



Roanoke Regional Airport Commission

5202 AVIATION DRIVE, N.W.

ROANOKE, VA 24012

PHONE: (540) 362-1999

ISSUE DATE: MARCH 6, 2025

INVITATION FOR BID # 25-011

FOR

**REHABILITATE TAXIWAY B FROM TAXIWAY B1
TO B4**

SEALED BIDS DUE:

APRIL 17, 2025

ON OR BEFORE

3:00 P.M. (LOCAL TIME)

ALL INFORMATION AND CLARIFICATION INQUIRIES MUST BE SUBMITTED IN WRITING

TO: TROY PHILPOTT, PROCUREMENT AND CONTRACTS MANAGER

AT PROCUREMENT@FLYROA.COM

BY 5:00 P.M. ON THURSDAY, APRIL 10, 2025

**REHABILITATE TAXIWAY B FROM TAXIWAY B1 TO B4 PROJECT
BID NO: 25-011**

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BID INFORMATION

SECTION A

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INVITATION FOR BIDS
Bid No. 25-011

The Roanoke Regional Airport Commission will accept sealed bids for furnishing all labor, materials, and equipment and performing all work for:

REHABILITATE TAXIWAY B FROM TAXIWAY B1 TO B4
AT
ROANOKE BLACKSBURG REGIONAL AIRPORT

The work involves the rehabilitation of Taxiway B pavement between Taxiway B1 and Taxiway B4, including connector Taxiways B1, B2, and B3 outside of the Runway Safety Area. Bids shall be received until 3:00 P.M. local time on April 17, 2025, in the Office of Roanoke Regional Airport Commission, 5202 Aviation Drive, Roanoke, Virginia 24012 or via email at Procurement@flyroa.com. Bids will be publicly opened and read aloud at that time in Conference Room A on the Second Floor of the Airport Terminal Building.

Contract Documents will be will be posted on eVA, Virginia Department of General Services' central electronic procurement website, at <https://eva.virginia.gov>, and on the Roanoke Blacksburg Regional Airport Current Bids and Proposals website, at <https://www.flyroa.com/current-bids-and-proposals>. Electronic copies of the Contract Documents can also be obtained by emailing Troy Philpott, Procurement and Contracts Manager, Roanoke Regional Airport, at Troy.Philpott@flyroa.com.

Bidders are invited to submit bids for this work on the bid forms provided in the package; other bid forms will not be accepted. The successful bidder shall be required to have and maintain a Class "A" Virginia Contractor's License and not less than \$5,000,000 in general liability, \$1,000,000.00 in motor vehicle insurance, and \$5,000,000.00 umbrella insurance. Contractor, its employees and any subcontractors' employees will be required to submit to federal security threat assessments, may be subject to fingerprint-based criminal records checks, and must be and remain approved by the Commission for access to airport secure areas.

Each bid must be accompanied by a bid security in a form acceptable to the Commission in an amount equal to at least five percent (5%) of the amount of the bid by the Contractor, payable to the Roanoke Regional Airport Commission, as a guaranty that if the bid is accepted, the bidder will execute the Contract and file required Performance and Payment Bonds within the time provided in the Instructions to Bidders.

Minority business enterprises will be afforded full 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.

A Pre-bid Meeting will be held in the Airport Terminal Building, 2nd Floor, Commission Conference Room A, at 10:00 A.M. on March 19, 2025. No other escorted reviews of the site will be provided.

The Roanoke Regional Airport Commission reserves the right to waive any informalities, technicalities, or irregularities in a Bid, or to reject any or all bids, or to re-advertise for bids and to award or refrain from awarding the Contract for the project specified, should any such action be deemed to be in the best interest of the Commission.

If the bid by the lowest responsible bidder exceeds funds allocated for the project, the Commission reserves the right to negotiate with the apparent low bidder pursuant to the terms set out in the Instructions to Bidders. The Commission additionally reserves the right to reject any and all bids, and to accept any part of or combination of bids, to waive any informalities or irregularities in any bid, and to award the Contract to other than the lowest bidder, should it be deemed to be in the best interest of the Commission. If a contract is awarded to other than the low bidder, it will be awarded to the lowest responsible and responsive bidder.

The Roanoke Regional 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-2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that for 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 (including limited English proficiency), creed, sex (including sexual orientation and gender identity), age, or disability in consideration for an award.

All bidders shall endeavor to afford Disadvantaged Business Enterprises (DBEs) a reasonable opportunity to participate in this project. The Commission's goal for DBE participation is 8.9%. All bidders wishing to remain in competition for the contract shall submit documentation of their DBE goal accomplishments or good faith efforts in accordance with the bid documents.

ROANOKE REGIONAL AIRPORT COMMISSION

INSTRUCTIONS TO BIDDERS

I. GENERAL

- A. The Contractor covenants and agrees that it and its agents and employees shall comply with and shall be solely responsible for compliance with all applicable municipal, state and federal laws, national and local codes, and Roanoke Regional Airport Commission rules and regulations applicable to the removal, preparation, and installation of materials and other associated products and services to be provided pursuant to the Contract Documents.
- B. As used herein, the terms "Owner," "Commission," "Airport Commission," or "Sponsor," or shall refer to the Roanoke Regional Airport Commission.
- C. As used herein, the terms "Work," or "Project" shall refer to all construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations.
- D. As used herein, the terms "Contractor" and "successful bidder" shall refer to the person or entity selected to enter a contract with the Commission for the above referenced Work.
- E. As used herein, the term "Contract" or "Contract Documents" shall mean and include the Invitation to Bid, Instruction to Bidders, Bid Forms, the Performance Bond, Labor and Material Payment Bond, Contract Form, General Conditions, Drawings, Technical Specifications, Supplementary Drawings, any addenda issued to bidders, and any other documents specifically incorporated by reference in the Contract Form.
- F. Attention of all prospective bidders is directed to the fact that the Airport Commission is a governmental body, and in accordance with Virginia law is not subject to state sales tax; however, such exclusion does not extend to Contractor in its purchase of goods and services for the Project.
- G. The Contractor shall procure all permits and licenses, pay all charges and fees, and give all notices necessary and incidental to the due and lawful prosecution of the Work.

- H. LIQUIDATED DAMAGES. Time is of the essence in the completion of the Work. Bidders are advised that the Contract Documents do contain provisions for liquidated damages, including without limitation, liquidated damages for failure to complete the Work in a timely manner. **By submitting a bid, a bidder acknowledges and agrees that the bidder has been advised of such liquidated damages and has reviewed and agreed to all liquidated damages provision in the Contract Documents, including, without limitation, Contractor's waiver of any defenses as to the validity of such liquidated damages based on such liquidated damages being void as penalties or not being reasonably related to actual damages.**
- I. All proposals or bids and any accompanying or related information submitted to the Commission will become the property of the Commission and will not be returned. Trade secrets or proprietary information submitted by a proposer or bidder may not be subject to the Virginia Freedom of Information Act (Section 2.2-3700 et seq.), provided that the proposer or bidder: (i) properly invokes the protections of the applicable sections of the Virginia Code, as amended, including, without limitation, Virginia Public Procurement Code Section 2.2-4342 for trade secrets or proprietary information prior to or upon submission of the data or other materials to be protected; (ii) clearly identifies the data or other materials in the proposal to be protected; and, (iii) states in writing the reasons why protection is necessary.

By submitting a proposal or bid, the submitting entity consents and agrees that, notwithstanding any express or implied claim of copyright, any and all documents submitted to the Commission are not subject to copyright and, as such, may be copied; however, the release of such documents shall be governed by applicable law, including, without limitation, the Virginia Freedom of Information Act.

- J. Note: This public body does not discriminate against faith-based organizations in accordance with the Code of Virginia 2.2-4343.1 or against a bidder or offeror because of race, religion, color, sex, national origin, age, disability, or any other basis prohibited by state law relating to discrimination in employment.

II. **GENERAL BOND REQUIREMENTS**

A. Bid Bond

Each separate Bid shall be accompanied by a Certified or Cashier's Check or a Bid Bond on the form provided herein in the amount of not less than five percent (5%) of the total amount bid, including all alternates, made payable to the Roanoke Regional Airport Commission. If a Bid Bond is provided in lieu of a Certified or Cashier's Check, it must be signed by the bidder as principal and by a corporate surety authorized to transact business in Virginia,

be substantially on the form included with the Bid Forms herein, include an executed surety bond affidavit and be accompanied by a valid power of attorney indicating that the person signing the bond on behalf of the Surety has full legal authority to do so.

B. Performance and Labor and Material Payment Bonds

Good and sufficient Performance and Labor and Material Payment Bonds in substantially the forms contained in these specifications and in the sum of not less than 100 percent of the contract amount, with a surety Company satisfactory to the Owner and licensed to conduct business in the Commonwealth of Virginia, will be required of the Contractor guaranteeing that the contract, including the various guarantee periods hereunder, will be faithfully performed and that labor and material suppliers shall be paid. The fully executed Bonds, along with appropriate Power of Attorney and the executed Contract shall be delivered to Owner, no later than fifteen (15) calendar days from the date of receipt of Owner's Notice of Award. If, at any time after the execution of the agreement, Owner shall deem the surety or sureties upon such bond or bonds to be unsatisfactory, or if, for any reasons, such bond or bonds ceases to be adequate to cover the performance of the work as above specified, Contractor shall, at its expense within five (5) days of receipt of Owner's written notice to do so, furnish additional bond or bonds in such form and amount and with such surety or sureties as shall be satisfactory to the Owner. In such event, no payment to the Contractor shall be deemed due under the agreement until such new or additional bond or bonds are furnished in a manner and form satisfactory to the Owner.

Only the Performance and Labor and Material Payment Bond Forms in substantially the form as are bound as within these documents are acceptable.

