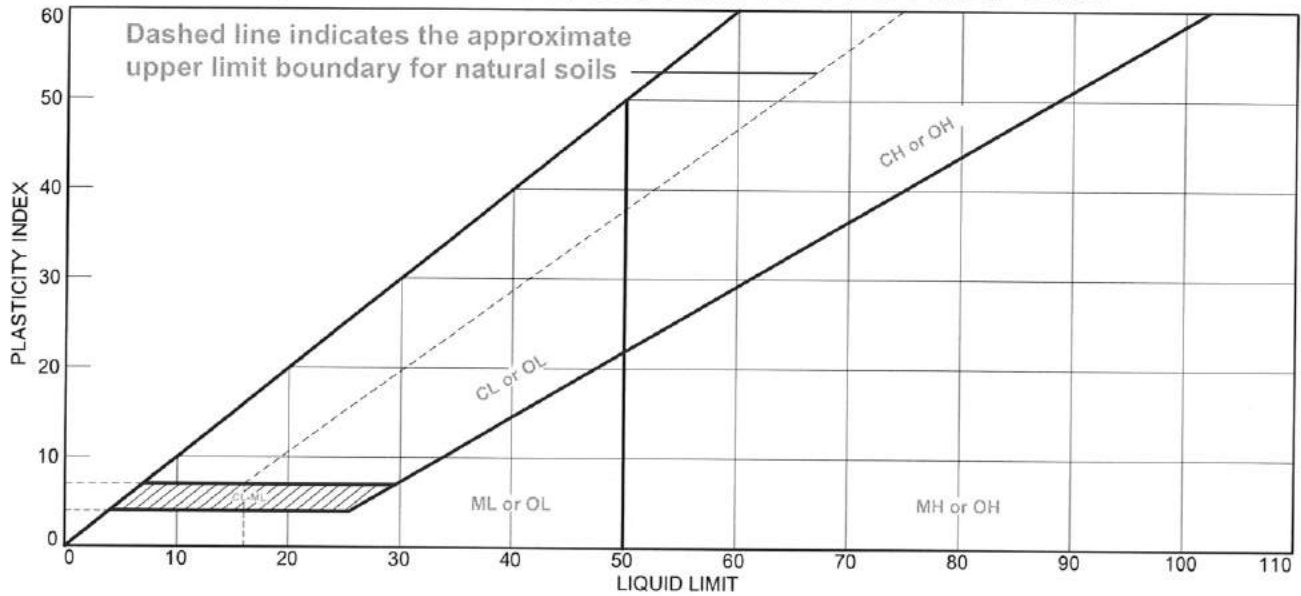
Project No. 1229-021 **Client:** Airport Solutions Group, LLC
Project: Reconstruct Runway 1-19
 Orange, MA
Location: Boring D-26
Sample Number: Bulk **Depth:** 0.5-4'
R.W. Gillespie & Associates, Inc.
 Biddeford, Maine

Remarks:

Lab No. 15831-13

Tested By: AGS **Checked By:** MTG *MTG*

LIQUID AND PLASTIC LIMITS TEST REPORT



| MATERIAL DESCRIPTION | LL | PL | PI | %<#40 | %<#200 | USCS |
|------------------------------|----|----|----|-------|--------|-------|
| poorly graded sand with silt | NV | NP | NP | 34.8 | 5.0 | SP-SM |

Project No. 1229-021 **Client:** Airport Solutions Group, LLC
Project: Reconstruct Runway 1-19
 Orange, MA
Location: Boring D-27
Sample Number: Bulk **Depth:** 0.5'-4'
R.W. Gillespie & Associates, Inc.
 Biddeford, Maine

Remarks:

Lab No. 15831-14

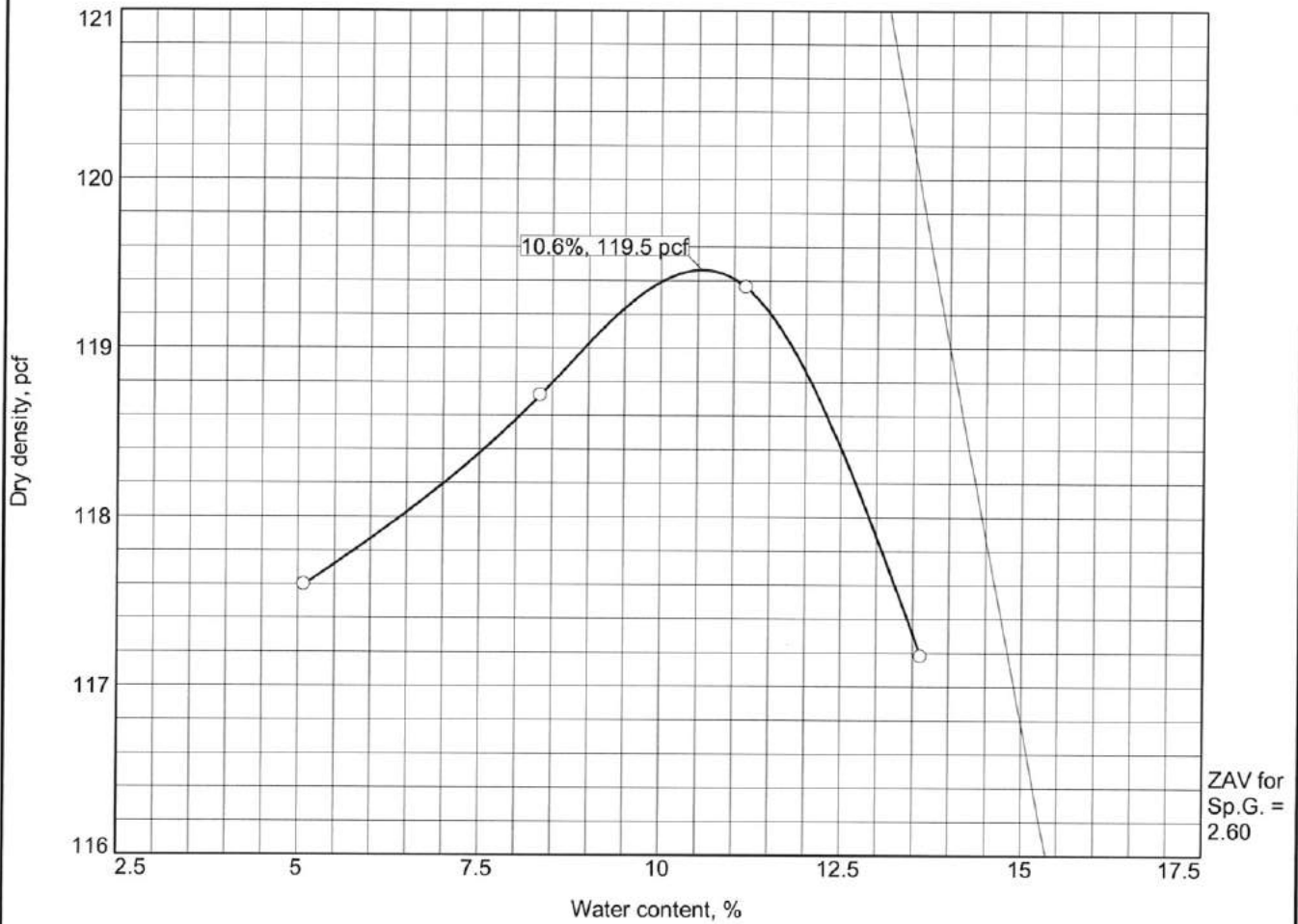
Tested By: AGS **Checked By:** MTG *MTG*

APPENDIX D

MOISTURE-DENSITY RELATIONSHIP TEST RESULTS

Geotechnical Engineering Evaluation
Reconstruct Runway 1-19
Orange Municipal Airport
Orange, Massachusetts

MOISTURE DENSITY REPORT



Test specification: ASTM D 698-12 Method A Standard - Mechanical
 ASTM D4718-15 Oversize Corr. Applied to Each Test Point

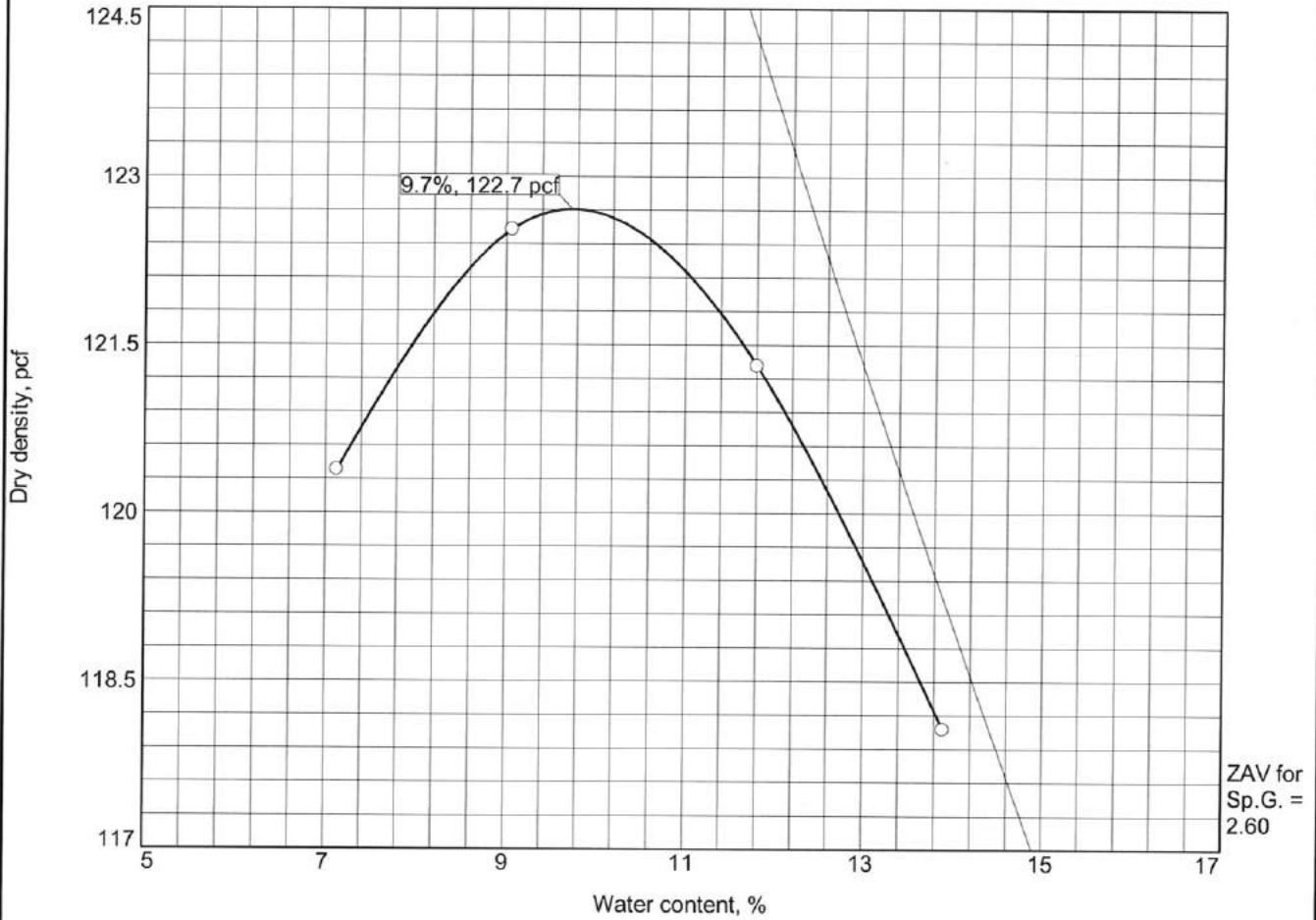
| Elev/ Depth | Classification | | Nat. Moist. | Sp.G. | LL | PI | % > #4 | % < No.200 |
|----------------|----------------|--------|----------------|-------|----|----|-----------|---------------|
| | USCS | AASHTO | | | | | | |
| 0.5'-4' | SP | A-1-b | | | NV | NP | 15.8 | 4.9 |

| ROCK CORRECTED TEST RESULTS | MATERIAL DESCRIPTION |
|---|--------------------------------|
| Maximum dry density = 119.5 pcf Optimum moisture = 10.6 % | poorly graded sand with gravel |
| Project No. 1229-021 Client: Airport Solutions Group, LLC Project: Reconstruct Runway 1-19 Orange, MA Location: Boring D-2 Sample Number: Bulk R.W. Gillespie & Associates, Inc. Biddeford, Maine | Remarks: |
| | Lab No. 15831-01 |

Tested By: JJB

Checked By: MTG

MOISTURE DENSITY REPORT



Test specification: ASTM D 698-12 Method A Standard - Mechanical
 ASTM D4718-15 Oversize Corr. Applied to Each Test Point

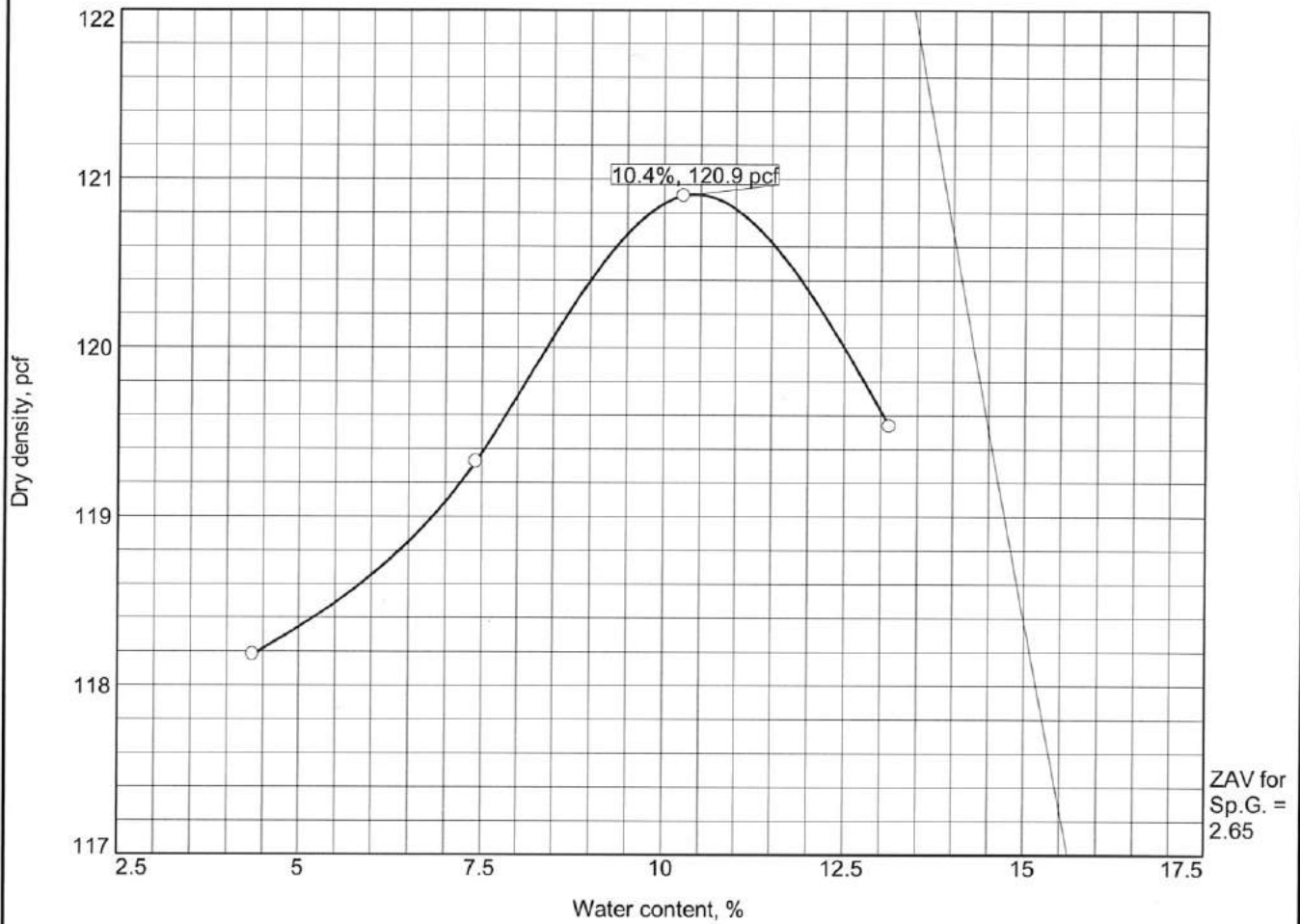
| Elev/ Depth | Classification | | Nat. Moist. | Sp.G. | LL | PI | % > #4 | % < No.200 |
|----------------|----------------|--------|----------------|-------|----|----|-----------|---------------|
| | USCS | AASHTO | | | | | | |
| 0.5'-4' | SW | A-1-b | | | NV | NP | 12.3 | 4.9 |

| ROCK CORRECTED TEST RESULTS | MATERIAL DESCRIPTION |
|--|-------------------------|
| Maximum dry density = 122.7 pcf Optimum moisture = 9.7 % | well-graded sand |
| Project No. 1229-021 Client: Airport Solutions Group, LLC Project: Reconstruct Runway 1-19 Orange, MA Location: Boring D-6 Sample Number: Bulk R.W. Gillespie & Associates, Inc. Biddeford, Maine | Remarks: |
| | Lab No. 15831-03 |