III. **PREPARATION AND SUBMISSION OF BIDS**

- A. The Bidder must submit its Bid on the Bid Forms contained herein; no other form is acceptable. Any bid received after the time specified in the Invitation to Bid for receipt shall be returned to the bidder unopened.
- B. All blank spaces in the Bid Forms must be correctly and completely filled in, where indicated, in ink or type written, except that all signatures shall be signed in ink by an official of the firm who is authorized to submit the bid.
- C. The Bidder must state the price(s) (typewritten or in ink) both in words and numerals. Where a discrepancy occurs between the prices quoted in words and/or in numbers, the figure quoted in words shall take precedence and govern in the determining final costs or award of the contract.

- D. Erasures or other changes in a Bid shall be made on the bid form and be explained or noted and dated over the signature of the Bidder prior to the bid submittal time and the sealing of the bid envelope. No alterations to the bid figures by notations on the outside of the envelope will be considered.
- E. Bids containing reservations, exceptions, conditions, omissions, unexplained erasures or alterations, items not required in the bid or irregularities of any kind may be rejected by the Owner.
- F. When requested by the Owner, a Power of Attorney or other satisfactory evidence of the authority of the official signing in behalf of the firm shall be furnished for the Owner's records.
- G. The cost of any item whatsoever, not listed in the Bid Form, yet which is mentioned in the Specifications or shown on the Plans, shall be considered to be included in the cost of some other item of bid in the Bid Form or as part of the total bid price.
- H. Information Required
 1. The bidder must supply all information required by the bid **and fully complete each page of the Bid Form in Section C, and shall provide with its Bid the additional information and documents listed in this Section H. and Section I. below.**
 2. Each bidder shall present evidence of its experience, qualifications and financial ability, upon the form enclosed herein, to perform the work and to satisfactorily complete the project. Qualifications information shall include the identification of the proposed on-site superintendent with relevant project experience on similar work at the same level of responsibility (complete Part III of the Section C Bid Form).
 3. No bid will be received and tabulated or considered, nor any contract awarded, unless the bidder has demonstrated in the bid form that it is properly licensed as a Class A Contractor, as required under the Code of Virginia (1950), as amended (complete Part II of the Section C Bid Form).
 4. Each Bidder shall complete and submit with its bid the Worker's Compensation Certificate of Coverage appearing as Part V of the of the Section C Bid Form of these contract documents. No award shall be made to any Bidder who fails to show such evidence of required Worker's Compensation coverage.
 5. Every bidder shall include in its bid the identification number issued to it by the State Corporation Commission confirming that it is organized or authorized to transact business in the Commonwealth pursuant to Title 13.1

or Title 50. If the bidder is not required to be authorized to transact business in the Commonwealth as a foreign business entity under Title 13.1 or Title 50 or as otherwise required by law, the bidder shall include in its bid a statement describing why the bidder is not required to be so authorized. Any bidder that fails to provide the required information shall not receive an award unless a waiver of this requirement is granted by the Commission's Executive Director. (Complete Part VI of the Section C Bid Form.)

7. Each bidder shall provide the bid bond or security specified in Section A.II.A. above. (Complete Bid Bond Form found in Section C Bid Form of these bid documents)

I. Bid Submission

There are two options for submitting a bid for Rehabilitate Taxiway B from Taxiway B1 to B4 project.

1. **Electronic Submission:**

Each Bidder shall submit its Bid via email to procurement@flyroa.com with the subject line clearly stating:

Bid For: Rehabilitate Taxiway B from Taxiway B1 to B4
Bid No. 25-011
Roanoke Blacksburg Regional Airport
Roanoke, Virginia
Class "A" Virginia Contractor No. _____

The email must include the Bidder's name and address in the body of the email. The Owner shall not be responsible for bids that are improperly submitted, misidentified, or not received due to email transmission errors.

2. **Physical Submission:**

Each Bidder shall present its Bid in a sealed, opaque 9 x 12 inch envelope. The outside of the envelope shall be plainly marked on the bottom left-hand corner with:

Bid For: Rehabilitate Taxiway B from Taxiway B1 to B4
Bid No. 25-011
Roanoke Blacksburg Regional Airport
Roanoke, Virginia
Class "A" Virginia Contractor No. _____

with the name and address of the Bidder in the upper left-hand corner.

The Owner shall not be responsible for premature opening of bids not properly addressed and identified, as required herein.

All bids shall be delivered to the Roanoke Regional Airport Commission, Administrative Offices, 5202 Aviation Drive, Roanoke, VA 24012, no later than 3:00 P.M. local time, on April 17, 2025.

When sent by mail, no bid will be considered unless received by the Commission on or before the time and at the place designated in the Invitation to Bid. The Commission will in no way be responsible for delays caused by the U. S. Postal Service or any other deliverer of the bid, or for delay caused by any other occurrence. Any bid received after the time specified in the Invitation to Bid for receipt of bids, shall be returned to the Bidder unopened.

- J. Both options for submittal shall contain the signed original copy of:
- | | |
|----------|--|
| Bid Form | Fully completed with all blanks filled in and all requested information provided (see Section A.H. 1-5) and including the signature of an authorized official of Bidder and the Bidder's Class "A" Virginia Contractor's License Number; |
| Bid Bond | Bid Bond or Guarantee (see Section A.II.A.), fully completed and signed by Bidder and, if applicable, its Surety. |
- K. A pre-bid meeting and site review will be provided by Commission's representatives on March 19, 2025, at 10:00 A.M. in order to assist Bidders in preparing their bid packages. Any interested bidder should arrive at the Commission Office, 5202 Aviation Dr, Roanoke, VA 24012, by the specified time in order to discuss the project and be escorted to view the site. As certain areas of work are in non-public, secure locations, all perspective bidders are strongly encouraged to attend the pre-bid meeting. No additional meetings or site reviews will be provided or allowed.

IV. **INTERPRETATIONS**

- A. Each Bidder shall carefully examine the Contract Documents and all addenda or other revisions and thoroughly familiarize itself with the detailed requirements prior to submitting a Bid. Should a Bidder find discrepancies or ambiguities in, or omission from the Contract Documents, or should it be in doubt as to their meaning, it shall at once, and in any event, not later than 5:00 P.M. on Thursday, April 10, 2025, notify Troy Philpott, the Owner's Procurement and Contracts Manager in writing of the nature of the problem or question. Said Manager will send or arrange for the sending of written Addenda and/or answers to questions to all Bidders of record who have requested a bid package. Bidders shall not seek nor be entitled to rely upon

any oral instructions, statements, or interpretations by Owner or Owner's Consultant. All Addenda sent to Bidders will become a part of the Contract Documents.

- B. Acknowledgment or receipt of all Addenda shall be made by each bidder in the space provided in the Bid Form.

V. **MODIFICATIONS AND/OR WITHDRAWAL OF PROPOSALS**

A. Prior to Bid Opening:

A Bidder may withdraw or revise (by withdrawal of one bid and submission of another) a bid, provided that Bidder's request for withdrawal is received by the Owner in writing or by telegram or fax before the time specified for opening bids. Revised bids must be received at the place specified in the Invitation to Bid before the time specified for opening all bids.

B. Withdrawal After Bid Opening:

1. A Bidder may withdraw its bid from consideration if the price bid is substantially lower than the other bids due solely to a mistake therein, provided the bid was submitted in good faith, and the mistake was a clerical mistake as opposed to a judgment mistake, and was actually due to an unintentional arithmetic error or an unintentional omission of a quantity of work, labor or material made directly in the compilation of a bid, which unintentional arithmetic error or unintentional omission can be clearly shown by objective evidence drawn from inspection of original work papers, documents and materials used in the preparation of the bid sought to be withdrawn. The Bidder shall give notice in writing of its claim of right to withdraw its bid within two (2) business days after the conclusion of the bid opening procedure, and shall submit original work papers, documents and materials used in preparation of such bid with the written notice. The work papers, documents and materials submitted by the bidder shall, at the bidder's request, be considered trade secrets or proprietary information. The mistake shall be proved only from the original work papers, documents and materials delivered as required herein.
2. No bid may be withdrawn under this section when the result would be the awarding of the contract on another bid of the same Bidder or of another bidder in which the ownership of the withdrawing bidder is more than five (5) percent.
3. If a bid is withdrawn under the authority of this section, the lowest remaining responsive and responsible bid shall be deemed to be the low bid.

4. No Bidder who is permitted to withdraw a bid shall, for compensation, supply any material or labor to or perform any subcontract or other work agreement for the person or firm to whom the contract is awarded or otherwise benefit, directly or indirectly, from the performance of the project for which the withdrawn bid was submitted.
5. The Executive Director shall notify the bidder in writing within five business days of the decision regarding the bidder's request to withdraw its bid. If the Commission's Executive Director denies the withdrawal of a bid under the provisions of this Section, the Executive Director shall notify the Bidder and Commission in writing shall state in such notice the reasons for the decision and shall recommend award of the Contract by Commission to such Bidder at the bid price, provided such Bidder is a responsible and responsive bidder. At the same time that the notice is provided, the Commission shall return all work papers and copies thereof that have been submitted by the bidder.

VI. **REJECTION OF BIDS**

- A. Bids containing any omission, alterations of form, additions, exceptions or conditions not called for, conditional or alternate bids unless called for, or incomplete bids may be considered nonresponsive, irregular, or informal and may be rejected.
- B. If the bid from the lowest responsible and responsive bidder exceeds funds budgeted and tentatively allocated for this specific project, the Executive Director may negotiate with the apparent low bidder to obtain a contract price within available funds. The Executive Director shall determine that the lowest responsible and responsive bid exceeds funds available for this project and notify such bidder in writing of the Commission's desire to negotiate. Thereafter, negotiations with the apparent low bidder may be held to obtain a contract within available funds involving discussions of reduction of quantities, or other cost saving mechanisms. Any such negotiated contract shall be subject to the Commission's final approval.
- C. The Commission reserves the right to award the Contract to a Bidder other than the apparent low Bidder if such bidder is not the lowest responsible and responsive bidder. Should a contract be awarded to a Bidder other than the apparent low Bidder, it will be awarded to the lowest responsive and responsible Bidder meeting all requirements of these Contract Documents.
- D. The Commission reserves the right to accept or reject alternates in any order or combination, to waive any informalities or irregularities in any bid, to accept any part of or combination of bids, to reject any or all bids, and to re-advertise and rebid, should any said action be deemed to be in the best interest of the Commission.

VII. AWARD AND EXECUTION OF CONTRACT

A. Consideration of Bids and Award of Contract

The Commission reserves the absolute right to consider all bids and to determine, after such consideration, whether to award a contract for the Project. If a contract is awarded, the award will be to the lowest responsive and responsible bidder selected by the Commission; as such award may be evaluated to be in the best interest of the Commission. No award will be made until the Commission has concluded such investigations as it deems necessary to establish the responsibility, qualifications and financial ability of the bidders and their products to perform in accordance with the contract documents to the satisfaction of the Commission within the time prescribed. The Commission reserves the right to reject the bid of any bidder who does not pass such investigation to the Commission's satisfaction. If the Contract is awarded, the Commission will give the successful bidder written notice of the award within sixty (60) calendar days after the opening of the bids. Until the final execution and delivery of the Contract back to the successful bidder, the Commission reserves the right to reject any or all bids, to waive informalities, technicalities or non-material defects or to advertise for new bids, or to proceed to do the work otherwise should any such action be deemed to be in the best interests of the Commission.

B. Acceptance of Bid

As soon as the bids have been reviewed and compared, which shall occur within thirty (30) consecutive calendar days after the Bid Opening date, the Roanoke Regional Airport Commission may give written notice of its intent to award a contract. Actual award of contract, if it is to be awarded, is contingent upon receipt of grant funding for the project and shall be made within one hundred and eighty (180) consecutive calendar days after Bid Opening Date. The successful bidder shall be required, within fifteen (15) consecutive calendar days after the receipt of the "Notice of Bid Acceptance" to execute the Contract and return the Contract to the Commission.

C. Execution of Contract

The successful Bidder shall sign (execute) the Contract and return such signed Contract to the Owner, along with required insurance certificates and completed bond forms within fifteen (15) calendar days from the date of receipt of the Notice of Award by Owner. If the successful Bidder shall fail to execute the Contract within such fifteen (15) day period, the Commission may require forfeiture of the Bid Security, pursue any other remedies available at law or in equity, rescind the contract award and/or the Commission may then

proceed to accept the Bid of the next lowest responsive and responsible Bidder. If the Contract is mailed, special handling is recommended.

D. Approval of Contract

Upon receipt from the successful bidder of required insurance documents, the executed Contract, the Performance and Payment Bonds, the construction schedule and any other required documents, the Owner may complete the execution of the Contract in accordance with applicable laws, and return a copy of the fully executed Contract to the Contractor. No contract is binding upon the Owner until it has been executed by the Owner and delivered to the Contractor. Work shall commence only upon Contractor's receipt of a written notice to proceed from Owner.

E. Failure to Execute Contract

Failure of the successful bidder to execute the Contract and furnish the required insurance documents and bonds within the 15 calendar days period after receiving Notice of Award shall be just cause for cancellation of the award. An award may then be made to the next lowest responsive and responsible bidder, or the work re-advertised, or handled as the Owner may determine in its sole and exclusive discretion.

F. Failure to Accept Bids

Should no "Notice of Bid Acceptance" be issued by Owner within one hundred and eighty (180) consecutive calendar days after the opening of bids, each Bidder may have its bid security returned from Owner.

GENERAL CONDITIONS

SECTION B

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B. GENERAL CONDITIONS

1. Contract Documents

Contract Documents ("Contract") shall include: the Invitation to Bid, Instructions to Bidders, Completed Bid Forms, Addenda issued to Bidders, Completed Contract Form, General Conditions, Performance Bond, Labor and Material Payment Bond, Technical Specifications, Drawings, Supplementary Drawings, Appendices, and any Supplemental Agreements between the parties.

2. Time of Completion (Contract Time), Notice to Proceed and Liquidated Damages

A. Contract Time. The work under this Contract shall be completed and final acceptance issued by the Owner in accordance with Subparagraph B below.

B. Notice to Proceed. The Contractor will be issued two Notices to Proceed for the work under this Contract. The first Notice to Proceed for **Phase 1- Administrative Services** will be issued upon the return of the executed Contract to Contractor. During Phase 1, Contractor will attend a preconstruction conference, prepare, submit and have approved work and phasing schedules, safety plans, color samples, other required submittals, etc.; arrange for its employees and/or subcontractors to be background checked, trained and badged for access to and work within the airport secured areas; and order supplies and other equipment needed for the project. All work preliminary to the actual start of labor at the Airport must commence within ten (10) calendar days and completed within two hundred and forty (240) calendar days of the effective date of the first Notice to Proceed. Review time by the Owner and/or Engineer during which Contractor can undertake none of the administrative tasks shall not be counted as part of this time period.

The second Notice to Proceed will be for **Phase 2 –Performance of the Work**, which will be issued by Owner at the expiration of the Phase I time period. All Phase 2 Work on site shall commence within ten (10) calendar days and shall be Substantially Complete within one hundred and fifty (150) calendar days and achieve Final Acceptance within one hundred and eighty (180) calendar days of the effective date of the Phase 2 Notice to Proceed, including all inspections and testing procedures required by these contract documents.

In the event that Contractor fails to complete the Phase I work within the time allowed, Owner may still issue the second notice to proceed; however, Contractor may not enter the work site or begin work at the airport prior to the obtaining of all required permits and receipt of security badges and the approval of all required submittals, nor shall the Phase 2 calendar days be tolled while the contractor is

unable to work. In such case, Owner would also have a basis for canceling the Contract for cause in accordance with the Contract Documents.

The Contractor shall notify the Owner and the Consultant at least 48 hours in advance of the time any operations will begin at the Airport.

C. Liquidated Damages. Time is of the essence in the completion of this Contract. The Contract Documents contain provisions for liquidated damages, including without limitation, liquidated damages for failure to complete each phase of the Work in a timely manner and a waiver by Contractor of any defenses as to the validity of such liquidated damages. Contractor acknowledges and agrees that the Contractor has been advised of such liquidated damages and has reviewed and agreed to all liquidated damages provisions in the Contract Documents, including, without limitation, Contractor's waiver of any defenses as to the validity of such liquidated damages based on such liquidated damages being void as penalties or not being reasonably related to actual damages.

3. Owner's Representative

In addition to Owners employees, Owner has contracted for the services of a Consultant to draft and interpret technical specifications and to provide oversight for the Project.

Whenever in these Contract Documents reference is made to "Consultant", "Architect" or "Engineer," it is intended to mean Delta Airport Consultants, Inc. and any other consultant contracted by the Owner to assist on this project.

4. Authority of the Consultant

The Consultant shall decide any and all questions which may arise as to the quality and acceptability of materials furnished, work performed, and as to the manner of performance and rate of progress of the Work. It shall decide all questions which may arise as to the interpretation of the specifications or plans relating to the Work and the fulfillment of the contract on the part of the Contractor. The Consultant shall determine the amount and quality of the several kinds of work performed and materials furnished which are to be paid for the under contract.

5. Conformity with Drawings and Specifications

If the Consultant finds the materials furnished, work performed, or the finished product not within reasonably close conformity with the Contract Documents, but that the portion of the Work affected will, in its opinion, result in a finished product having a level of safety, economy, durability, and workmanship acceptable to the Owner, it will advise the Owner of its determination that the affected work be

accepted and remain in place. In this event, the Consultant will document its determination and recommend to the Owner a basis of acceptance which will provide for an adjustment in the contract price for the affected portion of the work. The Consultant's determination and recommended Contract price adjustments will be based on good consulting judgment and such tests or retests of the affected work as are, in its opinion, needed. Changes in the contract price shall be covered by contract modifications (change order or supplemental agreement) as applicable.

If the Consultant finds the materials furnished, work performed, or the finished product are not in reasonably close conformity with the drawings 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 Owner's and/or Consultant's written orders.

For the purpose of this subsection, the term "reasonably close conformity" shall not be construed as waiving the Contractor's responsibility to complete the Work in accordance with the contract, drawings, and specifications. The term shall not be construed as waiving the Consultant's right to insist on strict compliance with the requirements of the Contract Documents, during the Contractor's prosecution of the Work, when, in the Consultant's opinion, such compliance is essential to provide an acceptable finished portion of the Work or for the Project.

For the purpose of this subsection, the term "reasonably close conformity" is also intended to provide the Consultant with the authority to use good professional judgment in its determinations as to acceptance of work that is not in strict conformity but will provide a finished product equal to or better than that intended by the requirements of the Contract Documents.

6. Coordination of Contract, Drawings, and Specifications

The Contractor shall not take advantage of any apparent error or omission on the Contract Documents. In the event the Contractor discovers any apparent error or discrepancy, it shall immediately call upon the Consultant for its interpretation and decision, and such decision shall be final.

7. All Costs Included

The Contractor shall provide and pay for all permits, materials, equipment, labor, demolition, transportation, inspections, disposal costs, delivery charges, fuel, telephone, room and board expenses, and all other facilities and incidentals necessary for the execution and completion of the work as described in the Contract Documents. No amount in addition to the bid price will be paid Contractor for any of the work or services specified in the Contract Documents.