Tested By: JJB/CAG

Checked By: MTG

MOISTURE DENSITY REPORT



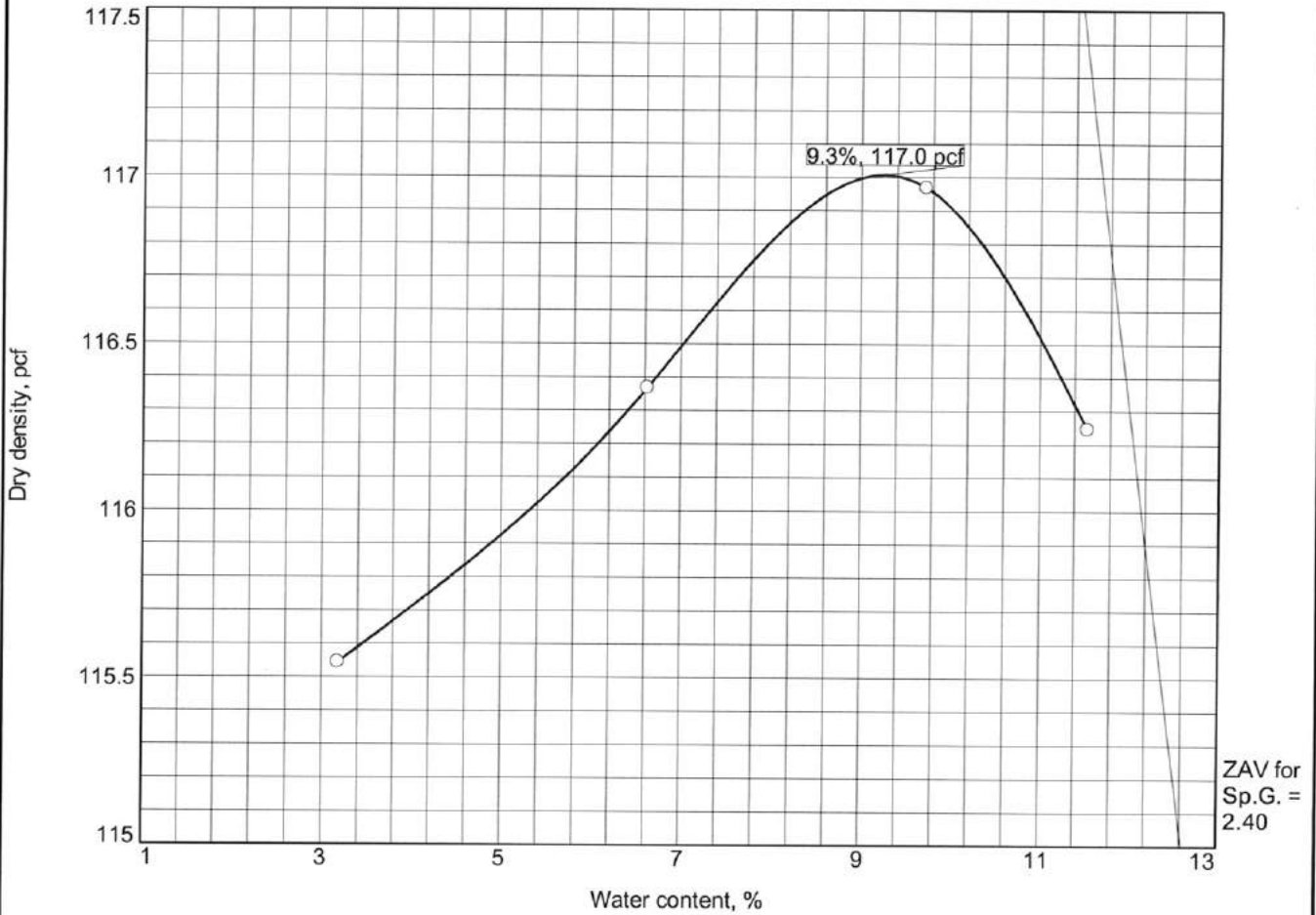
Test specification: ASTM D 698-12 Method A Standard - Mechanical
 ASTM D4718-15 Oversize Corr. Applied to Each Test Point

| Elev/ Depth | Classification | | Nat. Moist. | Sp.G. | LL | PI | % > #4 | % < No.200 |
|----------------|----------------|--------|----------------|-------|----|----|-----------|---------------|
| | USCS | AASHTO | | | | | | |
| 0.5'-4' | SP | A-1-b | | | NV | NP | 17.7 | 4.4 |

| ROCK CORRECTED TEST RESULTS | MATERIAL DESCRIPTION |
|---|--------------------------------|
| Maximum dry density = 120.9 pcf Optimum moisture = 10.4 % | poorly graded sand with gravel |
| Project No. 1229-021 Client: Airport Solutions Group, LLC Project: Reconstruct Runway 1-19 Orange, MA ○ Location: Boring D-10 Sample Number: Bulk | Remarks: |
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | |
| Lab No. 15831-05 | |

Tested By: JJB _____ Checked By: MTG *MTG* _____

MOISTURE DENSITY REPORT



Test specification: ASTM D 698-12 Method A Standard - Mechanical
 ASTM D4718-15 Oversize Corr. Applied to Each Test Point

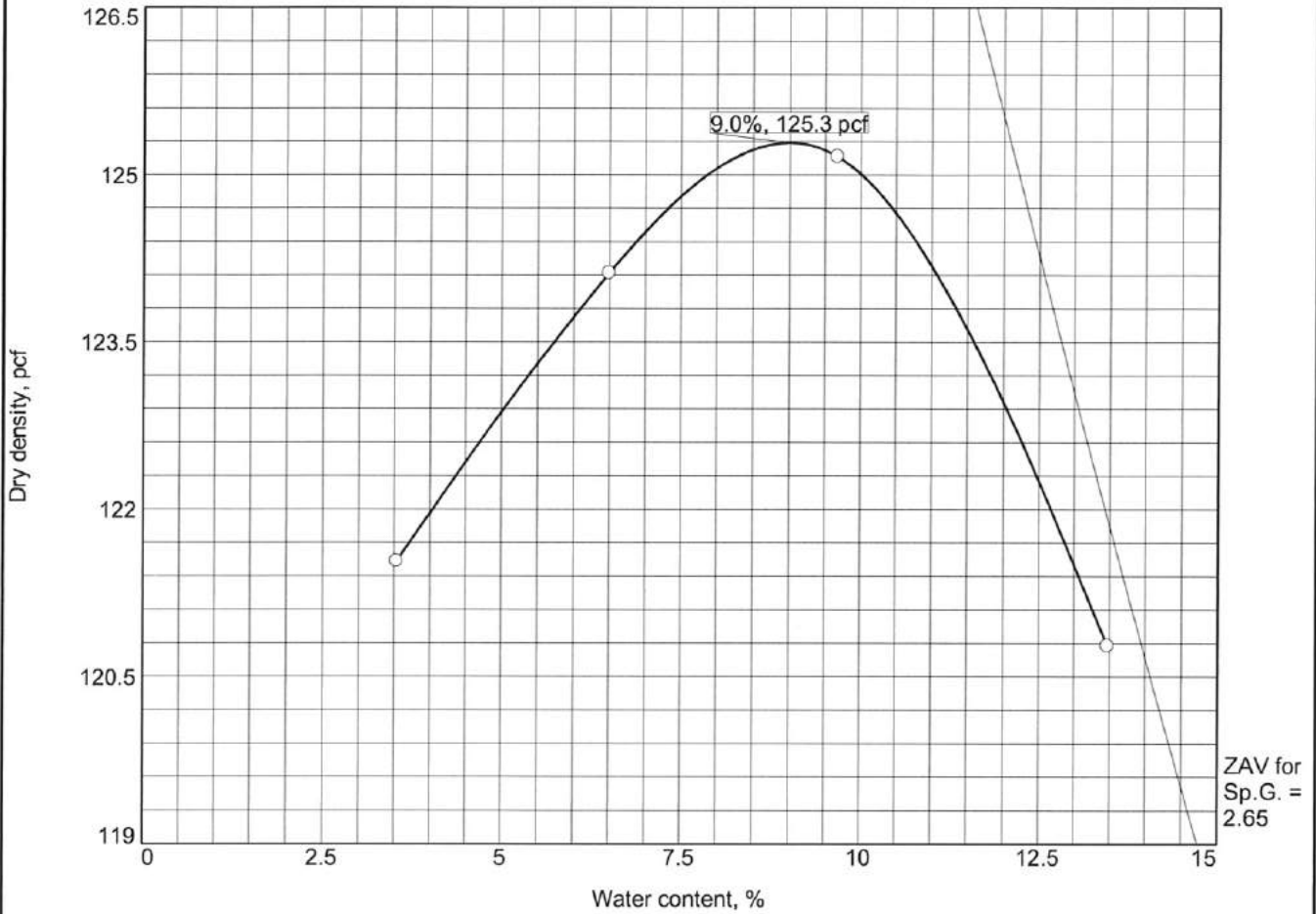
| Elev/ Depth | Classification | | Nat. Moist. | Sp.G. | LL | PI | % > #4 | % < No.200 |
|----------------|----------------|--------|----------------|-------|----|----|-----------|---------------|
| | USCS | AASHTO | | | | | | |
| 0.5'-4' | SP | A-1-b | | | NV | NP | 12.3 | 3.9 |

| ROCK CORRECTED TEST RESULTS | MATERIAL DESCRIPTION |
|---|-------------------------|
| Maximum dry density = 117.0 pcf Optimum moisture = 9.3 % | poorly graded sand |
| Project No. 1229-021 Client: Airport Solutions Group, LLC Project: Reconstruct Runway 1-19 Orange, MA Location: Boring D-12 Sample Number: Bulk R.W. Gillespie & Associates, Inc. Biddeford, Maine | Remarks: |
| | Lab No. 15831-06 |

Tested By: JJB/CAG

Checked By: 15831-06

MOISTURE DENSITY REPORT



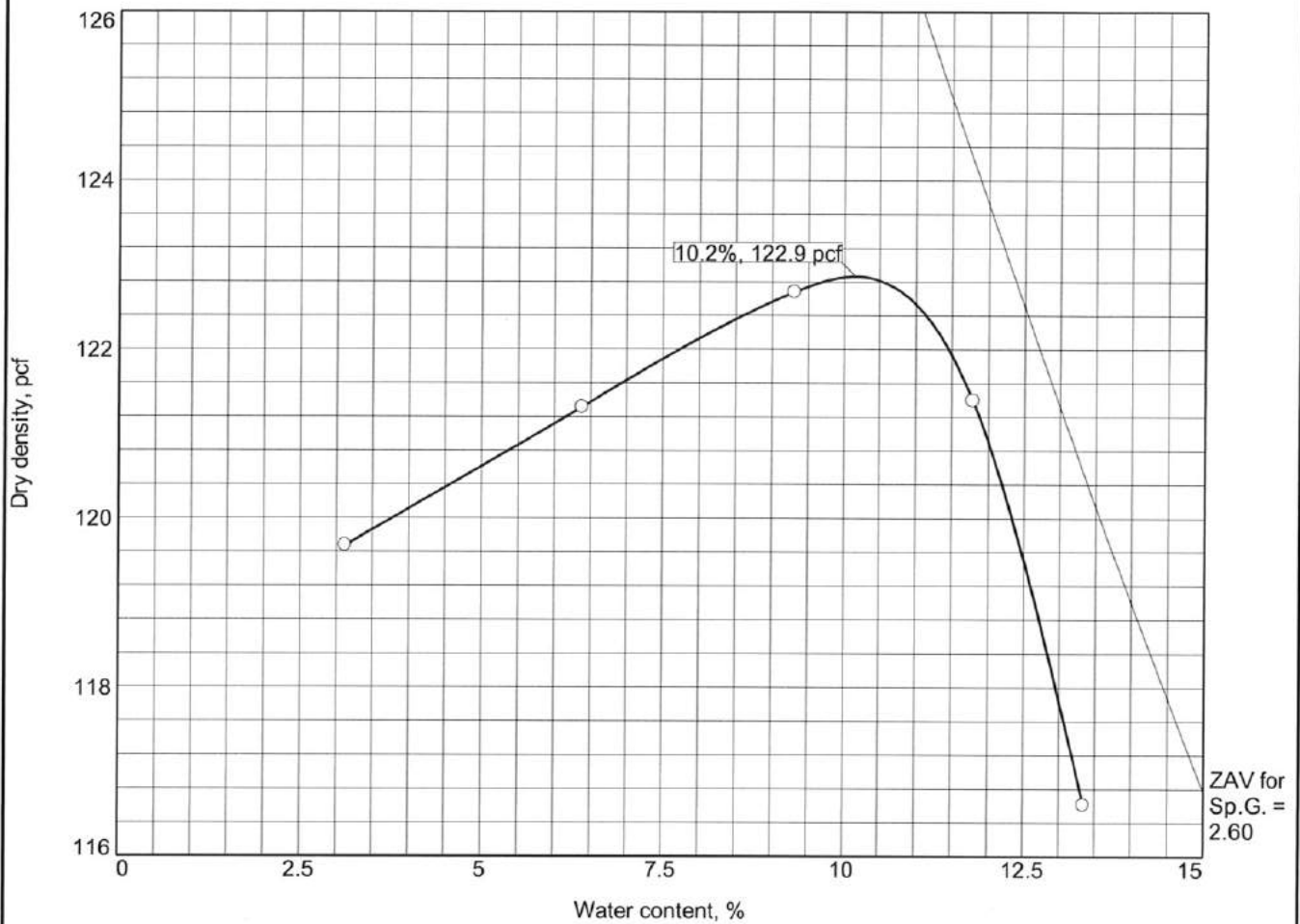
Test specification: ASTM D 698-12 Method A Standard - Mechanical
 ASTM D4718-15 Oversize Corr. Applied to Each Test Point

| Elev/ Depth | Classification | | Nat. Moist. | Sp.G. | LL | PI | % > #4 | % < No.200 |
|----------------|----------------|--------|----------------|-------|----|----|-----------|---------------|
| | USCS | AASHTO | | | | | | |
| 0.5'-4' | SP-SM | A-1-b | | | NV | NP | 21.3 | 6.5 |

| ROCK CORRECTED TEST RESULTS | MATERIAL DESCRIPTION |
|---|---|
| Maximum dry density = 125.3 pcf Optimum moisture = 9.0 % | poorly graded sand with silt and gravel |
| Project No. 1229-021 Client: Airport Solutions Group, LLC Project: Reconstruct Runway 1-19 Orange, MA Location: Boring D-16 Sample Number: Bulk | Remarks: |
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | |
| Lab No. 15831-08 | |

Tested By: JJB/CAG Checked By: MTG *MTG*

MOISTURE DENSITY REPORT



Test specification: ASTM D 698-12 Method A Standard - Mechanical
 ASTM D4718-15 Oversize Corr. Applied to Each Test Point