All materials and equipment added and incorporated in the work shall be new, unless otherwise specified. If required by the Owner, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

8. **Laws to Be Observed**

Contractor expressly warrants that in the performance of the Work it shall comply with all applicable laws, codes, regulations, standards, etc., which may be required of it by all applicable local, state and federal jurisdictions and their respective agencies, offices, bureaus, and other administrative/regulatory entities, including, but not limited to, all local, state and federal ordinances, laws and regulations, concerning building and fire codes, solid waste and environmental matters, FAA, TSA and airport security regulations, and all applicable sections of the Occupational Safety and Health Act (OSHA), the Virginia Uniform Statewide Building Code.

The Contractor shall be responsible for arranging all inspections by local authorities for compliance with all building code requirements, ordinances and regulations.

9. **Permits, Licenses, and Taxes**

The Contractor shall be solely responsible for providing and shall procure all permits and licenses, pay all charges, fees, and taxes, and give all notices necessary and incidental to the due and lawful prosecution of the Work.

The Contractor shall obtain or possess a valid Contractor's Business License in accordance with any applicable City of Roanoke Ordinances.

A City of Roanoke Building permit is required for this project.

10. **Airport Security**

A. Work Area and Badges

Contractor acknowledges that all work for this phase work will be performed within "**Secured Area, "SIDA" and/or "Sterile Area"**, which is/are highly restricted access area(s) and are referred to individually and collectively herein as "Security Restricted Areas." Contractor agrees to be responsible for, and to ensure that, none of its employees, agents, subcontractors or representatives gains access, enters or moves about the Security Restricted Area(s) without prior approval of the Owner's Executive Director as evidenced by a Commission issued identification badge, or constant escort by a duly authorized and badged employee of the Owner; and that the Contractor, its employees, agents, subcontractors and representatives shall

comply with the requirements of Owner's federally mandated security program at Contractor's sole cost and shall be subject to the penalties of such program. *Only persons delivering materials or performing job functions of extremely short duration will be permitted to enter and remain inside any Security Restricted Area under escort by a badged representative of Contractor; all other persons involved with and performing the Work must be approved, trained and badged.*

Prior to issuance of a Commission identification badge, an authorized representative of Contractor shall designate an individual, in writing and on company letterhead, to serve as the Consultant's "Authorized Signatory." Only the Contractor's Authorized Signatory may initiate requests for unescorted access to the Security Restricted Areas of the airport for its employees or subcontractors, in accordance with the Commission's Airport Security Plan (ASP). The Authorized Signatory and each employee for whom access is being requested must submit to a Security Threat Assessment, vetting applicants through various TSA databases, and further, the Authorized Signatory and each employee for whom access to the Secured Area, Sterile Area or a Security Identification Display Area (SIDA) is requested shall be required to submit to a fingerprint based criminal history records check. The Authorized Signatory and all persons for whom badges are requested will be required to attend a security training taught or overseen by Commission personnel. The Owner reserves the right to deny unescorted access within one or more of the Security Restricted Areas to some or all Consultant's employees or the employees of Consultant's subcontractors.

Contractor agrees that it shall be responsible for paying a \$30.00 deposit for each identification badge issued. In the event the badge is returned at the completion of the work, then the deposit shall be returned to Contractor. In the event that any badge is not returned, then the deposit for the badge shall be forfeited and Contractor may be held in violation of TSA regulations and be subject to a fine up to \$10,000.00. In the event that the badge is lost or otherwise unaccounted for during the time the work is being performed, then the deposit shall be forfeited and a new deposit and fee shall be charged for the replacement badge in accordance with the schedule of fees established by the Commission. Currently the first replacement badge will be \$50.00, second replacement badge \$75.00 third replacement badge \$100.00 during any consecutive twelve-month period. Contractor understands and agrees that the fees and charges listed above are subject to revision by the Commission at any time and that it shall be subject to the fees established from time to time by the Commission.

Upon voluntary or involuntary termination of employment or completion of the work at the Airport, Contractor shall notify Airport Security within 8 hours and surrender the identification badge(s) as soon as possible.

Contractor must keep employment records for each identification badge applicant for at least 180 days after termination of unescorted privileges and return of the badges.

B. Tools

Recognizing that certain portions of the terminal area where the work may be or is being performed is located inside the Secured Area/SIDA and/or Sterile Area, Contractor shall take extraordinary measures to ensure that none of its tools or materials shall be left in any area where they might be picked up and taken onto an aircraft by passengers or other persons in violation of TSA regulations.

C. Vehicles

Contractor agrees that any vehicles that it may be permitted to bring inside the security fence line shall be commercial vehicles, properly insured and identified with the company name on both sides of the vehicles using letters eight inches or greater in height, and subject to search before each entry, as well as subject to escort by Commission personnel at all times it or they are in operation. Contractor may also be required to affix a Commission issued vehicle decal to each such vehicle.

All persons routinely driving such vehicles shall be trained regarding driving inside the security fence in an area where aircraft are operating, and/or be escorted by an employee of the Commission.

In addition, Contractor shall keep its vehicles and any bins, tool boxes, etc. located therein, in a locked condition whenever located inside the fence and Contractor is not actively engaged in the process of removing/replacing tools and materials into or out of the vehicle.

It is anticipated that only very infrequent access within the fence line by vehicles delivering certain materials or equipment will be allowed with this contract. Such vehicles shall be escorted by Owner's personnel at all times. Most materials will be stored outside the Security Restricted Areas at a location designated by the Owner.

D. Access Points

The Contractor shall use only authorized access points and routes into and within the Security Restricted Areas. Contractor is responsible for ensuring that all employees of Contractor and the subcontractors use only the authorized access points and approved routes to access the work sites, and

that they verify that the access points are secure immediately after use. Gates that fail to secure must be immediately reported to an Airport Law Enforcement Officer. The persons and vehicles entering the any part of a Security Restricted Area shall proceed immediately to and from the work sites and the entrance gate, and shall not unnecessarily drive or walk onto or across any aircraft parking or taxiing area.

The airport is subject to TSA security requirements and rigid adherence is mandatory. Any fines resulting from unauthorized contractor's personnel entering a Security Restricted Area or being left without escort or other security violations by Contractor, its employees and subcontractors will be deducted from money otherwise due Contractor.

E. Remaining within Work Site

Contractor shall delineate limits of construction and access with its employees daily. None of Contractor's employees or those of its subcontractors should move beyond or outside such limits without authorization of the Owner. Violators are subject to removal from the jobsite and loss of the identification badge and working privileges inside one or more Security Restricted Areas, as applicable.

11. Prosecution and Progress

The Contractor shall bring to the Preconstruction Conference its progress schedule for the Consultant's approval. The Contractor's progress schedule, when approved by the Consultant, may be used to establish major construction operations and to check on the progress of the Work. The Contractor shall provide sufficient materials, equipment, and labor to guarantee the completion of the project in accordance with the drawings and specifications within the time set forth in the Contract Documents.

If the Contractor falls behind the submitted schedule, the Contractor shall, upon the Consultant's request, submit a revised schedule for completion of the Work within the contract time and modify its operations to provide such additional materials, equipment, and labor necessary to meet the revised schedule. Should the prosecution of the Work be discontinued for any reason, the Contractor shall notify the Consultant at least 48 hours in advance of resuming operations.

The Contractor shall not commence any work prior to the effective date on which the notice to proceed is issued by the Owner. Once begun, the Contractor shall perform the work continuously until completion.

12. **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 Documents.

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. Neither Contractor nor its employees, agents, invitees or subcontractors shall bring any firearms or other weapons onto airport property; nor shall any person come onto or remain upon airport property while under the influence of alcohol or illegal drugs.

Any person employed by the Contractor or by any subcontractor who, including the project superintendent, in the opinion of the Consultant, does not perform his work in a proper and skillful manner or is intemperate or disorderly shall, at the written request of the Consultant or Owner, be removed forthwith by the Contractor or subcontractor employing such person, and shall not be employed again in any portion of the Work without the consent of the Consultant or Owner.

Should the Contractor fail to remove such person or persons or fail to furnish suitable and sufficient personnel for the proper prosecution of the Work, the Consultant may suspend the Work by written notice until compliance with such orders.

All equipment which is proposed to be used on the Work shall be of sufficient size and in such mechanical condition as is necessary to meet requirements of the Work and to produce a satisfactory quality of Work. Equipment used on any portion of the Work shall be such that no injury to previously completed Work, adjacent property, existing airport facilities or persons will result from its use.

No gunpowder-activated equipment shall be utilized on this project.

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 Documents.

When the Contract specifies the use of certain methods and equipment, such methods and equipment shall be used unless others are authorized by the Consultant. If the Contractor desires to use a method or type of equipment other than specified in the Contract, it may request authority from the Consultant 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 Consultant 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 Consultant may direct. No change will be made in basis of payment for the Contract items involved or in Contract time as a result of authorizing a change in methods or equipment under this subsection.

13. **Cooperation of Contractor**

The Contractor will be supplied with four hard copies or an electronic PDF of the Plans and Technical Specifications. It shall have available at the work site at all times one hard copy each of the plans and specifications, along with a record of all field deviations and revisions. Additional copies of plans and specifications may be obtained by the Contractor for the cost of reproduction.

The Consultant shall notify the Contractor as to the location, date, and time of a Preconstruction Conference to confirm and discuss matters pertaining to scheduling and execution of the Work. The Contractor shall bring to the Preconstruction Conference a detailed progress and phasing schedule for the project. Once the Contractor's plan is approved, any deviations must receive the Consultant's approval.

The Contractor shall give constant attention to the Work to facilitate the progress thereof, and it shall cooperate with the Owner and Consultant and any inspectors and with other contractors in every way possible. The Contractor shall have a competent superintendent or foreman on the Work at all times who is fully authorized as its agent on the work, and who will be available to contact on a 24-hour basis throughout the duration of the Contract. The superintendent or foreman shall be capable of reading and thoroughly understanding the drawings and specifications and shall receive and fulfill instructions from the Consultant or its authorized representative.

As part of its bid, the Contractor shall provide the resume of and work references for the proposed job superintendent, who shall have similar and relevant project experience with the same level of responsibility prior to award of the contract. The Owner specifically retains the right to reject such project superintendent if the level and type of prior experience, or the references from prior projects, are not considered by the Owner to be good and adequate. If the Owner rejects the proposed Superintendent, or should a replacement superintendent be required prior to completion of the project,

Contractor shall provide information regarding a replacement and Owner shall have the right of approval of replacement superintendent.

The Contractor shall meet with a representative of Owner at the beginning of each work day to discuss and coordinate the anticipated work tasks, deliveries, and tenant operational issues.

Should the Contractor encounter conditions differing from those shown on the Drawings or mentioned in the Specifications, or encounter work not covered by the contract to be in need of repair, it shall immediately give notice to the Consultant. The Consultant will promptly investigate the conditions and direct the Contractor as to the changes or repairs that will be required to correct the conditions.

14. **Alteration of Work and Quantities**

A. Change Orders. The Owner reserves and shall have the right to make such alterations in the Work as may be necessary or desirable to complete the Work originally intended in an acceptable manner. All changes in the Work shall be effectuated by prior written change orders issued by the Consultant and approved and signed by the Consultant, Owner, and the Contractor or subsequent to a Construction Change Directive as described herein. Change orders for altered work shall include extensions of Contract time where, in the Consultant's opinion, such extensions are commensurate with the amount and difficulty of added work and/or they affect the critical path for the Project.

If the Owner and the Contractor are unable to agree on a unit adjustment for any contract item that requires a change, the Owner reserves the right to terminate the Contract with respect to the item and make other arrangements for its completion.

The Contractor's performance and payment bond surety shall waive notice of, and in the bond shall consent to, any subsequent additions, deletions, alterations, extensions, or forbearances relative to the Project and the Contractor's obligations under the Contract Documents, including without limitation the amount of Work to be done, the amount of payment for such Work, or the time allocated to complete such Work. The Surety shall agree to be bound to the full extent of the bond amount for any such additions, deletions, alterations, extensions, or forbearances concerning the Project and the Contractor's obligations under the Contract Documents.

Except as specified in Section B. Construction Change Directives below, no change, alteration, addition or deletion with respect to the Work shall be made by the Contractor unless authorized by prior written change order issued by

the Consultant and endorsed in writing by the Owner. The Contractor shall submit requests for changes in the Contract price and/or completion time in writing to the Consultant within ten (10) calendar days of any occurrence claimed as the basis for the need for a change. The Contractor shall be required to certify the cause of the change order and, if appropriate, length of time involved. Contractor's failure to give such 10-day written notice of such occurrence giving rise to the need for a change order shall be deemed a waiver by the Contractor of any claim for additional compensation and/or contract time relative to the occurrence. Should the Consultant deny Contractor's request for the desired change order for additional compensation or completion time, any claim by Contractor with Owner shall be filed in accordance with the requirements of Subsection 39 below.

- B. Construction Change Directives. A construction change directive is a written order prepared by the Consultant and signed by the Owner and Consultant, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.
1. A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.
 2. If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:
 - a. Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
 - b. Unit prices stated in the Contract Documents or subsequently agreed upon;
 - c. Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
 - d. As provided in Section 6 below.
 3. If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

4. Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Consultant of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.
5. A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.
6. If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Consultant shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 2.c. above, the Contractor shall keep and present, in such form as the Consultant may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section G. shall be limited to the following:
 - a. Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;
 - b. Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;
 - c. Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
 - d. Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and
 - e. Additional costs of supervision and field office personnel directly attributable to the change.
7. The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that result in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Consultant. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

8. Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Consultant will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Consultant determines, in the Consultant's professional judgment, to be reasonably justified. The Consultant's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of Contractor to disagree and assert a Claim in accordance with Section 39 herein.
 9. When the Owner and Contractor agree with a determination made by the Consultant concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Consultant will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.
- C. In determining the cost to the Owner resulting from either an increase or a decrease in the Work, by either Change Order or Construction Change Directive, when no unit price has been bid or agreed upon, the allowances for overhead and profit combined, included in the total cost to the Owner, shall not exceed the percentages as follows:
1. For the Prime Contractor, for any Work performed by its own forces, 15% of the cost;
 2. For the Prime Contractor, for Work performed by his Subcontractors, 7% of the amount due the Subcontractor;
 3. For each Subcontractor involved, for Work performed by its own forces, 15% of the cost;
 4. For each Subcontractor, for Work performed by its lower tier Subcontractors, 7% of the amount due the lower tier Subcontractor.

15. **Public Convenience and Safety**

The Contractor shall control its operations and those of its subcontractors and all suppliers, to assure the least inconvenience to the airport tenants and the traveling public. Under all circumstances, safety shall be the most important consideration.

16. **Barricades, Warning and Notification Signs, and Hazard Markings**

The Contractor shall furnish, erect, and maintain all barricades, warning and notification signs, and markings for hazards necessary to protect airport employees, airport tenants, the public and the Work. During any work on or around the Terminal or elsewhere as appropriate, the Contractor shall install the proper

barricades and signage to isolate half of the tug driveway at a time as the designated work area. Contractor shall coordinate placement of signs and other requirements for signs with the Owner. Signs shall be metal with wording, lettering size and type of stands determined by the Owner. Cost of signs and stands to be included in the price bid for other items.

17. Opening Sections of the Work

Should it be necessary for the Contractor to complete portions of the Contract Work for the beneficial occupancy of the Owner prior to completion of the entire Contract, such "phasing" of the Work shall be specified herein and indicated on the Drawings. When so specified, the Contractor shall complete such portions of the Work on or before the contract time of completion specified or as otherwise specified. The Contractor shall make its own estimate of the difficulties involved in arranging its work to permit such beneficial occupancy by the Owner.

The Contract phasing will be as described in the contract documents and as presented by Contractor and specifically approved by Owner. Upon completion of any portion of the Work to satisfy the phasing requirements, such portion may be accepted by the Owner in accordance with the subsection titled PARTIAL ACCEPTANCE, Subsection 31 of Section B.

No portion of the Work may be opened by the Contractor for public use until authorized by the Owner in writing. Should it become necessary to open a portion of the Work to public traffic on a temporary or intermittent basis, such openings shall be made when, in the opinion of the Consultant, 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 its expense.

The Contractor shall make its 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.

18. Maintenance During Construction

The Contractor shall maintain the Work during construction and until the Work is accepted. This 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.

All costs of maintenance work during construction and before the project is accepted shall be included in the price bid for the Work, and the Contractor will not be paid an additional amount for such work.

19. Contractor's Responsibility for Work

Until the Consultant's final written acceptance of the entire completed Work, excepting only those portions of the work accepted in accordance with the subsection titled PARTIAL ACCEPTANCE, Subsection 31 of these General Conditions, the Contractor shall have the charge and care thereof and shall take every precaution against injury or damage to any part due to any cause, whether arising from the execution or from the no execution of the Work. The Contractor shall 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.

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.

20. Failure to Maintain the Work

Should the Contractor at any time fail to maintain the Work as provided in the subsection titled MAINTENANCE DURING CONSTRUCTION, Subsection 19 of these General Conditions, the Consultant 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 Consultant's notification, the Consultant 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 deducted from monies due or to become due the Contractor.

21. Risk of Loss

Risk of loss or damage from any source shall not pass to the Owner until final acceptance.

The Contractor shall immediately replace missing or damaged equipment or materials and will be responsible for making any and all claims against carriers.

22. Maintenance of Traffic

It is the explicit intention of the Contract that the safety of the public, airport employees, airport tenants, and the Contractor's equipment and personnel is the most important consideration. It is understood and agreed that the Contractor shall provide for the free, unobstructed and safe movement of members of the public in the public areas of the airport with respect to its own operations and the operations of all its subcontractors.

With respect to its own operations and the operations of all its subcontractors, the Contractor shall provide markings, lighting, signing, flagging, barricades and other acceptable means of identifying: personnel, equipment, storage areas, and any work area or condition that may be hazardous to the passage of the public and airport employees and tenants and/or required by the Owner.

23. Maintenance of Work Site and Daily/Nightly Return of Work Area to Operational Condition

At the completion of each work day or night work session, any and all areas of construction activities shall be left in a condition whereby normal passenger operations can be conducted without subjecting passengers, employees and tenants to hazardous or unsafe conditions.

- All public areas shall be open and safely accessible to the public, unless otherwise noted herein.
- All material storage, removal and installation operations shall not obstruct safe entrances and/or exits to the Terminal Building, except as required by the Work and approved by the Owner. All materials, equipment and vehicles shall be removed from the work area at the end of each day's work, with the possible exception of the work area barricade, marking and lighting systems.
- **All debris shall be removed, and all work area demolition removal routes cleaned; waste and loose material capable of causing damage to aircraft landing gears, propellers or being ingested in jet engine, shall not be placed, permitted to drop or be blown by the wind or jet blast onto the aircraft ramp at any time. Material tracked on or near this area shall be removed continuously during the Work. All debris must be containerized; no open-topped debris containers or dumpsters will be allowed. Use magnetic broom equipment continuously to control metallic materials on the aircraft parking ramp and the entrances onto the ramp.**
- All material and stock shall be secured and barricaded at locations determined by the Owner and shall not unduly obstruct Airport operations.