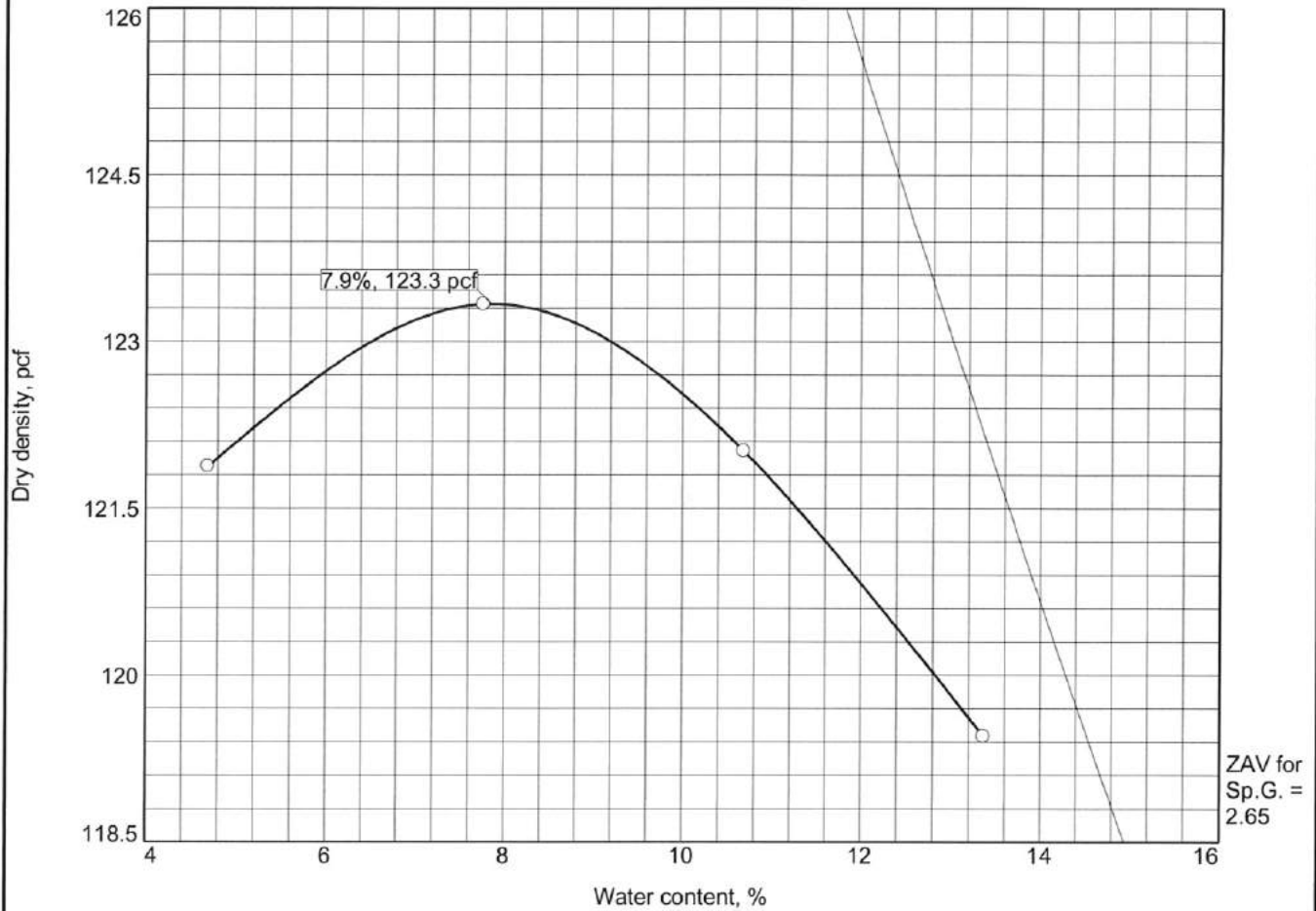
| Elev/ Depth | Classification | | Nat. Moist. | Sp.G. | LL | PI | % > #4 | % < No.200 |
|----------------|----------------|--------|----------------|-------|----|----|-----------|---------------|
| | USCS | AASHTO | | | | | | |
| 0.5'-4' | SP-SM | A-1-b | 2.6 | 2.4 | NV | NP | 23.8 | 5.9 |

| ROCK CORRECTED TEST RESULTS | MATERIAL DESCRIPTION |
|---|---|
| Maximum dry density = 122.9 pcf Optimum moisture = 10.2 % | Poorly graded sand with silt and gravel |
| Project No. 1229-021 Client: Airport Solutions Group, LLC Project: Reconstruct Runway 1-19 Orange, MA <input type="radio"/> Location: Boring D-20 Sample Number: Bulk | Remarks: |
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | |
| Lab No. 15831-10 | |

Tested By: CAG

Checked By: MTG

MOISTURE DENSITY REPORT



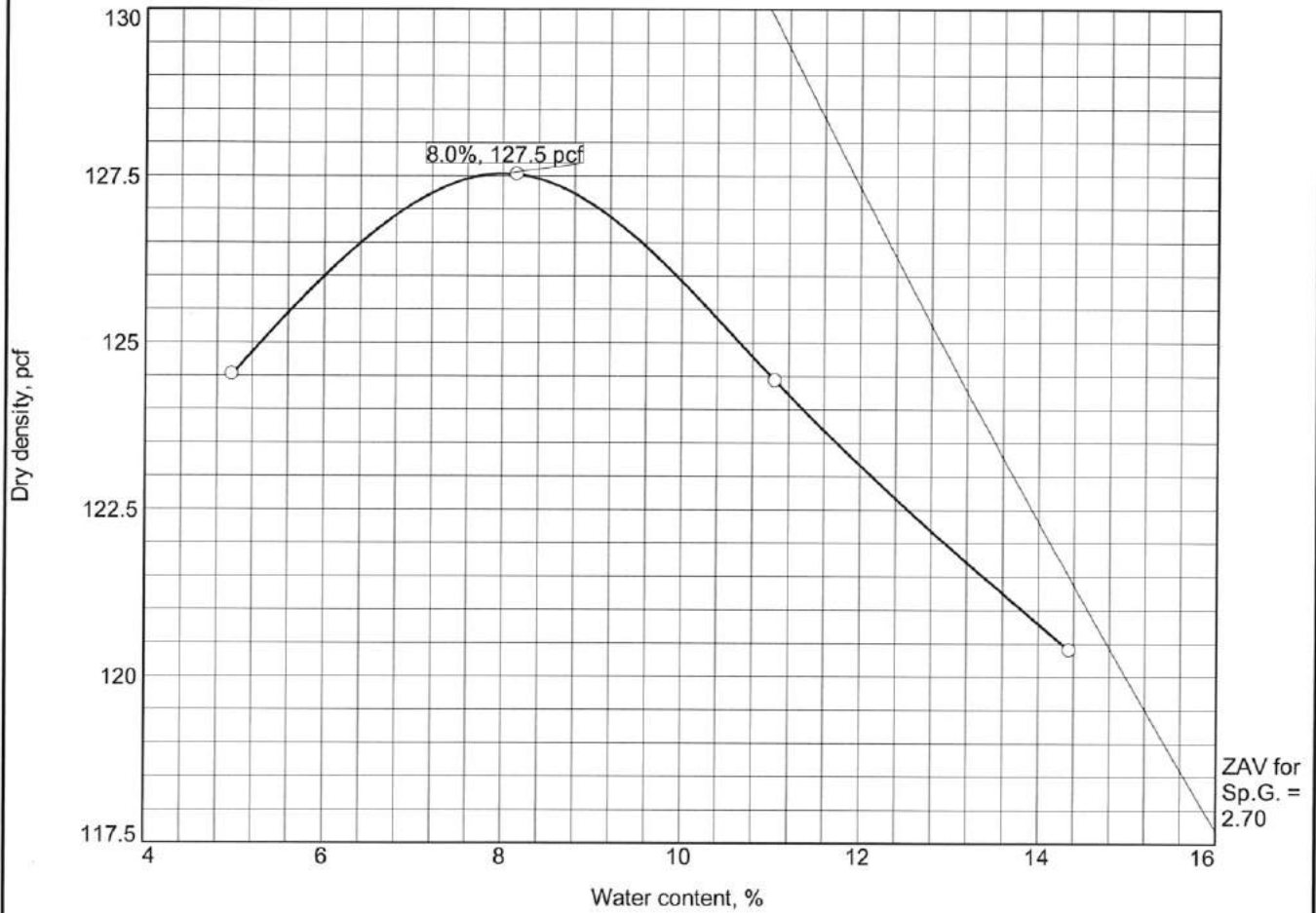
Test specification: ASTM D 698-12 Method A Standard - Mechanical
 ASTM D4718-15 Oversize Corr. Applied to Each Test Point

| Elev/ Depth | Classification | | Nat. Moist. | Sp.G. | LL | PI | % > #4 | % < No.200 |
|----------------|----------------|--------|----------------|-------|----|----|-----------|---------------|
| | USCS | AASHTO | | | | | | |
| 0.5'-4' | SW | A-1-b | | | NV | NP | 17.2 | 4.7 |

| ROCK CORRECTED TEST RESULTS | MATERIAL DESCRIPTION |
|---|------------------------------|
| Maximum dry density = 123.3 pcf Optimum moisture = 7.9 % | well-graded sand with gravel |
| Project No. 1229-021 Client: Airport Solutions Group, LLC Project: Reconstruct Runway 1-19 Orange, MA Location: Boring D-24 Sample Number: Bulk | Remarks: |
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | |
| Lab No. 15831-12 | |

Tested By: JJB _____ Checked By: MTG *MTG*

MOISTURE DENSITY REPORT



Test specification: ASTM D 698-12 Method A Standard - Mechanical
 ASTM D4718-15 Oversize Corr. Applied to Each Test Point

| Elev/ Depth | Classification | | Nat. Moist. | Sp.G. | LL | PI | % > #4 | % < No.200 |
|----------------|----------------|--------|----------------|-------|----|----|-----------|---------------|
| | USCS | AASHTO | | | | | | |
| 0.5-4' | SW-SM | A-1-b | | | NV | NP | 17.1 | 9.3 |

| ROCK CORRECTED TEST RESULTS | MATERIAL DESCRIPTION |
|---|---------------------------------------|
| Maximum dry density = 127.5 pcf Optimum moisture = 8.0 % | well-graded sand with silt and gravel |
| Project No. 1229-021 Client: Airport Solutions Group, LLC Project: Reconstruct Runway 1-19 Orange, MA ○ Location: Boring D-26 Sample Number: Bulk | Remarks: |
| R.W. Gillespie & Associates, Inc. Biddeford, Maine | |
| Lab No. 15831-13 | |

Tested By: JJB/CAG _____ Checked By: MTG *MTG*

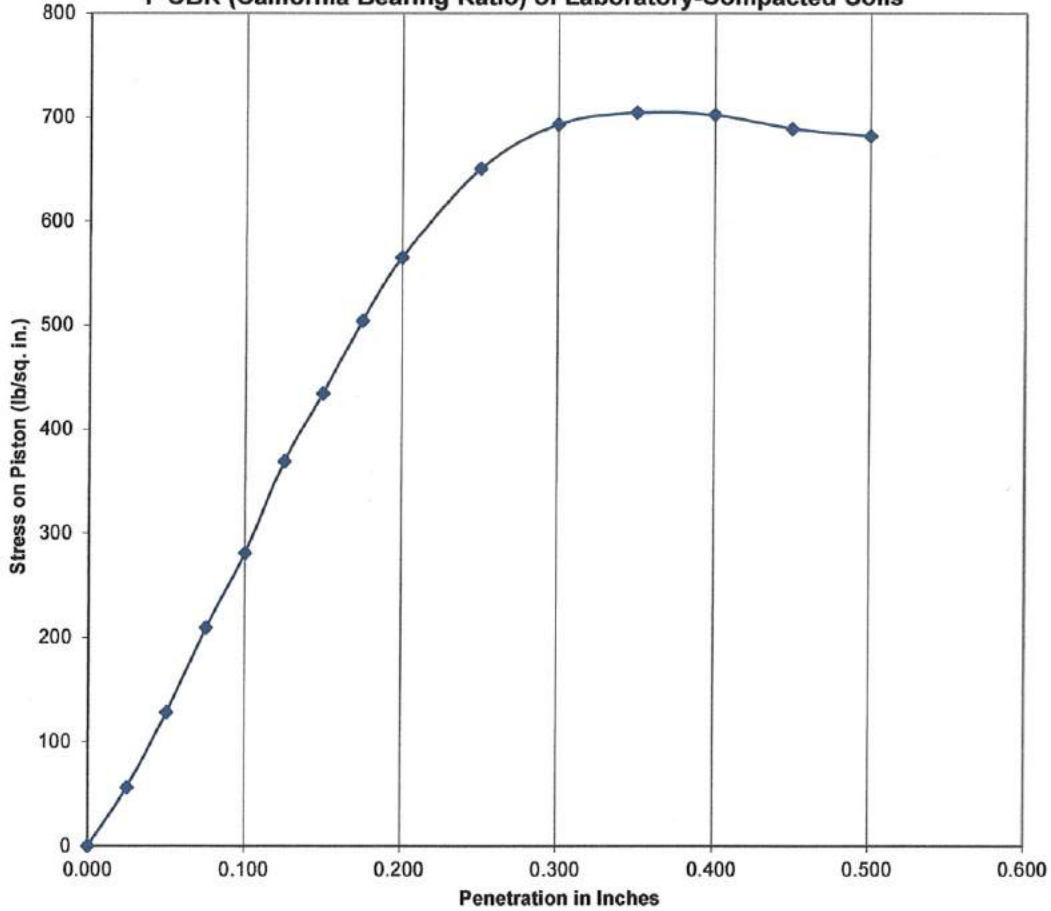
APPENDIX E

ATTERBERG LIMIT TEST RESULTS

Geotechnical Engineering Evaluation
Reconstruct Runway 1-19
Orange Municipal Airport
Orange, Massachusetts

**Lab California Bearing Ratio
ASTM D 1883**

1' CBR (California Bearing Ratio) of Laboratory-Compacted Soils

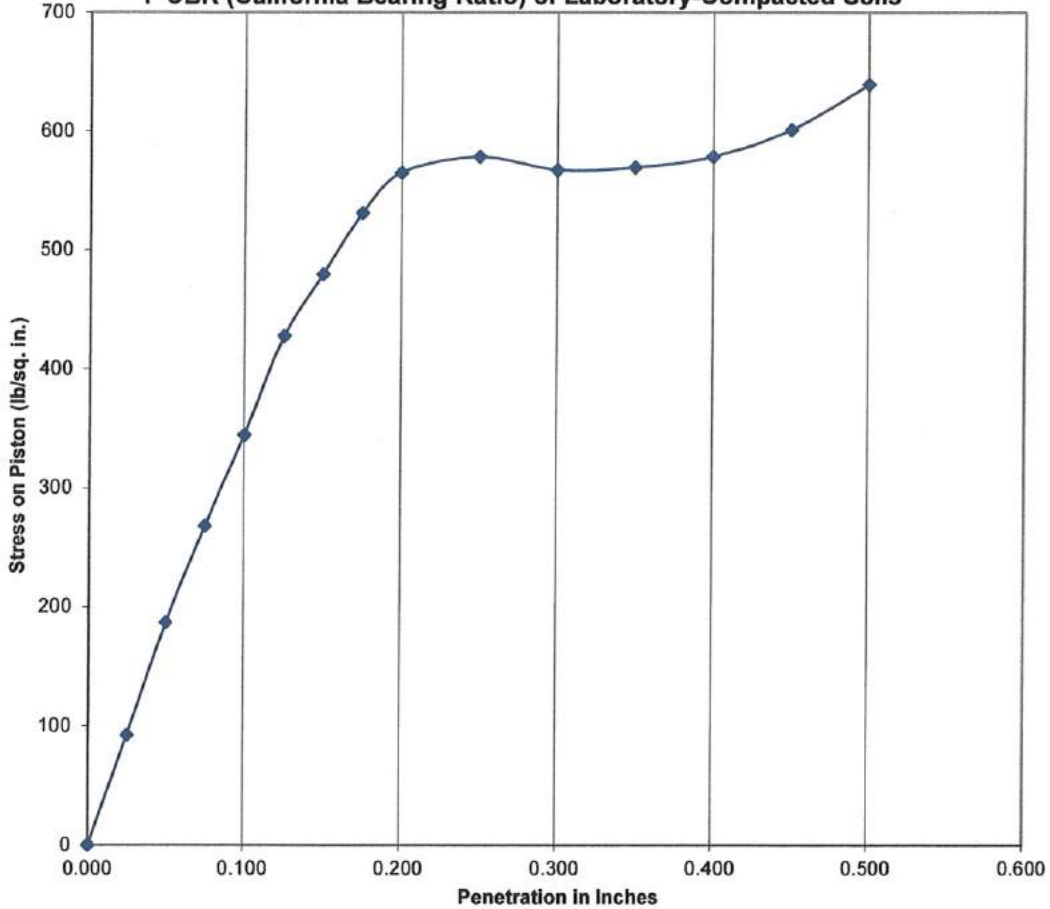


Bearing Ratio = 28.1 at 98.0% Compaction

| | | | |
|--|-------------------------|---|------------------------------|
| Test Location: | D-2 | Sample #/Test Depth: | Bulk/0.5'-4' |
| Prep Method: | D698 | As Compacted Moisture Content: | 10.6% |
| Curing Conditions: | Soaked | Top 1" of Test Sample Moisture Content: | 9.6% |
| Tested Dry Density: | 117.2 | Sample Swell: | 0% |
| Surcharge Weight: | 10 lbs | % Retained on 19mm Sieve: | 4% |
| Special Sample Testing Procedures or Comments from Above | | | |
| None | | | |
| Project: | Reconstruct Runway 1-19 | Client: | Airport Solutions Group, LLC |
| Project #: | 1229-021 | Date: | 12/17/2019 |
| Location: | Orange, MA | Sample #: | 15831-01 |
| R. W. Gillespie & Associates | | | |
| 20 Pomerleau St. Suite 100 Biddeford, ME 04005 | | 177 Shattuck Way, Suite 1 West Newington, NH 03801 | |