24. **HAZARDOUS AND OTHER WASTES, MATERIAL AND SUBSTANCES**

- A. Contractor shall not dispose of or release any wastes of any kind, whether hazardous or not, on Owner's premises.
- B. Contractor shall remove from the airport all waste and debris arising from its work at the airport and shall dispose of it properly, in accordance with all applicable laws. In particular, Contractor shall remove all new, used and empty paint containers; all new and used lubricants, sealants, solvents and cleaners; and rags, cloths, etc. used in conjunction with the Work.
- C. Contractor shall not bring or allow or permit to be brought onto the Premises any hazardous, toxic or petroleum material substance not required for the Work. Contractor shall not dispose of or release onto or from the Premises any hazardous, toxic or petroleum material, substance, or waste. Compliance with all environmental laws shall be Contractor's sole responsibility at its sole cost. Contractor shall immediately furnish to the Executive Director written notice of any and all releases of hazardous wastes, materials or substances whenever such releases are required to be reported to any federal, state or local authority, and pay for all clean up and removal costs. Such written notice shall identify the substance released, the amount released, and the measures undertaken to clean up and remove the released material and any contaminated soil or water, and shall further certify that no contamination remains. Contractor shall also provide Commission with copies of any and all reports resulting from tests on Airport Property or made to any governmental agency, which relate to Airport property.
- D. Regardless of Commission's acquiescence and in addition to indemnification provisions contained elsewhere in this Agreement, Contractor shall defend, indemnify, and hold Commission its officers, officials, board members, agents, and employees, harmless from all costs, liabilities, fines or penalties, including attorney's fees, resulting from or arising out of violation of this section and agrees to reimburse said parties for any and all costs and expenses incurred in eliminating or remedying such violations. Contractor further covenants and agrees to reimburse Commission and hold Commission its officers, agents and employees harmless from any and all costs, expenses, attorney's fees and all penalties or civil judgments obtained against the Commission as a result of Contractor's use, release or disposal of any petroleum product, hazardous substance, material, or waste onto the ground or into the water or air. Contractor agrees to waive any and all statutes of limitations applicable to any controversy or dispute arising under this section and Contractor further agrees that it will not raise or plead a statute of limitations defense in any action arising out of Contractor's failure to comply with the provisions contained in this section.

25. Source of Supply and Quality Requirements

The materials used on the Work shall conform to the requirements of the Contract Documents.

Unless otherwise indicated, it is understood and agreed that any item offered or shipped by the Contractor shall be in NEW AND FIRST-CLASS CONDITION, that all containers shall be new and suitable for storage or shipment, and that prices include standard commercial packaging or preparation and delivery costs for the items shipped.

All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the instructions of the applicable manufacturer, or fabricator, except as otherwise specifically provided in the Contract Documents.

26. Inspection of the Work

All materials and each part or detail of the Work shall be subject to inspection by the Consultant. The Consultant 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 Consultant 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.

27. Tests and Inspections

Tests, inspections, and approvals of portions of the Work required by the Contract Documents or by laws, ordinances, rules, regulations, or orders of public authorities having jurisdiction shall be made at an appropriate time. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. The Contractor shall give the Consultant timely notice of when and where tests and inspections are to be made so that the Consultant may be present for such procedures.

If the Consultant, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not required by the preceding paragraph, the Consultant will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Consultant of when and where tests and inspections are to be made so that the Consultant may be present for such procedures. Such costs, except as provided in the following paragraph, shall be at the Owner's expense.

If tests, inspections, or approvals reveal failure of portions of the Work to comply with requirements of the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Consultant's services and expenses shall be at the Contractor's expense.

28. Unacceptable Materials

Any material or assembly or method of removal or installation that does not conform to the requirements of the Contract Documents 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 Consultant.

No rejected material or assembly, the defects of which have been corrected by the Contractor, shall be returned to the site of the work until such time as the Consultant has approved its use in the work.

29. Removal of Unacceptable and Unauthorized Work

All Work which does not conform to the requirements of the Contract Documents will be considered unacceptable, unless otherwise determined acceptable by the Consultant as provided in the subsection titled CONFORMITY WITH DRAWINGS AND SPECIFICATIONS, Subsection 5 of these General Conditions.

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 the Subsection 20 titled CONTRACTOR'S RESPONSIBILITY FOR WORK of these General Conditions.

Work done contrary to the instructions of the Consultant, work done beyond the lines shown on the Plans or as given, except as herein specified, or any extra work done without an executed change order, 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 forthwith with any order of the Consultant made under the provisions of this subsection, the Consultant will have authority to cause unacceptable work to be remedied or removed and replaced and unauthorized work to be removed and to deduct and/or offset the costs (incurred by the Owner) from any monies due or to become due the Contractor.

30. **Partial Acceptance**

If at any time during the prosecution of the project the Contractor fully completes a usable unit or portion of the Work, the occupancy of which will benefit, or is required by, the Owner, it shall request the Consultant to make final inspection of that unit. If the Consultant finds upon inspection that the unit has been satisfactorily completed in compliance with the contract, he may accept it as being completed; provided that such partial acceptance and beneficial occupancy by the Owner shall not void or alter any provision of the contract, nor shall it start any warranty period prior to the entire Project being accepted.

Reference is made to Subsection 2, TIME OF COMPLETION, NOTICE TO PROCEED AND LIQUIDATED DAMAGES, in these General Conditions and to Sections 3, TERM, and 4, CONTRACT SUM AND LIQUIDATED DAMAGES, of the Contract.

31. **Final Acceptance**

Upon due notice from the Contractor of presumptive completion of the entire project, commonly referred to as Substantial Completion, the Consultant and Owner will make an inspection.

If all construction provided for and contemplated by the Contract is found to be completed in accordance with the Contract Documents, including, without limitation, drawings, supplementary drawings, and specifications, such inspection shall constitute the final inspection, and the Owner 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 Contractor shall proceed to correct the unsatisfactory work, commonly referred to as the "punch list", within fourteen (14) consecutive calendar days. 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 Consultant will make the Final Acceptance and notify the Contractor in writing of this acceptance as of the date of the final inspection. **Final Acceptance shall be achieved within the Contract Time (refer to Subsection 20 and Subsection 41 of these General Conditions).**

If the Consultant is required to conduct more than the two (2) final inspections outlined above, the charges for the Consultant's services associated with such additional inspections shall be deducted and/or offset by the Owner from the Contractor's final payment for the project.

32. Contractor's Warranties

The Contractor expressly warrants that all aspects of the Work shall be of good and merchantable quality and fit for the particular purpose for which intended. In addition to and not in lieu of any other warranties, express or implied, the Contractor expressly warrants and guarantees the Work against defects or deficiencies in all material and workmanship and shall maintain, repair or replace, solely at its own cost and expense including, without limitation, any cost of labor, materials or travel, any work that is found by the Owner to be defective, within a period of one (1) years from the date of Final Acceptance of the Work.

The establishment of the time period of one (1) years after Final Acceptance relates only to the specific Contractual obligation of the Contractor to correct the Work, and has no relationship to and is in addition to and not in lieu of any manufacturer's warranty, the time within which Contractor's obligations to comply with the Contract Documents may be sought to be enforced, nor the time within which proceedings may be commenced to establish the Contractor's liability with the respect to any of its obligations other than specifically to correct the Work.

If the Contractor, after notice, fails to proceed promptly to comply with the terms of the express warranty contained in these General Conditions, the Owner may have the defects corrected and the Contractor and its Surety shall be liable for all expense incurred.

This warranty shall be in addition to and not in lieu of any and all other applicable and required warranties, as specified in these contract documents, including, without limitation, manufacturer's, special, express or implied warranties.

33. Subletting of Contract

Contractor shall not assign this Contract or any of its rights or duties hereunder, nor shall Contractor subcontract any of the Work hereunder, without the prior written consent of the Owner's Executive Director. In the event of authorized assignment or subcontracting, the Contractor shall file copies of all assignments and subcontracts with the Owner.

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 or by a qualified superintendent or foreman from its staff. The qualified representative shall be duly authorized to receive and execute orders of the Owner and/or Consultant.

The Contractor may only replace or add subcontractors with the prior written consent of the Owner.

Contractor shall provide a listing of all subcontractors for the projects, including name, contact, address, phone, work to be performed, contract price, and amount actually paid.

34. Certificate for Payment

- A. For all work items listed in the Unit Price Schedule, the Contractor shall be paid based on the actual quantities of work performed, as measured and verified in the field by the Consultant, multiplied by the corresponding unit price specified in the schedule. Where the unit is a lump sum, the payment will be based upon the Consultants estimate of the percentage of the lump sum work completed and in place. The unit price includes all labor, materials, equipment, overhead, and profit associated with the execution of that work item.
- B. The "Unit Price Schedule Completed" portion of the form shall be completed, the Contractor's certification completed and signed, and the appropriate substantiating material attached to each Certificate for Payment along with the appropriate approval of the Consultant.

35. Payment to Contractor

PROGRESS PAYMENTS: Unless otherwise provided by the Contract Documents and based upon Certificate for Payment form approved by and submitted to the Consultant by the Contractor and upon a Recommendation for Payment issued by the Consultant, the Owner shall make Progress Payments to the Contractor on account of the Contract Sum not later than the last day of the succeeding calendar month for all Work satisfactorily performed under and in accordance with the requirements of this Contract during the preceding monthly period ending on the 25th day of the preceding month. The Contractor's Certificate for Payment shall be submitted to the Consultant not later than the first day of each month, who shall, if it approves the same, issue to the Owner, with copy to the Contractor, a Recommendation of Payment thereon. To insure the proper performance of this Contract, the Owner shall retain five percent (5%) of the amount of each approved Certificate for Payment until all of the Work provided for in the Contract Documents is fully completed, as determined by Consultant and Owner, and Owner has issued final acceptance of the Work.

The preparation, submission and approval of all Certificates for Payment and Recommendation for Payment shall be in accordance with the provision of the Contract Documents.

FINAL PAYMENT. Final payment, constituting the entire unpaid balance of the Contract Sum, but less such sum to which the Owner is entitled pursuant to the Contract Documents as liquidated damage for delay in timely completion of the work or damages/costs pursuant to Section 5 of the Contract, shall be paid by the Owner to the Contractor within thirty (30) days after completion of the Work, provided the Work has been fully and satisfactorily completed, the Contract duly performed, Final Acceptance has occurred, the Lien and Claims Release and the Warranty of Construction forms have been completed and submitted by Contractor, a Certificate for Payment marked "Final," has been issued by the Consultant, and the Owner's Executive Director has accepted in writing all said work.

A separate request for payment of all sums retained by the Owner is required upon approval of Final Payment.

Prior to receiving any payments under this Contract, if the Contractor is an individual, the Contractor shall provide their social security number to the Owner and if the Contractor is a proprietorship, partnership, or corporation, the Contractor shall provide its federal employer identification number to the Owner.

36. **Payments to Subcontractors**

If Contractor has used any subcontractor to perform work required under the Contract Documents, Contractor must take one of the following actions within seven (7) days after receipt of the amount paid to Contractor by Owner for work performed by the subcontractor:

- A. Pay the subcontractor for the proportionate share of the total payment received from the Owner attributable to the work performed by the subcontractor under that contract; or
- B. Notify the Owner and subcontractor, in writing, of Contractor's intention to withhold all or part of the subcontractor's payment with the reason for nonpayment.

Contractor agrees to pay interest to subcontractor on all amounts owed by Contractor that remain unpaid after seven (7) days following receipt by Contractor of payment for Owner for work performed by subcontractor, except for amounts withheld pursuant to subparagraph (b) above. Interest on the unpaid amount will accrue at the legal rate.

Contractor agrees to include in each of its subcontracts a provision requiring each subcontractor to be subject to the same payment and interest requirements with respect to each lower-tier subcontractor.

The Contractor agrees that it shall defend, indemnify, and hold the Owner harmless for any lawful claims caused by failure of the Contractor to make prompt payments to all persons supplying it equipment, labor, tools or materials in prosecution and completion of the Work provided for in the Contract. In the event of such claims, the Owner may, after providing written notice to the Contractor, withhold from any progress and/or Final Payment the unpaid sum of money deemed sufficient to pay all lawful claims and associated costs in connection with the Contract.

37. Claims by Contractor

A. CONTRACTOR CLAIMS TO ENGINEER FOR CHANGE ORDERS. If for any reason the Contractor deems that additional compensation or other relief is due it, including, without limitation, work or materials not clearly provided for in the Contract, drawings, or specifications, or not previously authorized as extra work, or inadequate time for additional work, it shall notify the Engineer in writing, attaching all supporting documentation/date, of its intention to request such change order for additional compensation or time, within ten (10) calendar days of notice of the occurrence giving rise to the claimed change. Any and all such claims by Contractor for additional compensation or other relief shall be submitted first to Engineer in accordance with the provisions of this Section. The Contractor shall not begin such work or incur the expense for such materials until it receives a prior written change order executed by the Owner. If such notification is not given, or the Engineer 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 relief or compensation. Such notice by the Contractor and the fact that the Engineer 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. If Contractor submits its request for the claimed change order within ten (10) calendar days of notice of the occurrence giving rise to the need for the claimed change, and if Engineer should deny Contractor's request for the claimed change order or additional compensation or completion time, any claim by Contractor with Owner shall be filed in accordance with the requirements of Section B below. Nothing in this subsection shall be construed as granting Contractor a right to dispute final payment based on actual differences from Contractor's original estimates of measurements or computations.

B. CONTRACTOR CLAIMS TO OWNER. Contractual claims, disputes and other matters relating to the acceptability of the work, the interpretation or the requirements of the Agreement, or the performance or furnishing of the work, including without limitation, Engineer's denial of Contractor's request for a change order for additional money and/or an increase in time, shall be

submitted in writing together with all supporting documentation/data and a request for a formal decision to the Owner's Executive Director. Contractor shall deliver the written notice with supporting data for each such claim, dispute or other matter promptly, but in no event later than ten (10) calendar days after the start of the occurrence of the event giving rise to the claim. Contractor's failure to submit written notice of such claim, dispute or other matter with the supporting data to Owner's Executive Director within the time specified shall be deemed to be and shall constitute a waiver by Contractor of any and all claims for such matters and shall be an absolute bar to any future claim or suit against Owner for damages or relief of any kind based upon such occurrence or event.. In reviewing any such claim or dispute, Executive Director may request any additional information or documentation from Contractor or other parties and may utilize appropriate assistance from other sources. Any final decision in writing by the Executive Director shall be issued to Contractor within ninety (90) calendar days from the later of: i.) receipt of the written claim; or ii.) receipt of any additional information requested from the Contractor. Failure of the Executive Director to render a decision within ninety (90) calendar days shall be deemed a final decision by the Roanoke Regional Airport Commission denying the claim, and shall not result in the Contractor being awarded the relief claimed or in any other relief or penalty.

38. Acceptance and Final Payment

When the Contract Work has been accepted in accordance with the requirements of Subsection 32 FINAL ACCEPTANCE of these General Conditions, and the required documents (e.g. Release of Liens and Claims, Warranties, marked up drawings and/or record drawings, etc.) have been received by Consultant, the Consultant will approve Contractor's invoice for payment and submit it to Owner for processing and payment.

If the Contractor has filed a claim for additional compensation under the provisions of Subsection 39 CLAIMS BY CONTRACTOR of these General Conditions, such claims will be considered by the Owner in accordance with local laws or ordinances and the provisions of this Contract. Upon final adjudication of such claims, any additional payment determined to be due the Contractor will be paid pursuant to a supplemental final estimate.

39. Determination and Extension of Contract Time

The number of calendar days allowed for completion of each Phase of the Work shall be stated in the Contract Documents and shall be known as the CONTRACT TIME. 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.

Should the Contract Time require extension for reasons beyond the Contractor's control, it shall be adjusted as follows:

- A. Weather Related: The number of calendar days specified in the Contract for performance of the Phase 2 Work includes an allowance for 90 percent of the one hundred and fifty (150) calendar days being available for productive work.

The Contractor may request an extension in contract time, if the available days for productive work (including all Saturdays, Sundays, and holidays) are less than 90 percent of the established Phase 2 contract time. The contract time will be extended until the allowed number of available productive days is achieved.

A day will be considered available for productive work, irrespective of whether the Contractor actually worked or not, if, in the Consultant's sole and exclusive opinion, the Contractor could have been able to proceed with a principal work item for at least a 4-hour work period. The Contractor shall notify the Consultant within five calendar days, in writing or by fax, if it considers a particular day not available for productive work in at least a 4-hour work period.

The Contractor shall keep a daily record of weather conditions noting days and hours which are not available for work in accordance with the above criteria. Such records shall be provided to the Engineer on a weekly basis. Failure to provide such records will void any potential claims for Contract Time extensions due to weather.

- B. Other Causes: If the Contractor finds it impossible for reasons beyond its control to complete the Work within the Contract Time as specified, or as extended in accordance with the provisions of a written change order, it shall within five (5) calendar days of any occurrence claimed as the basis for the need for a change, make a written request to the Consultant for a change order with an extension of time setting forth the reasons which it believes will justify the granting of its request. The Contractor's plea that insufficient time was specified is not a valid reason for extension of time. If the Consultant finds that the work was delayed because of conditions beyond the control and without the fault of the Contractor, it may recommend that the Owner extend the time for completion in such amount as the conditions justify. Upon the Owner's concurrence and authorization as evidenced by a written change order, the extended time for completion shall be in full force and effect, the same as though it were the original time for completion.

Failure to provide written notice at the inception of the event giving rise to the need for a time extension within the time limits imposed in this Subsection will be deemed a waiver of any claim for time extension.

All calendar days elapsing between the effective dates of the Consultant's order to suspend and resume all work, due to causes not the fault of the Contractor, shall not be counted against the Contract Time. Charges against the Contract Time will cease as of the date of final acceptance as determined by the Consultant and Owner.

40. **Failure to Complete on Time**

It is mutually agreed between Contractor and Owner that time is of the essence in the performance of the Contract, and that in the event all Work required under the Contract is not fully and satisfactorily completed within the times specified, including all extensions and adjustments as provided in Subsection 41 DETERMINATION AND EXTENSION OF CONTRACT TIME of these General Conditions, it is agreed that the Contractor and its Surety shall owe Owner and Owner may retain, deduct, and/or offset from money to be paid Contractor, the sum set forth in the Contract for each calendar day that the Work remains incomplete, not as a penalty, but as the parties' reasonable agreement of liquidation of a reasonable portion of damages that will be incurred by Owner by failure of Contractor to complete the Work with the time stipulated. Contractor covenants and agrees that the actual damages that may result from failure to complete the Work within the time required under the Contract are uncertain and difficult to determine with exactness and that the amount fixed in the Contract is not out of proportion to the probable loss. Contractor further covenants and agrees that: (a) the actual damages that may result from failure to complete the work within the time specified are uncertain and difficult to determine with exactness and that the amounts fixed as liquidated damages herein are not out of proportion to the probable loss; (b) Owner retains the right to make such retentions, deductions and/or offsets for liquidated damages at any time and that Owner's imposition and the retention, deduction and/or offset of any liquidated damages hereunder shall not be subject to any prior notice or claim requirements; and, (c) **Contractor waives any defenses as to the validity of any liquidated damages provisions in this Contract based on such liquidated damages being void as penalties or not being reasonably related to actual damages.** It is further agreed, however, that application of liquidated damages hereunder shall not be Owner's exclusive remedy and shall not bar any other claim, cause of action, or remedy that Owner may have against Contractor under applicable law in the performance of this Contract.

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, shall in no way operate as a waiver on the part of the Owner of any of its rights under the Contract. It is understood that the foregoing provisions

shall not limit the right of the Owner to declare a breach of Contract, and in such event, the liability of the Contractor, including liability for such liquidated damages, shall continue.