**Lab California Bearing Ratio
ASTM D 1883**

1' CBR (California Bearing Ratio) of Laboratory-Compacted Soils

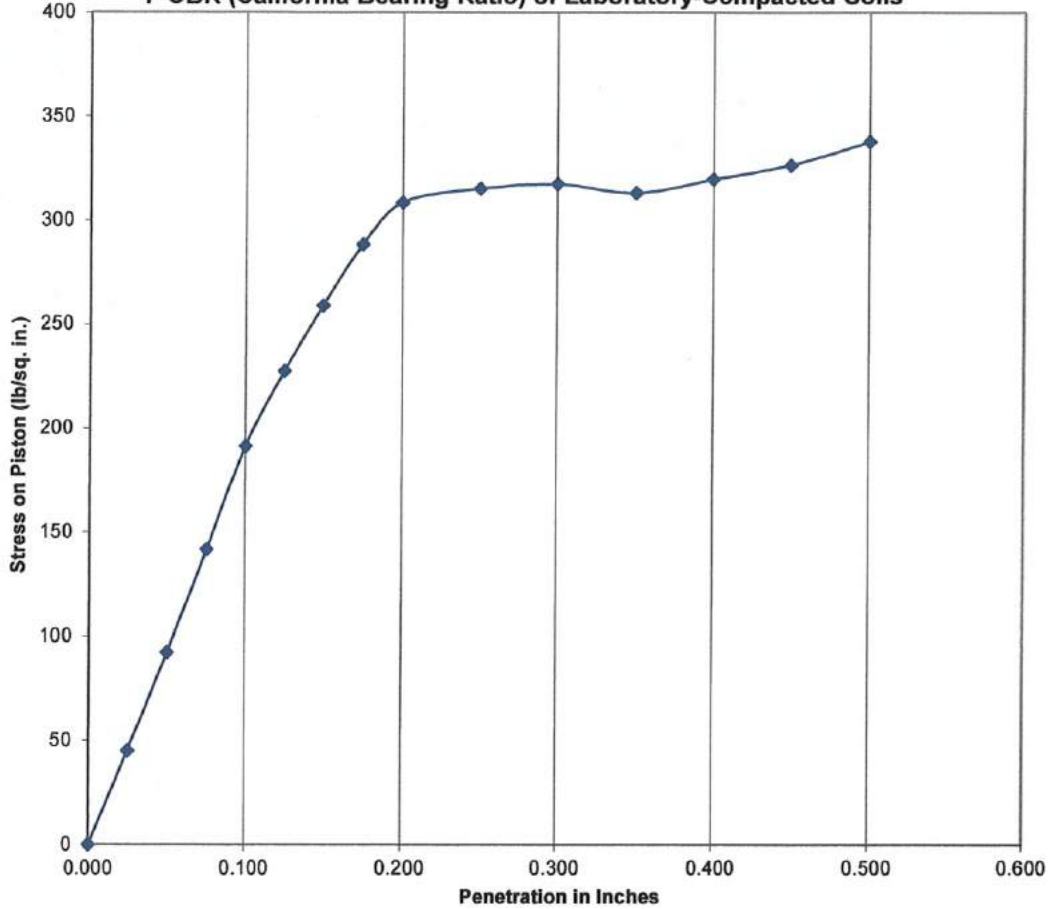


Bearing Ratio = 34.4 at 99.2% Compaction

| | | | |
|--|-------------------------|---|------------------------------|
| Test Location: | D-6 | Sample #/Test Depth: | Bulk/0.5'-4' |
| Prep Method: | D698 | As Compacted Moisture Content: | 9.1% |
| Curing Conditions: | Soaked | Top 1" of Test Sample Moisture Content: | 9.8% |
| Tested Dry Density: | 121.7 | Sample Swell: | 0% |
| Surcharge Weight: | 10 lbs | % Retained on 19mm Sieve: | 2.4% |
| Special Sample Testing Procedures or Comments from Above | | | |
| None | | | |
| Project: | Reconstruct Runway 1-19 | Client: | Airport Solutions Group, LLC |
| Project #: | 1229-021 | Date: | 12/27/2019 |
| Location: | Orange, MA | Sample #: | 15831-03 |
| R. W. Gillespie & Associates | | | |
| 20 Pomerleau St. Suite 100 Biddeford, ME 04005 | | 177 Shattuck Way, Suite 1 West Newington, NH 03801 | |

**Lab California Bearing Ratio
ASTM D 1883**

1' CBR (California Bearing Ratio) of Laboratory-Compacted Soils

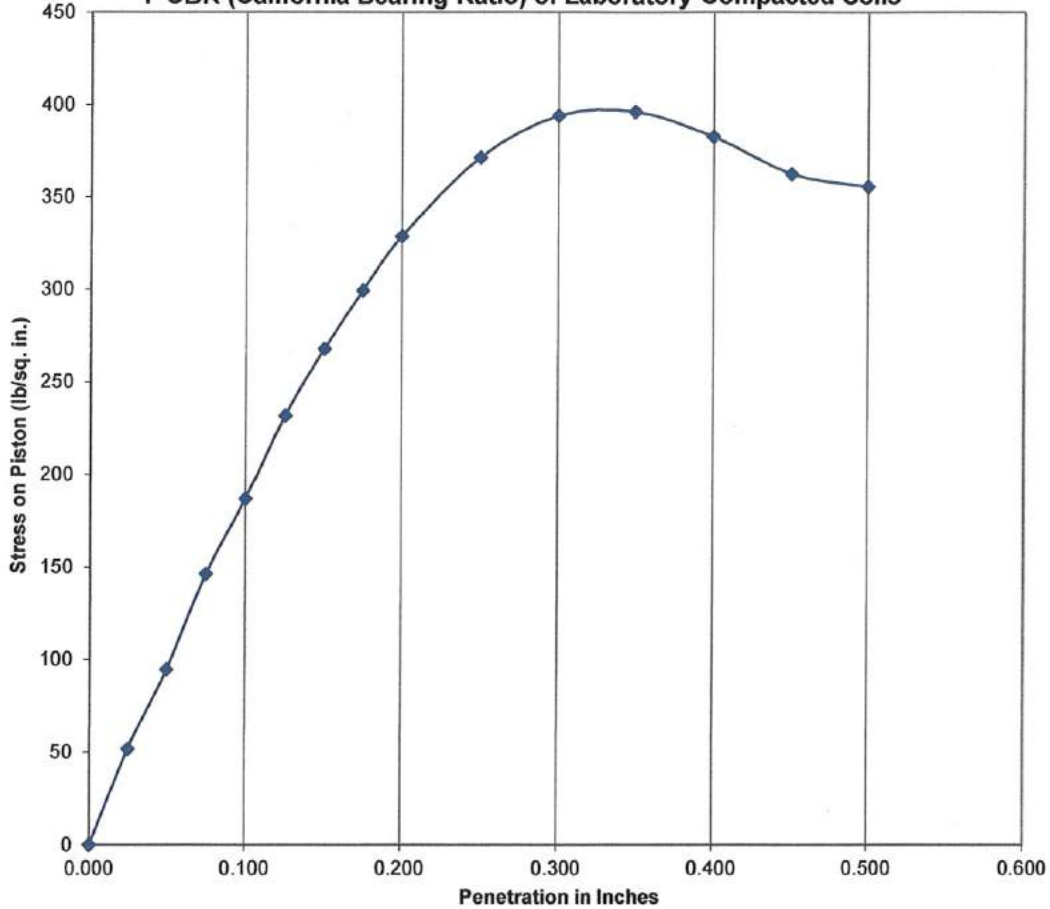


Bearing Ratio = 19.1 at 98.4% Compaction

| | | | |
|--|-------------------------|---|------------------------------|
| Test Location: | D-10 | Sample #/Test Depth: | Bulk/0.5'-4' |
| Prep Method: | D698 | As Compacted Moisture Content: | 10.0% |
| Curing Conditions: | Soaked | Top 1" of Test Sample Moisture Content: | 10.2% |
| Tested Dry Density: | 119.0 | Sample Swell: | 0% |
| Surcharge Weight: | 10 lbs | % Retained on 19mm Sieve: | 3% |
| Special Sample Testing Procedures or Comments from Above | | | |
| None | | | |
| Project: | Reconstruct Runway 1-19 | Client: | Airport Solutions Group, LLC |
| Project #: | 1229-021 | Date: | 12/17/2019 |
| Location: | Orange, MA | Sample #: | 15831-05 |
| R. W. Gillespie & Associates | | | |
| 20 Pomerleau St. Suite 100 Biddeford, ME 04005 | | 177 Shattuck Way, Suite 1 West Newington, NH 03801 | |

**Lab California Bearing Ratio
ASTM D 1883**

1' CBR (California Bearing Ratio) of Laboratory-Compacted Soils

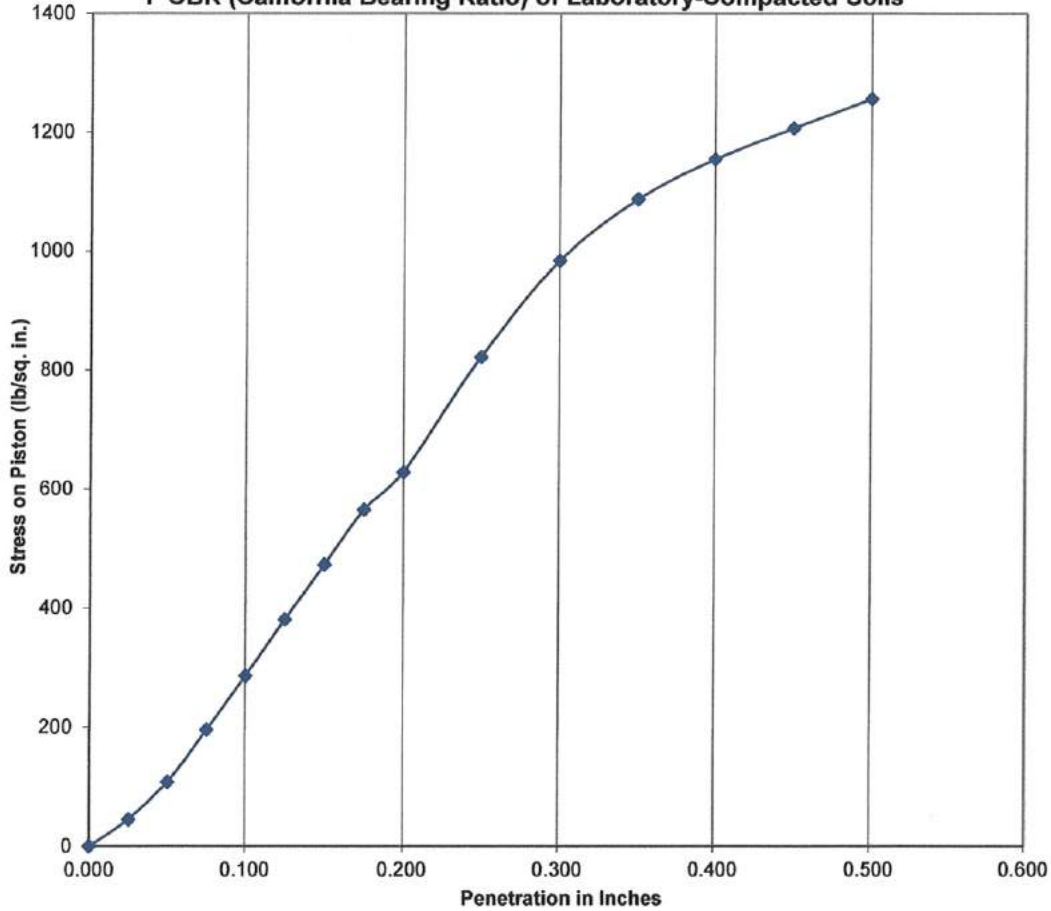


Bearing Ratio = 18.7 at 98.4% Compaction

| | | | |
|--|-------------------------|---|------------------------------|
| Test Location: | D-12 | Sample #/Test Depth: | Bulk/0.5'-4' |
| Prep Method: | D698 | As Compacted Moisture Content: | 9.4% |
| Curing Conditions: | Soaked | Top 1" of Test Sample Moisture Content: | 12.5% |
| Tested Dry Density: | 115.1 | Sample Swell: | 0% |
| Surcharge Weight: | 10 lbs | % Retained on 19mm Sieve: | 2.2% |
| Special Sample Testing Procedures or Comments from Above | | | |
| None | | | |
| Project: | Reconstruct Runway 1-19 | Client: | Airport Solutions Group, LLC |
| Project #: | 1229-021 | Date: | 12/27/2019 |
| Location: | Orange, MA | Sample #: | 15831-06 |
| R. W. Gillespie & Associates | | | |
| 20 Pomerleau St. Suite 100 Biddeford, ME 04005 | | 177 Shattuck Way, Suite 1 West Newington, NH 03801 | |

**Lab California Bearing Ratio
ASTM D 1883**

1' CBR (California Bearing Ratio) of Laboratory-Compacted Soils

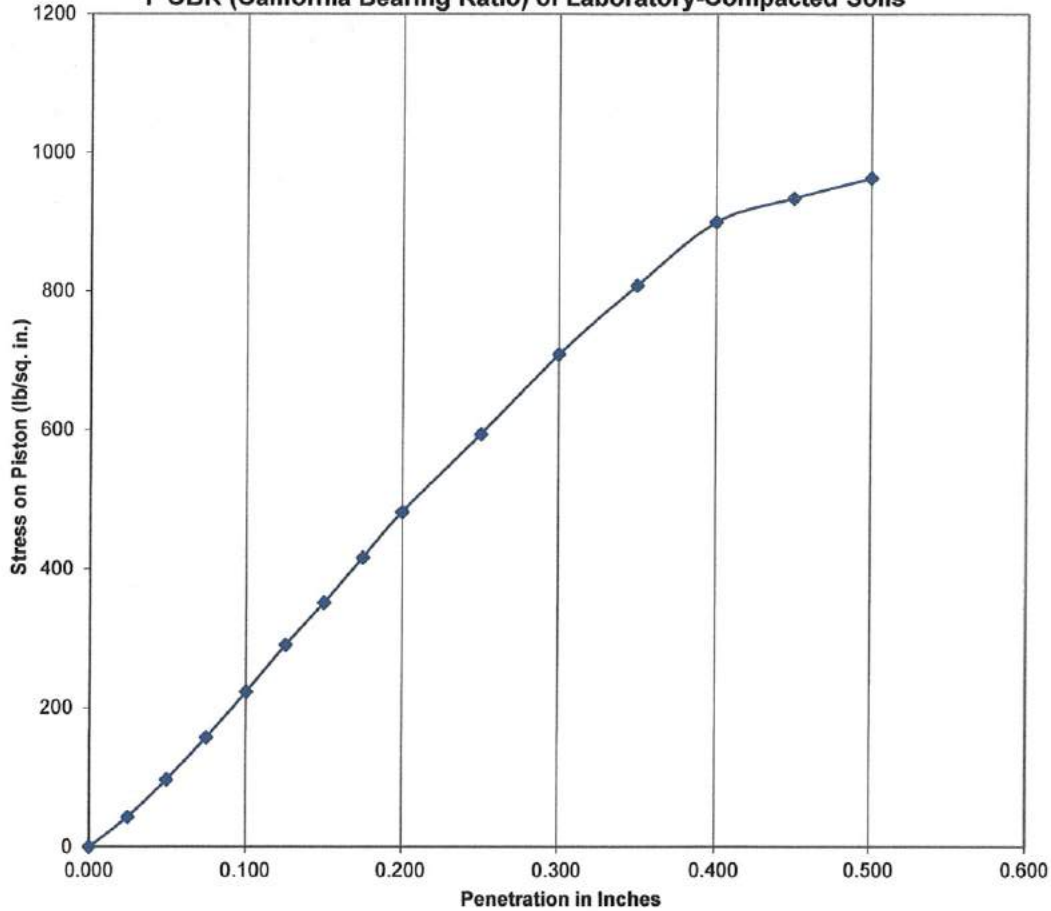


Bearing Ratio = 28.6 at 97.7% Compaction

| | | | |
|--|-------------------------|---|------------------------------|
| Test Location: | D-14 | Sample #/Test Depth: | Bulk/0.5'-4' |
| Prep Method: | D698 | As Compacted Moisture Content: | 8.4% |
| Curing Conditions: | Soaked | Top 1" of Test Sample Moisture Content: | 7.3% |
| Tested Dry Density: | 125.3 | Sample Swell: | 0% |
| Surcharge Weight: | 10 lbs | % Retained on 19mm Sieve: | 3.8% |
| Special Sample Testing Procedures or Comments from Above | | | |
| None | | | |
| Project: | Reconstruct Runway 1-19 | Client: | Airport Solutions Group, LLC |
| Project #: | 1229-021 | Date: | 12/27/2019 |
| Location: | Orange, MA | Sample #: | 15831-07 |
| R. W. Gillespie & Associates | | | |
| 20 Pomerleau St. Suite 100 Biddeford, ME 04005 | | 177 Shattuck Way, Suite 1 West Newington, NH 03801 | |

**Lab California Bearing Ratio
ASTM D 1883**

1' CBR (California Bearing Ratio) of Laboratory-Compacted Soils

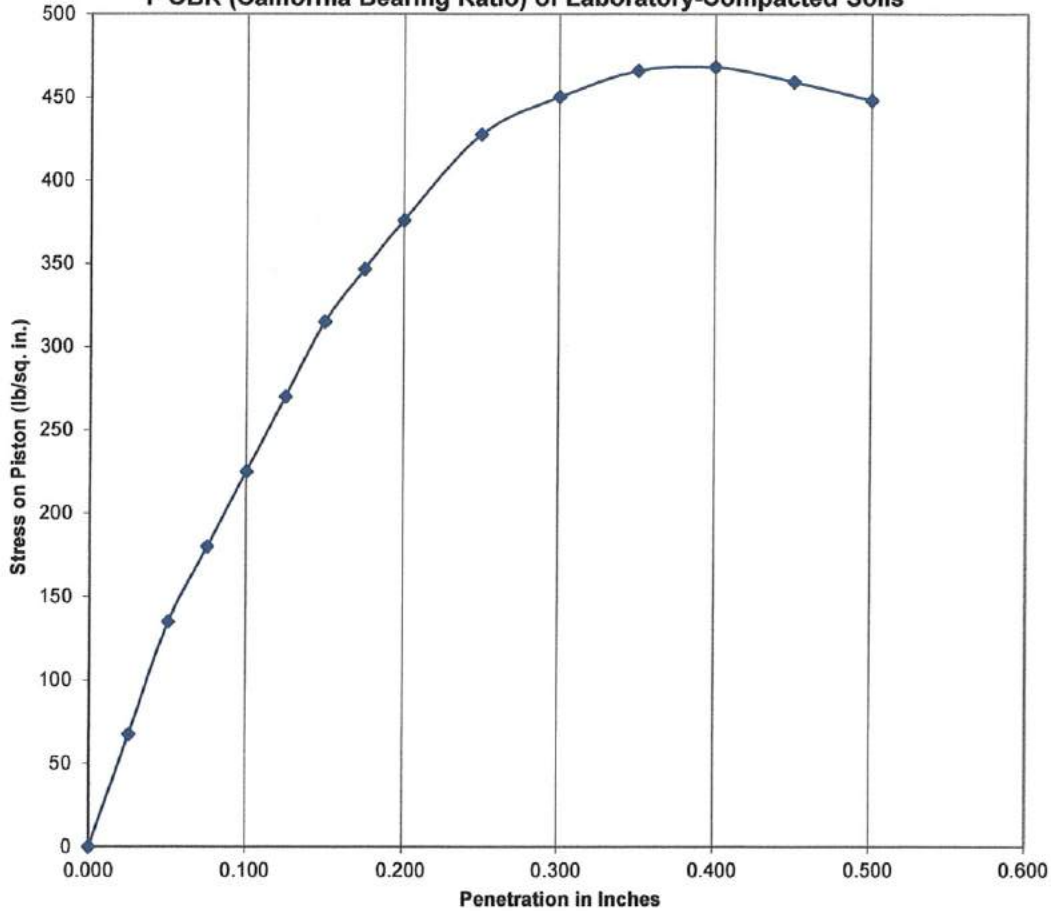


Bearing Ratio = 22.3 at 97.4% Compaction

| | | | |
|--|-------------------------|---|------------------------------|
| Test Location: | D-16 | Sample #/Test Depth: | Bulk/0.5'-4' |
| Prep Method: | D698 | As Compacted Moisture Content: | 9.6% |
| Curing Conditions: | Soaked | Top 1" of Test Sample Moisture Content: | 7.1% |
| Tested Dry Density: | 122.1 | Sample Swell: | 0% |
| Surcharge Weight: | 10 lbs | % Retained on 19mm Sieve: | 5.7% |
| Special Sample Testing Procedures or Comments from Above | | | |
| None | | | |
| Project: | Reconstruct Runway 1-19 | Client: | Airport Solutions Group, LLC |
| Project #: | 1229-021 | Date: | 12/27/2019 |
| Location: | Orange, MA | Sample #: | 15831-08 |
| R. W. Gillespie & Associates | | | |
| 20 Pomerleau St. Suite 100 Biddeford, ME 04005 | | 177 Shattuck Way, Suite 1 West Newington, NH 03801 | |

**Lab California Bearing Ratio
ASTM D 1883**

1' CBR (California Bearing Ratio) of Laboratory-Compacted Soils

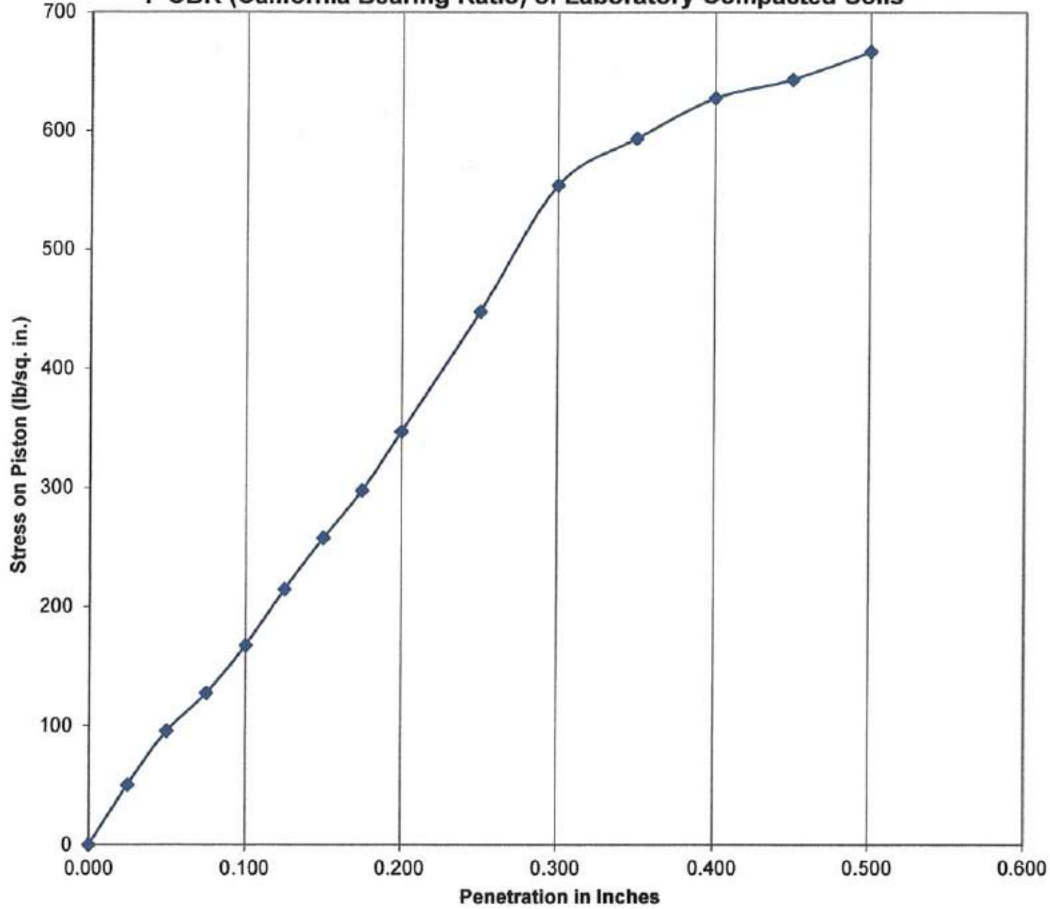


Bearing Ratio = 22.5 at 97.4% Compaction

| | | | |
|--|-------------------------|---|------------------------------|
| Test Location: | D-18 | Sample #/Test Depth: | Bulk/0.5'-4' |
| Prep Method: | D698 | As Compacted Moisture Content: | 10.2% |
| Curing Conditions: | Soaked | Top 1" of Test Sample Moisture Content: | 9.1% |
| Tested Dry Density: | 118.1 | Sample Swell: | 0% |
| Surcharge Weight: | 10 lbs | % Retained on 19mm Sieve: | 7.3% |
| Special Sample Testing Procedures or Comments from Above | | | |
| None | | | |
| Project: | Reconstruct Runway 1-19 | Client: | Airport Solutions Group, LLC |
| Project #: | 1229-021 | Date: | 12/27/2019 |
| Location: | Orange, MA | Sample #: | 15831-09 |
| R. W. Gillespie & Associates | | | |
| 20 Pomerleau St. Suite 100 Biddeford, ME 04005 | | 177 Shattuck Way, Suite 1 West Newington, NH 03801 | |

**Lab California Bearing Ratio
ASTM D 1883**

1' CBR (California Bearing Ratio) of Laboratory-Compacted Soils

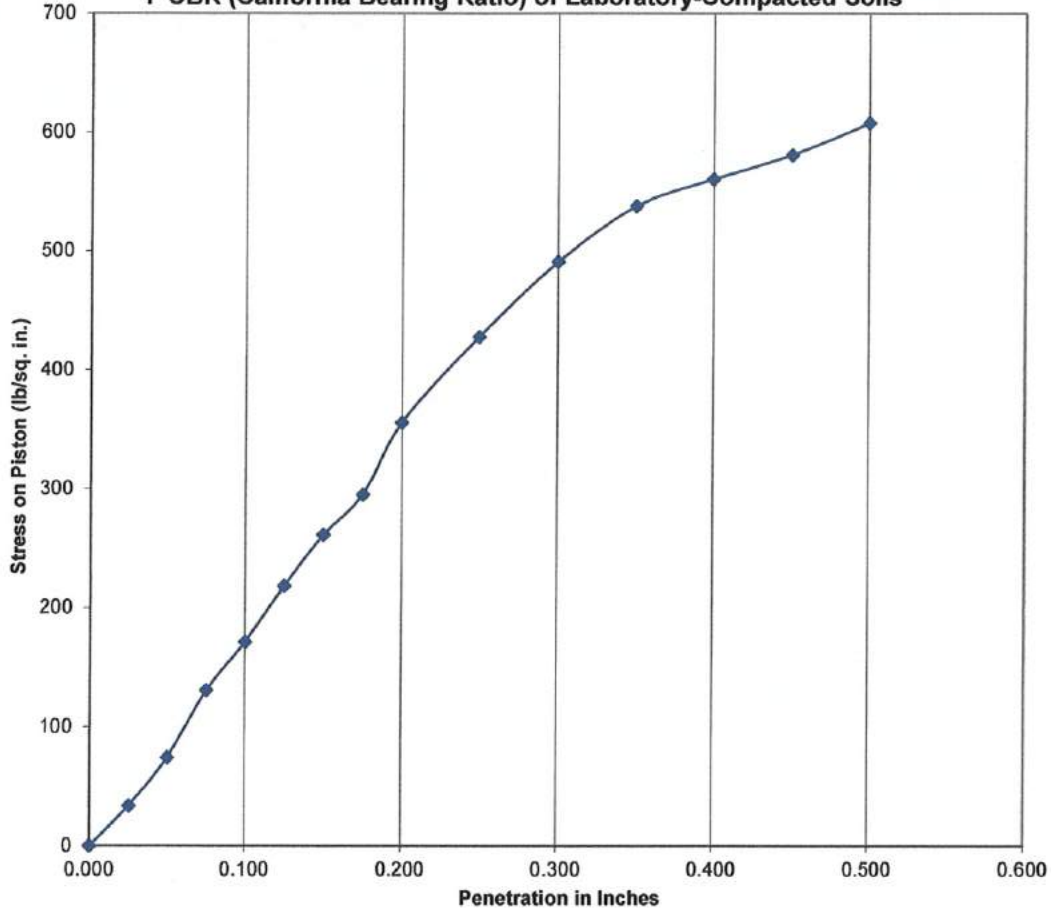


Bearing Ratio = 16.7 at 96.6% Compaction

| | | | |
|--|-------------------------|---|------------------------------|
| Test Location: | D-22 | Sample #/Test Depth: | Bulk/0.5'-4' |
| Prep Method: | D698 | As Compacted Moisture Content: | 8.0% |
| Curing Conditions: | Soaked | Top 1" of Test Sample Moisture Content: | 8.0% |
| Tested Dry Density: | 121.4 | Sample Swell: | 0% |
| Surcharge Weight: | 10 lbs | % Retained on 19mm Sieve: | 2.2% |
| Special Sample Testing Procedures or Comments from Above | | | |
| None | | | |
| Project: | Reconstruct Runway 1-19 | Client: | Airport Solutions Group, LLC |
| Project #: | 1229-021 | Date: | 12/27/2019 |
| Location: | Orange, MA | Sample #: | 15831-11 |
| R. W. Gillespie & Associates | | | |
| 20 Pomerleau St. Suite 100 Biddeford, ME 04005 | | 177 Shattuck Way, Suite 1 West Newington, NH 03801 | |

**Lab California Bearing Ratio
ASTM D 1883**

1' CBR (California Bearing Ratio) of Laboratory-Compacted Soils

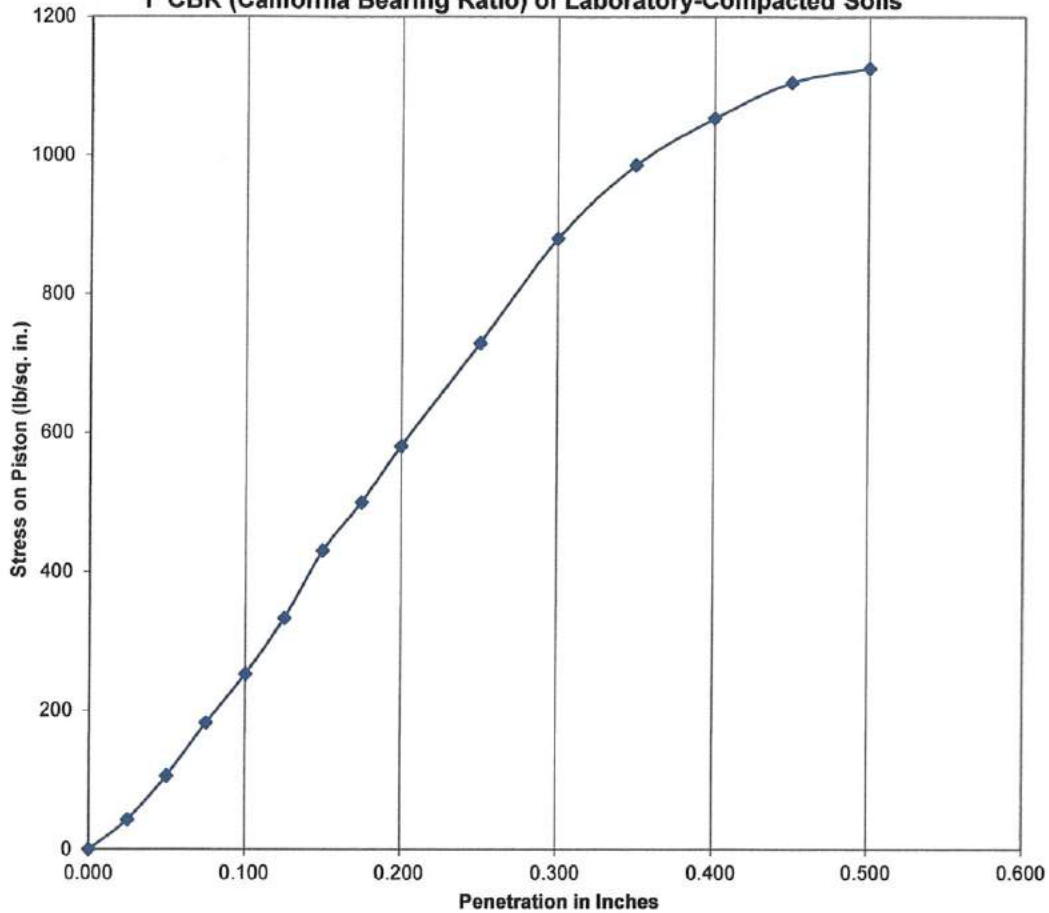


Bearing Ratio = 17.1 at 97.3% Compaction

| | | | |
|--|-------------------------|---|------------------------------|
| Test Location: | D-24 | Sample #/Test Depth: | Bulk/0.5'-4' |
| Prep Method: | D698 | As Compacted Moisture Content: | 7.7% |
| Curing Conditions: | Soaked | Top 1" of Test Sample Moisture Content: | 9.1% |
| Tested Dry Density: | 120.0 | Sample Swell: | 0% |
| Surcharge Weight: | 10 lbs | % Retained on 19mm Sieve: | 3% |
| Special Sample Testing Procedures or Comments from Above | | | |
| None | | | |
| Project: | Reconstruct Runway 1-19 | Client: | Airport Solutions Group, LLC |
| Project #: | 1229-021 | Date: | 12/17/2019 |
| Location: | Orange, MA | Sample #: | 15831-12 |
| R. W. Gillespie & Associates | | | |
| 20 Pomerleau St. Suite 100 Biddeford, ME 04005 | | 177 Shattuck Way, Suite 1 West Newington, NH 03801 | |

**Lab California Bearing Ratio
ASTM D 1883**

1' CBR (California Bearing Ratio) of Laboratory-Compacted Soils

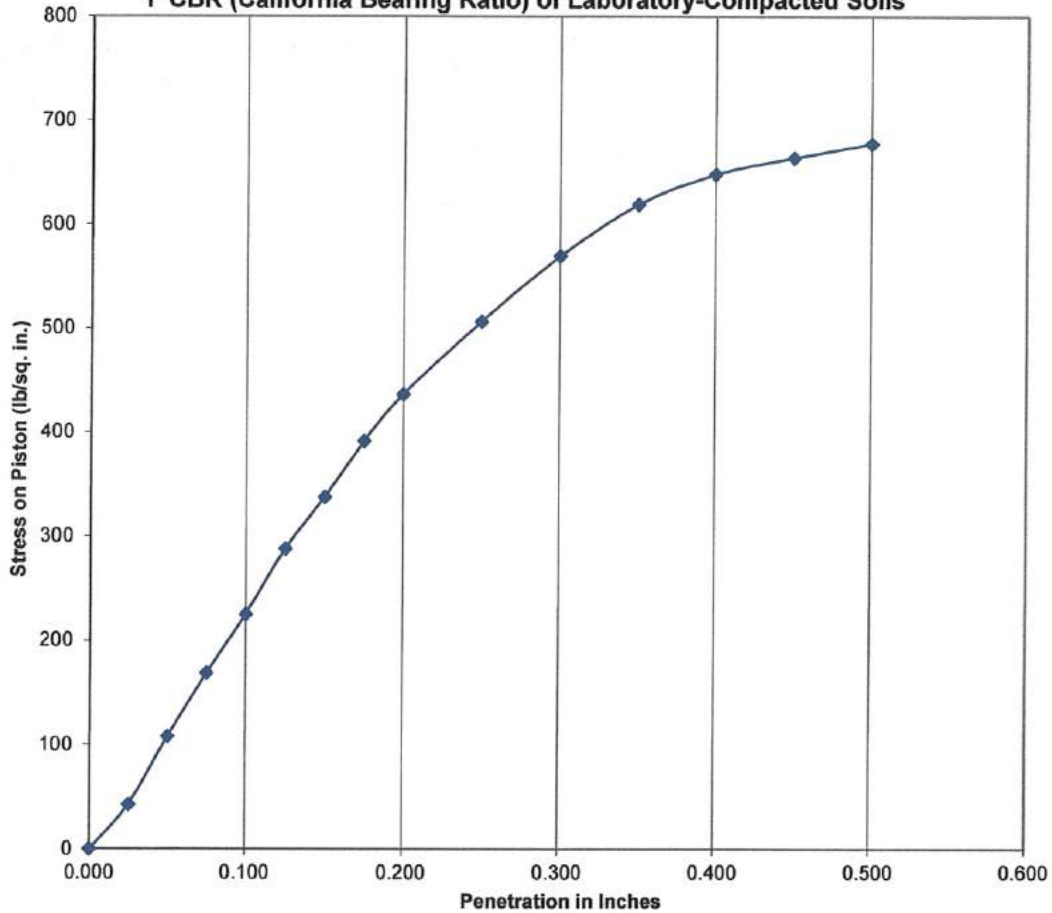


Bearing Ratio = 25.2 at 99.9% Compaction

| | | | |
|--|-------------------------|---|------------------------------|
| Test Location: | D-26 | Sample #/Test Depth: | Bulk/0.5'-4' |
| Prep Method: | D698 | As Compacted Moisture Content: | 8.5% |
| Curing Conditions: | Soaked | Top 1" of Test Sample Moisture Content: | 8.3% |
| Tested Dry Density: | 127.4 | Sample Swell: | 0% |
| Surcharge Weight: | 10 lbs | % Retained on 19mm Sieve: | 2.8% |
| Special Sample Testing Procedures or Comments from Above | | | |
| None | | | |
| Project: | Reconstruct Runway 1-19 | Client: | Airport Solutions Group, LLC |
| Project #: | 1229-021 | Date: | 12/27/2019 |
| Location: | Orange, MA | Sample #: | 15831-13 |
| R. W. Gillespie & Associates | | | |
| 20 Pomerleau St. Suite 100 Biddeford, ME 04005 | | 177 Shattuck Way, Suite 1 West Newington, NH 03801 | |

**Lab California Bearing Ratio
ASTM D 1883**

1' CBR (California Bearing Ratio) of Laboratory-Compacted Soils



Bearing Ratio = 22.5 at 99.5% Compaction

| | | | |
|--|-------------------------|---|------------------------------|
| Test Location: | D-27 | Sample #/Test Depth: | Bulk/0.5'-4' |
| Prep Method: | D698 | As Compacted Moisture Content: | 11.1% |
| Curing Conditions: | Soaked | Top 1" of Test Sample Moisture Content: | 11.3% |
| Tested Dry Density: | 115.2 | Sample Swell: | 0% |
| Surcharge Weight: | 10 lbs | % Retained on 19mm Sieve: | 2% |
| Special Sample Testing Procedures or Comments from Above | | | |
| None | | | |
| Project: | Reconstruct Runway 1-19 | Client: | Airport Solutions Group, LLC |
| Project #: | 1229-021 | Date: | 12/17/2019 |
| Location: | Orange, MA | Sample #: | 15831-14 |
| R. W. Gillespie & Associates | | | |
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APPENDIX F

ASPHALT EXTRACTION AND GRADATION TEST RESULTS

Geotechnical Engineering Evaluation
Reconstruct Runway 1-19
Orange Municipal Airport
Orange, Massachusetts

HMA Extraction & Gradation Test Report

ASTM D 2172 - Standard Test Methods for Quantitative Extraction of Bitumen From Bituminous Paving Mixtures

AASHTO T 164 - Standard Method of Test for Quantitative Extraction of Asphalt Binder from Hot Mix Asphalt

ASTM D 5444 - Standard Test Method for Mechanical Size Analysis of Extracted Aggregate

AASHTO T 30 - Standard Method of Test for Mechanical Analysis of Extracted Aggregate

| | | | |
|-------------|------------------------------|--------------|--------------|
| Project: | Reconstruction Runway 1-19 | Lab No: | 15851-01 |
| Project No: | 1229-021 | Mix Type: | Asphalt Core |
| Client: | Airport Solutions Group, LLC | Supplier: | D-2 |
| Client No: | | Mix No.: | |
| Lot: | | Ref No./PIN: | |
| Sublot: | | Tested By: | |
| Date Paved: | December 2, 2019 | Date Tested: | |

Asphalt Content

| | |
|-----------------------|--------------|
| Asphalt Content: 6.3% | Asphalt JMF: |
|-----------------------|--------------|

Aggregate Gradation

| Sieve Size | | Percent Passing | Specification |
|------------|----------|-----------------|---------------|
| Metric | Standard | | |
| 38 mm | 1 1/2" | | |
| 25 mm | 1" | | |
| 19 mm | 3/4" | 100.0 | |
| 12.5 mm | 1/2" | 89.2 | |
| 9.5 mm | 3/8" | 81.4 | |
| 4.75 mm | #4 | 60.3 | |
| 2.36 mm | #8 | 48.6 | |
| 1.18 mm | #16 | 38.8 | |
| 0.60 mm | #30 | 25.9 | |
| 0.30 mm | #50 | 14.6 | |
| 0.15 mm | #100 | 8.8 | |
| .075 mm | #200 | 6.0 | |

Notes



R.W. GILLESPIE & ASSOCIATES, INC.

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HMA Extraction & Gradation Test Report

ASTM D 2172 - Standard Test Methods for Quantitative Extraction of Bitumen From Bituminous Paving Mixtures

AASHTO T 164 - Standard Method of Test for Quantitative Extraction of Asphalt Binder from Hot Mix Asphalt

ASTM D 5444 - Standard Test Method for Mechanical Size Analysis of Extracted Aggregate

AASHTO T 30 - Standard Method of Test for Mechanical Analysis of Extracted Aggregate

| | | | |
|-------------|------------------------------|--------------|--------------|
| Project: | Reconstruction Runway 1-19 | Lab No: | 15851-02 |
| Project No: | 1229-021 | Mix Type: | Asphalt Core |
| Client: | Airport Solutions Group, LLC | Supplier: | D-8 |
| Client No: | | Mix No.: | |
| Lot: | | Ref No./PIN: | |
| Sublot: | | Tested By: | |
| Date Paved: | December 2, 2019 | Date Tested: | |

Asphalt Content

| | |
|-----------------------|--------------|
| Asphalt Content: 6.3% | Asphalt JMF: |
|-----------------------|--------------|

Aggregate Gradation

| Sieve Size | | Percent Passing | Specification |
|------------|----------|-----------------|---------------|
| Metric | Standard | | |
| 38 mm | 1 1/2" | | |
| 25 mm | 1" | | |
| 19 mm | 3/4" | 100.0 | |
| 12.5 mm | 1/2" | 93.0 | |
| 9.5 mm | 3/8" | 82.5 | |
| 4.75 mm | #4 | 61.6 | |
| 2.36 mm | #8 | 48.2 | |
| 1.18 mm | #16 | 38.2 | |
| 0.60 mm | #30 | 25.2 | |
| 0.30 mm | #50 | 13.9 | |
| 0.15 mm | #100 | 8.2 | |
| .075 mm | #200 | 5.5 | |

Notes



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HMA Extraction & Gradation Test Report

ASTM D 2172 - Standard Test Methods for Quantitative Extraction of Bitumen From Bituminous Paving Mixtures

AASHTO T 164 - Standard Method of Test for Quantitative Extraction of Asphalt Binder from Hot Mix Asphalt

ASTM D 5444 - Standard Test Method for Mechanical Size Analysis of Extracted Aggregate

AASHTO T 30 - Standard Method of Test for Mechanical Analysis of Extracted Aggregate

| | | | |
|-------------|------------------------------|--------------|--------------|
| Project: | Reconstruction Runway 1-19 | Lab No: | 15851-03 |
| Project No: | 1229-021 | Mix Type: | Asphalt Core |
| Client: | Airport Solutions Group, LLC | Supplier: | D-13 |
| Client No: | | Mix No.: | |
| Lot: | | Ref No./PIN: | |
| Sublot: | | Tested By: | |
| Date Paved: | December 2, 2019 | Date Tested: | |

Asphalt Content

| | |
|-----------------------|--------------|
| Asphalt Content: 6.4% | Asphalt JMF: |
|-----------------------|--------------|

Aggregate Gradation

| Sieve Size | | Percent Passing | Specification |
|------------|----------|-----------------|---------------|
| Metric | Standard | | |
| 38 mm | 1 1/2" | | |
| 25 mm | 1" | | |
| 19 mm | 3/4" | 100.0 | |
| 12.5 mm | 1/2" | 90.6 | |
| 9.5 mm | 3/8" | 82.5 | |
| 4.75 mm | #4 | 60.3 | |
| 2.36 mm | #8 | 48.1 | |
| 1.18 mm | #16 | 38.8 | |
| 0.60 mm | #30 | 26.5 | |
| 0.30 mm | #50 | 14.9 | |
| 0.15 mm | #100 | 8.6 | |
| .075 mm | #200 | 5.7 | |

Notes



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20 Pomerleau Street, Suite 100, Biddeford ME 04005, 207-286-8008 / 177 Shattuck Way, Suite 1 West, Newington NH 03801, 603-427-0244

HMA Extraction & Gradation Test Report

ASTM D 2172 - Standard Test Methods for Quantitative Extraction of Bitumen From Bituminous Paving Mixtures

AASHTO T 164 - Standard Method of Test for Quantitative Extraction of Asphalt Binder from Hot Mix Asphalt

ASTM D 5444 - Standard Test Method for Mechanical Size Analysis of Extracted Aggregate

AASHTO T 30 - Standard Method of Test for Mechanical Analysis of Extracted Aggregate

| | | | |
|-------------|------------------------------|--------------|--------------|
| Project: | Reconstruction Runway 1-19 | Lab No: | 15851-04 |
| Project No: | 1229-021 | Mix Type: | Asphalt Core |
| Client: | Airport Solutions Group, LLC | Supplier: | D-18 |
| Client No: | | Mix No.: | |
| Lot: | | Ref No./PIN: | |
| Sublot: | | Tested By: | |
| Date Paved: | December 2, 2019 | Date Tested: | |

Asphalt Content

| | |
|-----------------------|--------------|
| Asphalt Content: 6.1% | Asphalt JMF: |
|-----------------------|--------------|

Aggregate Gradation

| Sieve Size | | Percent Passing | Specification |
|------------|----------|-----------------|---------------|
| Metric | Standard | | |
| 38 mm | 1 1/2" | | |
| 25 mm | 1" | 100.0 | |
| 19 mm | 3/4" | 99.0 | |
| 12.5 mm | 1/2" | 86.5 | |
| 9.5 mm | 3/8" | 78.4 | |
| 4.75 mm | #4 | 57.9 | |
| 2.36 mm | #8 | 46.7 | |
| 1.18 mm | #16 | 37.6 | |
| 0.60 mm | #30 | 25.5 | |
| 0.30 mm | #50 | 14.4 | |
| 0.15 mm | #100 | 8.4 | |
| .075 mm | #200 | 5.4 | |

Notes



R.W. GILLESPIE & ASSOCIATES, INC.

20 Pomerleau Street, Suite 100, Biddeford ME 04005, 207-286-8008 / 177 Shattuck Way, Suite 1 West, Newington NH 03801, 603-427-0244

HMA Extraction & Gradation Test Report

ASTM D 2172 - Standard Test Methods for Quantitative Extraction of Bitumen From Bituminous Paving Mixtures

AASHTO T 164 - Standard Method of Test for Quantitative Extraction of Asphalt Binder from Hot Mix Asphalt

ASTM D 5444 - Standard Test Method for Mechanical Size Analysis of Extracted Aggregate

AASHTO T 30 - Standard Method of Test for Mechanical Analysis of Extracted Aggregate

| | | | |
|-------------|------------------------------|--------------|--------------|
| Project: | Reconstruction Runway 1-19 | Lab No: | 15851-05 |
| Project No: | 1229-021 | Mix Type: | Asphalt Core |
| Client: | Airport Solutions Group, LLC | Supplier: | D-24 |
| Client No: | | Mix No.: | |
| Lot: | | Ref No./PIN: | |
| Sublot: | | Tested By: | |
| Date Paved: | December 2, 2019 | Date Tested: | |

Asphalt Content

| | |
|-----------------------|--------------|
| Asphalt Content: 6.0% | Asphalt JMF: |
|-----------------------|--------------|

Aggregate Gradation

| Sieve Size | | Percent Passing | Specification |
|------------|----------|-----------------|---------------|
| Metric | Standard | | |
| 38 mm | 1 1/2" | | |
| 25 mm | 1" | | |
| 19 mm | 3/4" | 100.0 | |
| 12.5 mm | 1/2" | 99.5 | |
| 9.5 mm | 3/8" | 87.9 | |
| 4.75 mm | #4 | 60.6 | |
| 2.36 mm | #8 | 40.8 | |
| 1.18 mm | #16 | 27.4 | |
| 0.60 mm | #30 | 19.1 | |
| 0.30 mm | #50 | 13.1 | |
| 0.15 mm | #100 | 8.8 | |
| .075 mm | #200 | 6.4 | |

Notes



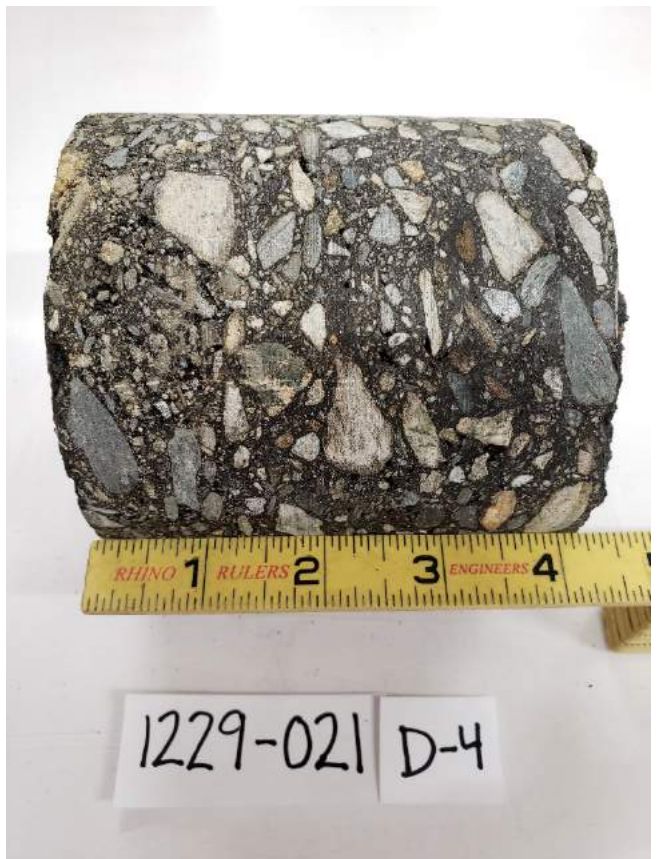
R.W. GILLESPIE & ASSOCIATES, INC.

20 Pomerleau Street, Suite 100, Biddeford ME 04005, 207-286-8008 / 177 Shattuck Way, Suite 1 West, Newington NH 03801, 603-427-0244

APPENDIX G

ASPHALT CORE PHOTOGRAPHS

Geotechnical Engineering Evaluation
Reconstruct Runway 1-19
Orange Municipal Airport
Orange, Massachusetts

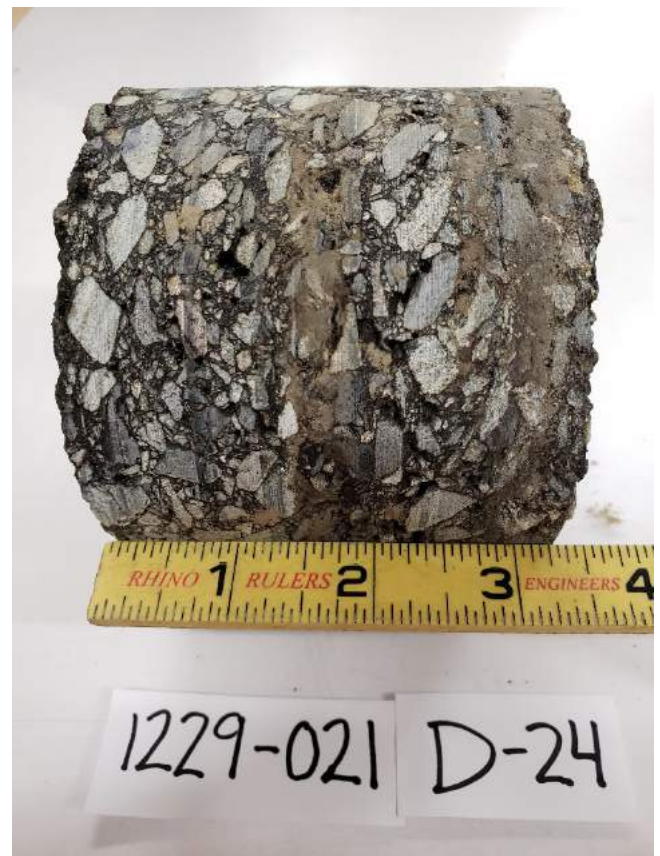
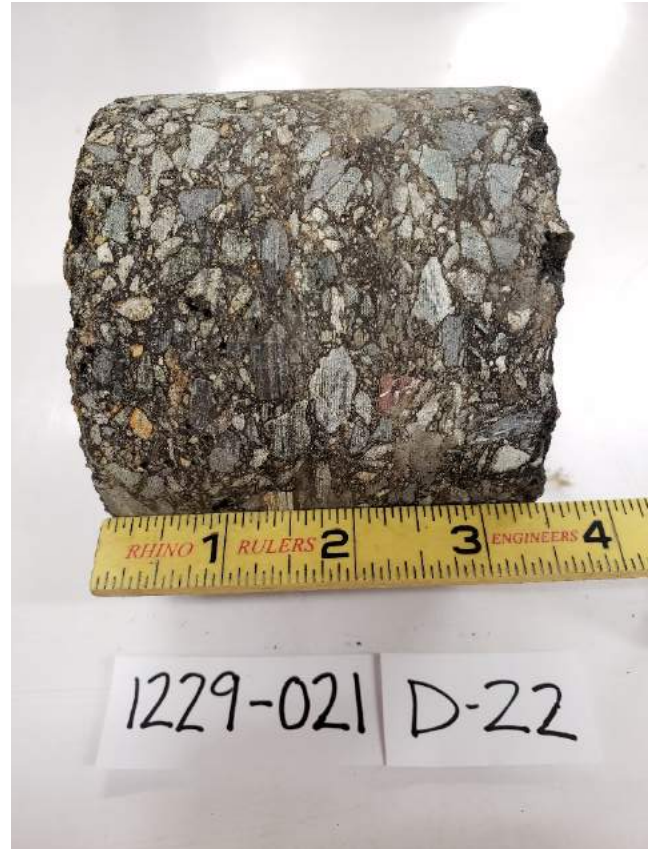














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APPENDIX E

ORANGE CONSERVATION COMMISSION ORDER OF CONDITIONS

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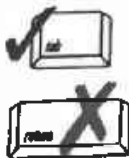
Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 – Order of Conditions
 Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
 253-0238
 MassDEP File #
 1184918
 eDEP Transaction #
 Orange
 City/Town

A. General Information

Please note: this form has been modified with added space to accommodate the Registry of Deeds Requirements

Important: When filing out forms on the computer, use only the tab key to move your cursor - do not use the return key.



1. From: Orange
Conservation Commission

2. This issuance is for (check one):
 a. Order of Conditions b. Amended Order of Conditions

3. To: Applicant:
Craig Schuster
 a. First Name b. Last Name
Airport Solutions Group, Inc.
 c. Organization
39 Winn Street
 d. Mailing Address
Burlington MA 01803
 e. City/Town f. State g. Zip Code

4. Property Owner (if different from applicant):
Len Bedaw
 a. First Name b. Last Name
Town of Orange
 c. Organization
80 Airport Street
 d. Mailing Address
Orange MA 01364
 e. City/Town f. State g. Zip Code

5. Project Location:
0 South Main Street Orange
 a. Street Address b. City/Town
250 20
 c. Assessor's Map/Plat Number d. Parcel/Lot Number
 Latitude and Longitude, if known: 42d56m160Ns 72d29m941Ws
 d. Latitude e. Longitude



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 – Order of Conditions
 Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
 253-0238
 MassDEP File #
 1184918
 eDEP Transaction #
 Orange
 City/Town

A. General Information (cont.)

6. Property recorded at the Registry of Deeds for (attach additional information if more than one parcel):
Franklin

| | |
|-----------|--|
| a. County | b. Certificate Number (if registered land) |
| 1550 | 132 |
| c. Book | d. Page |

7. Dates: 4/1/2020 5/8/2020 5/8/2020
 a. Date Notice of Intent Filed b. Date Public Hearing Closed c. Date of Issuance

8. Final Approved Plans and Other Documents (attach additional plan or document references as needed):
Plans C-1 Through C-5, dated March 2020, as provided

| | |
|--------------------------------------|--------------------------|
| a. Plan Title | c. Signed and Stamped by |
| GZA GeoEnvironmental, Inc | as noted on plans |
| b. Prepared By | d. Final Revision Date |
| | e. Scale |
| f. Additional Plan or Document Title | g. Date |

B. Findings

1. Findings pursuant to the Massachusetts Wetlands Protection Act:
- Following the review of the above-referenced Notice of Intent and based on the information provided in this application and presented at the public hearing, this Commission finds that the areas in which work is proposed is significant to the following interests of the Wetlands Protection Act (the Act). Check all that apply:
- | | | |
|--|---|---|
| a. <input type="checkbox"/> Public Water Supply | b. <input type="checkbox"/> Land Containing Shellfish | c. <input checked="" type="checkbox"/> Prevention of Pollution |
| d. <input type="checkbox"/> Private Water Supply | e. <input checked="" type="checkbox"/> Fisheries | f. <input checked="" type="checkbox"/> Protection of Wildlife Habitat |
| g. <input type="checkbox"/> Groundwater Supply | h. <input type="checkbox"/> Storm Damage Prevention | i. <input checked="" type="checkbox"/> Flood Control |
2. This Commission hereby finds the project, as proposed, is: (check one of the following boxes)

Approved subject to:

- a. the following conditions which are necessary in accordance with the performance standards set forth in the wetlands regulations. This Commission orders that all work shall be performed in accordance with the Notice of Intent referenced above, the following General Conditions, and any other special conditions attached to this Order. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, these conditions shall control.



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 5 – Order of Conditions

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

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B. Findings (cont.)

Denied because:

- b. the proposed work cannot be conditioned to meet the performance standards set forth in the wetland regulations. Therefore, work on this project may not go forward unless and until a new Notice of Intent is submitted which provides measures which are adequate to protect the interests of the Act, and a final Order of Conditions is issued. **A description of the performance standards which the proposed work cannot meet is attached to this Order.**
- c. the information submitted by the applicant is not sufficient to describe the site, the work, or the effect of the work on the interests identified in the Wetlands Protection Act. Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides sufficient information and includes measures which are adequate to protect the Act's interests, and a final Order of Conditions is issued. **A description of the specific information which is lacking and why it is necessary is attached to this Order as per 310 CMR 10.05(6)(c).**
- 3. Buffer Zone Impacts: Shortest distance between limit of project disturbance and the wetland resource area specified in 310 CMR 10.02(1)(a) _____ a. linear feet

Inland Resource Area Impacts: Check all that apply below. (For Approvals Only)

| Resource Area | Proposed Alteration | Permitted Alteration | Proposed Replacement | Permitted Replacement |
|---|----------------------------|----------------------------|-------------------------|-------------------------|
| 4. <input checked="" type="checkbox"/> Bank | 64 a. linear feet | 64 b. linear feet | 65 c. linear feet | 65 d. linear feet |
| 5. <input checked="" type="checkbox"/> Bordering Vegetated Wetland | 67 a. square feet | 67 b. square feet | 61 c. square feet | 61 d. square feet |
| 6. <input checked="" type="checkbox"/> Land Under Waterbodies and Waterways | 540 a. square feet | 540 b. square feet | 578 c. square feet | 578 d. square feet |
| | 13 e. c/y dredged | 13 f. c/y dredged | | |
| 7. <input type="checkbox"/> Bordering Land Subject to Flooding | _____ a. square feet | _____ b. square feet | _____ c. square feet | _____ d. square feet |
| Cubic Feet Flood Storage | _____ e. cubic feet | _____ f. cubic feet | _____ g. cubic feet | _____ h. cubic feet |
| 8. <input type="checkbox"/> Isolated Land Subject to Flooding | _____ a. square feet | _____ b. square feet | | |
| Cubic Feet Flood Storage | _____ c. cubic feet | _____ d. cubic feet | _____ e. cubic feet | _____ f. cubic feet |
| 9. <input checked="" type="checkbox"/> Riverfront Area | 4,204 a. total sq. feet | 4,204 b. total sq. feet | | |
| Sq ft within 100 ft | 4,204 c. square feet | 4,204 d. square feet | 4,204 e. square feet | 4,204 f. square feet |
| Sq ft between 100-200 ft | 0 g. square feet | 0 h. square feet | 0 i. square feet | 0 j. square feet |



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B. Findings (cont.)

Coastal Resource Area Impacts: Check all that apply below. (For Approvals Only)

| | Proposed Alteration | Permitted Alteration | Proposed Replacement | Permitted Replacement |
|--|---|-------------------------|-------------------------------|-------------------------------|
| 10. <input type="checkbox"/> Designated Port Areas | Indicate size under Land Under the Ocean, below | | | |
| 11. <input type="checkbox"/> Land Under the Ocean | _____ a. square feet | _____ b. square feet | | |
| | _____ c. c/y dredged | _____ d. c/y dredged | | |
| 12. <input type="checkbox"/> Barrier Beaches | Indicate size under Coastal Beaches and/or Coastal Dunes below | | | |
| 13. <input type="checkbox"/> Coastal Beaches | _____ a. square feet | _____ b. square feet | _____ c. nourishment cu yd | _____ d. nourishment cu yd |
| 14. <input type="checkbox"/> Coastal Dunes | _____ a. square feet | _____ b. square feet | _____ c. nourishment cu yd | _____ d. nourishment cu yd |
| 15. <input type="checkbox"/> Coastal Banks | _____ a. linear feet | _____ b. linear feet | | |
| 16. <input type="checkbox"/> Rocky Intertidal Shores | _____ a. square feet | _____ b. square feet | | |
| 17. <input type="checkbox"/> Salt Marshes | _____ a. square feet | _____ b. square feet | _____ c. square feet | _____ d. square feet |
| 18. <input type="checkbox"/> Land Under Salt Ponds | _____ a. square feet | _____ b. square feet | | |
| | _____ c. c/y dredged | _____ d. c/y dredged | | |
| 19. <input type="checkbox"/> Land Containing Shellfish | _____ a. square feet | _____ b. square feet | _____ c. square feet | _____ d. square feet |
| 20. <input type="checkbox"/> Fish Runs | Indicate size under Coastal Banks, Inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above | | | |
| | _____ a. c/y dredged | _____ b. c/y dredged | | |
| 21. <input type="checkbox"/> Land Subject to Coastal Storm Flowage | _____ a. square feet | _____ b. square feet | | |
| 22. <input type="checkbox"/> Riverfront Area | _____ a. total sq. feet | _____ b. total sq. feet | | |
| Sq ft within 100 ft | _____ c. square feet | _____ d. square feet | _____ e. square feet | _____ f. square feet |
| Sq ft between 100-200 ft | _____ g. square feet | _____ h. square feet | _____ i. square feet | _____ j. square feet |



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B. Findings (cont.)

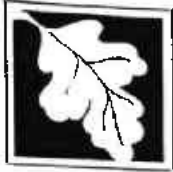
*#23. If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.5.c (BWV) or B.17.c (Salt Marsh) above, please enter the additional amount here.

23. Restoration/Enhancement *:
- a. square feet of BWV _____ b. square feet of salt marsh _____
24. Stream Crossing(s):
- a. number of new stream crossings _____ b. number of replacement stream crossings 1

C. General Conditions Under Massachusetts Wetlands Protection Act

The following conditions are only applicable to Approved projects.

1. Failure to comply with all conditions stated herein, and with all related statutes and other regulatory measures, shall be deemed cause to revoke or modify this Order.
2. The Order does not grant any property rights or any exclusive privileges; it does not authorize any injury to private property or invasion of private rights.
3. This Order does not relieve the permittee or any other person of the necessity of complying with all other applicable federal, state, or local statutes, ordinances, bylaws, or regulations.
4. The work authorized hereunder shall be completed within three years from the date of this Order unless either of the following apply:
 - a. The work is a maintenance dredging project as provided for in the Act; or
 - b. The time for completion has been extended to a specified date more than three years, but less than five years, from the date of issuance. If this Order is intended to be valid for more than three years, the extension date and the special circumstances warranting the extended time period are set forth as a special condition in this Order.
 - c. If the work is for a Test Project, this Order of Conditions shall be valid for no more than one year.
5. This Order may be extended by the issuing authority for one or more periods of up to three years each upon application to the issuing authority at least 30 days prior to the expiration date of the Order. An Order of Conditions for a Test Project may be extended for one additional year only upon written application by the applicant, subject to the provisions of 310 CMR 10.05(11)(f).
6. If this Order constitutes an Amended Order of Conditions, this Amended Order of Conditions does not extend the issuance date of the original Final Order of Conditions and the Order will expire on _____ unless extended in writing by the Department.
7. Any fill used in connection with this project shall be clean fill. Any fill shall contain no trash, refuse, rubbish, or debris, including but not limited to lumber, bricks, plaster, wire, lath, paper, cardboard, pipe, tires, ashes, refrigerators, motor vehicles, or parts of any of the foregoing.



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C. General Conditions Under Massachusetts Wetlands Protection Act

8. This Order is not final until all administrative appeal periods from this Order have elapsed, or if such an appeal has been taken, until all proceedings before the Department have been completed.
9. No work shall be undertaken until the Order has become final and then has been recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land upon which the proposed work is to be done. In the case of the registered land, the Final Order shall also be noted on the Land Court Certificate of Title of the owner of the land upon which the proposed work is done. The recording information shall be submitted to the Conservation Commission on the form at the end of this Order, which form must be stamped by the Registry of Deeds, prior to the commencement of work.
10. A sign shall be displayed at the site not less than two square feet or more than three square feet in size bearing the words,

"Massachusetts Department of Environmental Protection" [or, "MassDEP"]
"File Number 253-0238 "
11. Where the Department of Environmental Protection is requested to issue a Superseding Order, the Conservation Commission shall be a party to all agency proceedings and hearings before MassDEP.
12. Upon completion of the work described herein, the applicant shall submit a Request for Certificate of Compliance (WPA Form 8A) to the Conservation Commission.
13. The work shall conform to the plans and special conditions referenced in this order.
14. Any change to the plans identified in Condition #13 above shall require the applicant to inquire of the Conservation Commission in writing whether the change is significant enough to require the filing of a new Notice of Intent.
15. The Agent or members of the Conservation Commission and the Department of Environmental Protection shall have the right to enter and inspect the area subject to this Order at reasonable hours to evaluate compliance with the conditions stated in this Order, and may require the submittal of any data deemed necessary by the Conservation Commission or Department for that evaluation.
16. This Order of Conditions shall apply to any successor in interest or successor in control of the property subject to this Order and to any contractor or other person performing work conditioned by this Order.



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C. General Conditions Under Massachusetts Wetlands Protection Act(cont.)

17. Prior to the start of work, and if the project involves work adjacent to a Bordering Vegetated Wetland, the boundary of the wetland in the vicinity of the proposed work area shall be marked by wooden stakes or flagging. Once in place, the wetland boundary markers shall be maintained until a Certificate of Compliance has been issued by the Conservation Commission.
18. All sedimentation barriers shall be maintained in good repair until all disturbed areas have been fully stabilized with vegetation or other means. At no time shall sediments be deposited in a wetland or water body. During construction, the applicant or his/her designee shall inspect the erosion controls on a daily basis and shall remove accumulated sediments as needed. The applicant shall immediately control any erosion problems that occur at the site and shall also immediately notify the Conservation Commission, which reserves the right to require additional erosion and/or damage prevention controls it may deem necessary. Sedimentation barriers shall serve as the limit of work unless another limit of work line has been approved by this Order.
19. The work associated with this Order (the "Project")
- (1) is subject to the Massachusetts Stormwater Standards
 - (2) is NOT subject to the Massachusetts Stormwater Standards

If the work is subject to the Stormwater Standards, then the project is subject to the following conditions:

- a) All work, including site preparation, land disturbance, construction and redevelopment, shall be implemented in accordance with the construction period pollution prevention and erosion and sedimentation control plan and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollution Discharge Elimination System Construction General Permit as required by Stormwater Condition 8. Construction period erosion, sedimentation and pollution control measures and best management practices (BMPs) shall remain in place until the site is fully stabilized.
- b) No stormwater runoff may be discharged to the post-construction stormwater BMPs unless and until a Registered Professional Engineer provides a Certification that:
 - i. all construction period BMPs have been removed or will be removed by a date certain specified in the Certification. For any construction period BMPs intended to be converted to post construction operation for stormwater attenuation, recharge, and/or treatment, the conversion is allowed by the MassDEP Stormwater Handbook BMP specifications and that the BMP has been properly cleaned or prepared for post construction operation, including removal of all construction period sediment trapped in inlet and outlet control structures;
 - ii. as-built final construction BMP plans are included, signed and stamped by a Registered Professional Engineer, certifying the site is fully stabilized;
 - iii. any illicit discharges to the stormwater management system have been removed, as per the requirements of Stormwater Standard 10;



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C. General Conditions Under Massachusetts Wetlands Protection Act(cont.)

iv. all post-construction stormwater BMPs are installed in accordance with the plans (including all planting plans) approved by the issuing authority, and have been inspected to ensure that they are not damaged and that they are in proper working condition;

v. any vegetation associated with post-construction BMPs is suitably established to withstand erosion.

c) The landowner is responsible for BMP maintenance until the issuing authority is notified that another party has legally assumed responsibility for BMP maintenance. Prior to requesting a Certificate of Compliance, or Partial Certificate of Compliance, the responsible party (defined in General Condition 18(e)) shall execute and submit to the issuing authority an Operation and Maintenance Compliance Statement ("O&M Statement") for the Stormwater BMPs identifying the party responsible for implementing the stormwater BMP Operation and Maintenance Plan ("O&M Plan") and certifying the following:

i.) the O&M Plan is complete and will be implemented upon receipt of the Certificate of Compliance, and

ii.) the future responsible parties shall be notified in writing of their ongoing legal responsibility to operate and maintain the stormwater management BMPs and implement the Stormwater Pollution Prevention Plan.

d) Post-construction pollution prevention and source control shall be implemented in accordance with the long-term pollution prevention plan section of the approved Stormwater Report and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollution Discharge Elimination System Multi-Sector General Permit.

e) Unless and until another party accepts responsibility, the landowner, or owner of any drainage easement, assumes responsibility for maintaining each BMP. To overcome this presumption, the landowner of the property must submit to the issuing authority a legally binding agreement of record, acceptable to the issuing authority, evidencing that another entity has accepted responsibility for maintaining the BMP, and that the proposed responsible party shall be treated as a permittee for purposes of implementing the requirements of Conditions 18(f) through 18(k) with respect to that BMP. Any failure of the proposed responsible party to implement the requirements of Conditions 18(f) through 18(k) with respect to that BMP shall be a violation of the Order of Conditions or Certificate of Compliance. In the case of stormwater BMPs that are serving more than one lot, the legally binding agreement shall also identify the lots that will be serviced by the stormwater BMPs. A plan and easement deed that grants the responsible party access to perform the required operation and maintenance must be submitted along with the legally binding agreement.

f) The responsible party shall operate and maintain all stormwater BMPs in accordance with the design plans, the O&M Plan, and the requirements of the Massachusetts Stormwater Handbook.



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C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

- g) The responsible party shall:
1. Maintain an operation and maintenance log for the last three (3) consecutive calendar years of inspections, repairs, maintenance and/or replacement of the stormwater management system or any part thereof, and disposal (for disposal the log shall indicate the type of material and the disposal location);
 2. Make the maintenance log available to MassDEP and the Conservation Commission ("Commission") upon request; and
 3. Allow members and agents of the MassDEP and the Commission to enter and inspect the site to evaluate and ensure that the responsible party is in compliance with the requirements for each BMP established in the O&M Plan approved by the issuing authority.
- h) All sediment or other contaminants removed from stormwater BMPs shall be disposed of in accordance with all applicable federal, state, and local laws and regulations.
- i) Illicit discharges to the stormwater management system as defined in 310 CMR 10.04 are prohibited.
- j) The stormwater management system approved in the Order of Conditions shall not be changed without the prior written approval of the issuing authority.
- k) Areas designated as qualifying pervious areas for the purpose of the Low Impact Site Design Credit (as defined in the MassDEP Stormwater Handbook, Volume 3, Chapter 1, Low Impact Development Site Design Credits) shall not be altered without the prior written approval of the issuing authority.
- l) Access for maintenance, repair, and/or replacement of BMPs shall not be withheld. Any fencing constructed around stormwater BMPs shall include access gates and shall be at least six inches above grade to allow for wildlife passage.

Special Conditions (if you need more space for additional conditions, please attach a text document):

The work complies with the submitted plans and that the Commission will be allowed to make inspections, as deemed necessary, to insure compliance with said plans

20. For Test Projects subject to 310 CMR 10.05(11), the applicant shall also implement the monitoring plan and the restoration plan submitted with the Notice of Intent. If the conservation commission or Department determines that the Test Project threatens the public health, safety or the environment, the applicant shall implement the removal plan submitted with the Notice of Intent or modify the project as directed by the conservation commission or the Department.



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D. Findings Under Municipal Wetlands Bylaw or Ordinance

1. Is a municipal wetlands bylaw or ordinance applicable? Yes No
2. The _____ hereby finds (check one that applies):

Conservation Commission

- a. that the proposed work cannot be conditioned to meet the standards set forth in a municipal ordinance or bylaw, specifically:

1. Municipal Ordinance or Bylaw

2. Citation

Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides measures which are adequate to meet these standards, and a final Order of Conditions is issued.

- b. that the following additional conditions are necessary to comply with a municipal ordinance or bylaw:

1. Municipal Ordinance or Bylaw

2. Citation

3. The Commission orders that all work shall be performed in accordance with the following conditions and with the Notice of Intent referenced above. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, the conditions shall control.

The special conditions relating to municipal ordinance or bylaw are as follows (if you need more space for additional conditions, attach a text document):

The proposed work will follow the plans and specifications as submitted and that there is no request for an extension for vegetation control. The Commission acknowledges to Applicants response to DEP comments and agrees that the culvert, as proposed, is more appropriate for the stream crossing and has less impact on the resource area than an "open bottom" culvert.



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E. Signatures

This Order is valid for three years, unless otherwise specified as a special condition pursuant to General Conditions #4, from the date of issuance.

May 8, 2020
 1. Date of Issuance

Please indicate the number of members who will sign this form.
 This Order must be signed by a majority of the Conservation Commission.

3
 2. Number of Signers

The Order must be mailed by certified mail (return receipt requested) or hand delivered to the applicant. A copy also must be mailed or hand delivered at the same time to the appropriate Department of Environmental Protection Regional Office, if not filing electronically, and the property owner, if different from applicant.

Signatures:

Edward J. Berry

[Signature]

Juan Wells

by hand delivery on

by certified mail, return receipt requested, on

May 11, 2020
 Date

 Date



Massachusetts Department of Environmental Protection
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F. Appeals

The applicant, the owner, any person aggrieved by this Order, any owner of land abutting the land subject to this Order, or any ten residents of the city or town in which such land is located, are hereby notified of their right to request the appropriate MassDEP Regional Office to issue a Superseding Order of Conditions. The request must be made by certified mail or hand delivery to the Department, with the appropriate filing fee and a completed Request for Departmental Action Fee Transmittal Form, as provided in 310 CMR 10.03(7) within ten business days from the date of issuance of this Order. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.

Any appellants seeking to appeal the Department's Superseding Order associated with this appeal will be required to demonstrate prior participation in the review of this project. Previous participation in the permit proceeding means the submission of written information to the Conservation Commission prior to the close of the public hearing, requesting a Superseding Order, or providing written information to the Department prior to issuance of a Superseding Order.

The request shall state clearly and concisely the objections to the Order which is being appealed and how the Order does not contribute to the protection of the interests identified in the Massachusetts Wetlands Protection Act (M.G.L. c. 131, § 40), and is inconsistent with the wetlands regulations (310 CMR 10.00). To the extent that the Order is based on a municipal ordinance or bylaw, and not on the Massachusetts Wetlands Protection Act or regulations, the Department has no appellate jurisdiction.



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G. Recording Information

Prior to commencement of work, this Order of Conditions must be recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land subject to the Order. In the case of registered land, this Order shall also be noted on the Land Court Certificate of Title of the owner of the land subject to the Order of Conditions. The recording information on this page shall be submitted to the Conservation Commission listed below.

Orange Conservation Commission
 Conservation Commission

Detach on dotted line, have stamped by the Registry of Deeds and submit to the Conservation Commission.

To:

Orange Conservation Commission
 Conservation Commission

Please be advised that the Order of Conditions for the Project at:

0 South Main Street
 Project Location

253-0238
 MassDEP File Number

Has been recorded at the Registry of Deeds of:

Franklin
 County

Book

Page

for: Orange Airport
 Property Owner

and has been noted in the chain of title of the affected property in:

Book

Page

In accordance with the Order of Conditions issued on:

May 8, 2020
 Date

If recorded land, the instrument number identifying this transaction is:

Instrument Number

If registered land, the document number identifying this transaction is:

Document Number

Signature of Applicant



**Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands**

DEP File Number:

**Request for Departmental Action Fee
Transmittal Form**

Provided by DEP

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

A. Request Information

1. Location of Project

a. Street Address

b. City/Town, Zip

c. Check number

d. Fee amount

2. Person or party making request (if appropriate, name the citizen group's representative):

Name

Mailing Address

City/Town

State

Zip Code

Phone Number

Fax Number (if applicable)

3. Applicant (as shown on Determination of Applicability (Form 2), Order of Resource Area Delineation (Form 4B), Order of Conditions (Form 5), Restoration Order of Conditions (Form 5A), or Notice of Non-Significance (Form 6)):

Name

Mailing Address

City/Town

State

Zip Code

Phone Number

Fax Number (if applicable)

4. DEP File Number:

Important:
When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



B. Instructions

1. When the Departmental action request is for (check one):

- Superseding Order of Conditions – Fee: \$120.00 (single family house projects) or \$245 (all other projects)
- Superseding Determination of Applicability – Fee: \$120
- Superseding Order of Resource Area Delineation – Fee: \$120



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

DEP File Number:

Request for Departmental Action Fee

Provided by DEP

Transmittal Form

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

B. Instructions (cont.)

Send this form and check or money order, payable to the *Commonwealth of Massachusetts*, to:

Department of Environmental Protection
Box 4062
Boston, MA 02211

2. On a separate sheet attached to this form, state clearly and concisely the objections to the Determination or Order which is being appealed. To the extent that the Determination or Order is based on a municipal bylaw, and not on the Massachusetts Wetlands Protection Act or regulations, the Department has no appellate jurisdiction.
3. Send a **copy** of this form and a **copy** of the check or money order with the Request for a Superseding Determination or Order by certified mail or hand delivery to the appropriate DEP Regional Office (see <https://www.mass.gov/service-details/massdep-regional-offices-by-community>).
4. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.

APPENDIX F
NHESP ORDER OF CONDITIONS

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MASSWILDLIFE

DIVISION OF FISHERIES & WILDLIFE

1 Rabbit Hill Road, Westborough, MA 01581

p: (508) 389-6300 | f: (508) 389-7890

MASS.GOV/MASSWILDLIFE

May 7, 2020

Len Bedaw
Orange Municipal Airport
80 Airport St.
Orange MA 01364

RE: Applicant: Len Bedaw, Airport Manager
 Project Location: 80 Airport Street, Orange Municipal Airport
 Project Description: Runway 1-19 Reconstruction
 NHESP File No.: 20-39315

Dear Applicant:

The Natural Heritage & Endangered Species Program of the Massachusetts Division of Fisheries & Wildlife (the "Division") received the MESA Project Review Checklist, "Environmental Impacts Layout Figure" (1 sheet, dated February 2020, prepare by ASG, Inc.) Construction Plans titled "Reconstruct Runway 1-19" (7 Sheets, dated March 2020, prepared by ASG, LLC) depicting the proposed Reconstruction of Runway 1-19 at Orange Municipal Airport, and other required materials for review of this project pursuant to the Massachusetts Endangered Species Act (MESA) (MGL c.131A) and its implementing regulations (321 CMR 10.00).

The MESA is administered by the Division, and prohibits the Take of state-listed species. The Take of state-listed species is defined as "in reference to animals...harm...kill...disrupt the nesting, breeding, feeding or migratory activity...and in reference to plants...collect, pick, kill, transplant, cut or process...Disruption of nesting, breeding, feeding, or migratory activity may result from, but is not limited to, the modification, degradation, or destruction of Habitat" of state-listed species (321 CMR 10.02).

As proposed, the Runway 1-19 Reconstruction Project includes the removal of existing pavement, reconstruction, repaving, drainage modifications, temporary grading impacts and minor pavement modifications that will not increase the existing paved surface (i.e. no permanent loss of grassland habitat). The Project includes temporary grading modifications that will alter ± 14.8 ac of grassland habitat and will be restored to grassland upon project completion. To offset the temporary habitat loss during the grassland bird breeding and fledging period, April 15 - August 15, the Applicant has proposed to temporarily protect ± 31.8 acres from disturbance and mowing, as depicted on the Environmental Impacts Layout Figure (dated 2/2020), to provide a short-term nesting habitat enhancement for grassland birds.

The Division has determined that this Project, as currently proposed, will occur within Priority Habitat for the following species. These species and their habitats are protected in accordance with the MESA.

MASSWILDLIFE

| Scientific Name | Common Name | Taxonomic Group | MESA Status |
|------------------------------|---------------------|---------------------|-----------------|
| <i>Ammodramus savannarum</i> | Grasshopper Sparrow | Vertebrate Animal | Threatened |
| <i>Pooecetes gramineus</i> | Vesper Sparrow | Vertebrate Animal | Threatened |
| <i>Cicindela purpurea</i> | Purple Tiger Beetle | Invertebrate Animal | Special Concern |
| <i>Scleria pauciflora</i> | Papillose Nut-Sedge | Vascular Plant | Endangered |
| <i>Sturnella magna</i> | Eastern Meadowlark | Vertebrate Animal | Special Concern |

Based on the information provided and the information contained in our database, the Division finds that this project, as currently proposed, must be conditioned in order to avoid a prohibited Take of state-listed species (321 CMR 10.18(2)(a)). To avoid a prohibited Take of state-listed species, the following conditions must be met:

- 1) **Limit of Work.** All work including grading, staging, and access at the site shall be confined to the areas identified on the Construction Plans, titled “Reconstruct Runway 1-19” (dated March 2020). Any changes to the proposed project or any work beyond that shown on the plans shall require additional review and written approval from the Division.
- 2) **Restoration.** All grassland areas disturbed by construction activities, shall be restored to grasslands utilizing original topsoil. If additional topsoil is needed, then the proposed soil composition and source shall be identified and submitted to the Division for review and written approval prior to use. The proposed seed mix shall be submitted to the Division for review and written approval prior to use.
- 3) **Time of Year Restriction.** As identified in the application, work may commence in 2020 or 2021 and project components could occur during the grassland bird nesting season, April 15 – August 15. If work is proposed to occur during any of the grassland breeding period, April 15 – August 15, then by March 15 the Applicant must provide all grassland bird protection and minimization measures that will be implemented at the site for the duration of work to the Division for review and written approval prior to implementation.
- 4) **Authorization Duration.** This authorization is valid for 5 years from the date of issuance. Work may be completed at any time during this 5-year period in compliance with the conditions herein. Thereafter, the applicant shall re-file under the MESA.

Provided the above-noted conditions are fully implemented and there are no changes to the project plans, this project will not result in a Take of state-listed species. We note that all work is subject to the anti-segmentation provisions (321 CMR 10.16) of the MESA.

This determination is a final decision of the Division of Fisheries and Wildlife pursuant to 321 CMR 10.18. Any changes to the proposed project or any additional work beyond that shown on the site plans may require an additional filing with the Division pursuant to the MESA. This project may be subject to further review if no physical work is commenced within five years from the date of issuance of this determination, or if there is a change to the project.

Please note that this determination addresses only the matter of state-listed species and their habitats. If you have any questions regarding this letter please contact Amy Hoenig, Endangered Species Review Biologist, at (508) 389-6364.

Sincerely,

A handwritten signature in black ink, reading "Everose Schlüter". The signature is written in a cursive, flowing style.

Everose Schlüter, Ph.D.
Assistant Director

cc: Town of Orange
Steven Riberdy, GZA GeoEnvironmental, Inc.