41. **Default and Termination of Contract**

The Contractor shall be considered in default of its 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";
- B. Fails to perform the Work or fails to provide sufficient workers, equipment or materials to assure completion of work in accordance with the terms of the Contract;
- C. Performs the Work unsuitably or neglects or refuses to remove materials or to perform anew such work as may be rejected as unacceptable and unsuitable;
- D. Discontinues the prosecution of the Work;
- E. Fails to resume work which has been discontinued within a reasonable time after notice to do so;
- F. Becomes insolvent or is declared bankrupt, or commits any act of bankruptcy or insolvency;
- G. Allows any final judgment to stand against it unsatisfied for a period of 10 days;
- 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, or comply with any Contract term.

Should the Owner consider the Contractor in default of the Contract for any reason stated hereinbefore, including, without limitation, delay, neglect or improper prosecution of the Work, then 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 Contractor's surety, within a period of 10 days after such notice, does not proceed to correct the cause for such notice, then the Owner shall, upon

written notification from the Consultant of the facts giving rise to such notice and/or the Contractor's failure to comply with such notice, have full power and authority without violating the Contract, to declare the Contractor in default and to take the prosecution of the Work out of the hands of the Contractor. However, in the event that that Contractor's failure is a violation of law, or an act or condition that poses a risk of harm to people or their property, then Contractor shall immediately take action to cure such failure and shall complete such cure within 24 hours or risk being declared to be in default of the Contract. 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 the Contract according to the terms and provisions thereof, or use such other methods as in the opinion of the Consultant will be required for the completion of the Contract in an acceptable manner.

In the event that Contractor defaults in the performance of any of the terms, conditions or agreements contained in this Contract, and Owner places the enforcement of all or part of this Contract in the hands of an attorney, including the filing of a suit upon the same, Contractor agrees to pay all of Owner's reasonable attorney's fees and any costs related to any such proceeding. *All costs and charges incurred by the Owner, together with the cost of completing the Work under Contract, may be deducted, retained, and/or offset 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 continue to be liable and shall pay to the Owner the amount of such excess.*

42. SPECIAL CONDITIONS

A. 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. Separate contracts involving multiple Contractors may be underway simultaneously in, around and/or near several portions of the Work area. Contractor will be required to attend daily coordination meetings with other Contractors and Owner at the direction of the Owner's representative.

When separate contracts are let within the limits of any one project, each Contractor shall conduct its work so as 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 to the maximum extent feasible to avoid conflicts and all conflicts shall be brought to the Engineer's attention as soon as possible.

Each Contractor involved shall assume all liability, financial or otherwise, in connection with its contract and shall protect and save harmless the owner from any and all damages or claims that may arise because of inconvenience, delays, or loss experienced by him because of the presence and operations of other Contractors working within the limits of the same project.

The Contractor shall arrange its work and shall place and dispose of the materials being used so as not to interfere with the operations of the other Contractors within the limits of the same project. It shall join its work with that of the others in an acceptable manner and shall perform it in proper sequence to that of the others.

B. DAILY COORDINATION MEETINGS – CONTRACTOR DUTIES

1. Participate in brief daily coordination meetings with Owner and any on-site representative of Consultant to advise Owner of that day's intended construction activities.
2. Time: Conduct meeting at beginning of each work day, at time mutually agreed upon by Owner and Contractor.
3. Location: As mutually agreed upon by Owner and Contractor.
4. Required Attendees:
 1. Owner's Project Coordinator or designated representative.
 2. Contractor's superintendent.
 3. Appropriate subcontractors.
 4. Representatives of other contractors working on terminal projects.
 5. Tenant Representatives affected by the current day's work-
5. Agenda: Discuss and coordinate the following:
 1. Areas in which the (next) day's work will be conducted.
 2. Nature of work to be conducted.
 3. Scheduled deliveries.
 4. Access and Security issues.
 5. Tenant operational issues.
 6. Work/Projects being undertaken in the terminal by other contractors and coordination of all projects.
6. Do not work outside areas approved at daily meeting without prior notification to and approval by Owner's representative.

CONTINUOUS USE OF AIRPORT FACILITIES

The Owner will maintain continuous, normal use of the Terminal Building and all surrounding areas during any construction operations. Aircraft and passenger operations shall continue in the area surrounding the Terminal Building. All existing Owner and tenant facilities, aircraft, passengers and personnel in surrounding areas shall be protected.

Damage resulting from Contractor's operations shall be immediately repaired by Contractor or, at Owner's discretion, repaired by the Owner. The Contractor shall be responsible for the cost of such repairs. Cost will be deducted from payments made to the Contractor.

Contractor shall take every precaution to prevent fumes, noxious odors, preparation materials, and debris from entering the building and affecting or harming persons, aircraft and/or vehicles. Contractor shall also take action to prevent excessive noise. Should odors or noise be deemed excessive by the Owner, the Contractor shall be ordered to cease work immediately until the problem can be corrected to the Owner's satisfaction.

C. ON-SITE SAFETY

The Contractor is responsible for all aspects of onsite safety while performing the Work.

AIRPORT SAFETY REQUIREMENTS DURING CONSTRUCTION

1. GENERAL SAFETY REQUIREMENTS.

During performance of this Contract, the Airport runways, taxiways, and aircraft parking aprons shall remain in use by aircraft to the maximum extent possible. Aircraft use of areas near the Contractor's work will be controlled to minimize disturbance to the Contractor's operations. The Contractor shall not allow employees, subcontractors, suppliers, or any other unauthorized person to enter or remain in any airport area that would be hazardous to persons or to aircraft operations.

All work which is too close to an active runway, taxiway or apron to be performed under operational conditions shall be performed when the runway, taxiway or apron is not in use and the proper coordination with Air Traffic Control has been established. Such work shall not be accomplished without prior permission from the Director of Facilities and Grounds.

2. CONSTRUCTION AND FACILITIES MAINTENANCE.

The Contractor shall be aware of and take all precautions necessary to avoid the following types of airport safety problems and hazards during construction:

- (1) Trenches, holes, or excavations on or adjacent to any open runway or in safety areas.
- (2) Unmarked/unlighted holes or excavation in any apron, open taxiway, open taxi-lane, or related safety area.
- (3) Mounds or piles of earth, construction materials, temporary structures, or other objects in the vicinity of any open runway, taxiway, taxi-lane, or in a related safety, approach, or departure area.
- (4) Pavement drop-offs or pavement-turf lips (either permanent or temporary) which could cause, if crossed at normal operating speeds, damage to aircraft that normally use the airport. (The normal maximum is 3 inches for either.)
- (5) Vehicles or equipment (whether operating or idle) on any open runway, taxiway, taxi-lane, or in any related safety, approach, or departure area.
- (6) Vehicles, equipment, excavations, stockpiles, or other materials which could degrade or otherwise interfere with electronic signals from radios or electronic navigational aids.
- (7) Unmarked utility, navaid, weather service, runway lighting, or other power or signal cables that could be damaged during construction.
- (8) Objects (whether marked or flagged or not) or activities anywhere on or in the vicinity of the airport which could be distracting, confusing, or alarming to pilots during aircraft operations.
- (9) Unflagged/unlighted low visibility items (such as tall cranes, drills, and the like) anywhere in the vicinity of active runways, or in any approach or departure area.
- (10) Misleading or malfunctioning obstruction lights.
- (11) Unlighted/unmarked obstructions in the approach to any open runway.
- (12) Inadequate approach/departure surfaces (needed to provide adequate landing/takeoff clearance over obstructions or work or

storage areas).

- (13) Inadequate, confusing, or misleading (to user pilots) marking/lighting of runways, taxiways, taxi-lanes (including displaced or relocated thresholds).
- (14) Water, snow, dirt, debris, or other transient accumulation which temporarily obscures pavement marking, pavement edges, or derogates visibility of runway/taxiway marking or lighting, or of construction and maintenance areas.
- (15) Inadequate or improper methods of marking, barricading, and lighting of temporarily closed portions of airport operations area.
- (16) Trash or other materials with foreign object damage (FOD) potential, whether on runways, taxiways, or aprons, or in related safety areas.
- (17) Inadequate fencing or other marking to separate construction or maintenance areas from open aircraft operating areas.
- (18) Failure to control vehicle, human, and large animal access to, and nonessential non-aeronautical activities in, open aircraft operating areas.
- (19) Failure to maintain radio communication between construction/maintenance vehicles and air traffic control tower or other on-field communications facility, e.g., FAA Flight Service Station (FSS) or Unicom radio.
- (20) Construction activities or materials which could hamper crash-fire-rescue (CFR) vehicle access from the Aircraft Rescue and Firefighting (ARFF) station to all parts of the runway/taxiway system, to runway approach and departure areas, and to aircraft parking locations.
- (21) Bird attractants such as edibles (food scraps, etc.) or other miscellaneous garbage, other trash, or ponded water on airport.
- (22) See other sections of these contract documents for additional related safety, security and operational requirements.

The Contractor shall also conduct activities so as not to violate any safety standards herein and shall inspect all construction and storage areas as often as necessary to be aware of conditions, and promptly take all steps needed to prevent/remedy any unsafe or potentially unsafe conditions/activities discovered.

Before actual commencement of construction activity, Contractor shall (through the Office of the Director of Facilities and Grounds, and the Engineer) give notice using the Notice to Airmen (NOTAM system) of proposed time and date of commencement of construction in such areas.

Upon completion of work and return of all such areas to standard conditions, Contractor shall (through the office of the Director of Facilities and Grounds and the Engineer) issue notice (using the NOTAM system) of completion of construction.

3. TRENCHES, EXCAVATIONS AND STOCKPILED MATERIAL.

Open trenches or excavations exceeding 6" in depth and 6" in width or stockpiled material will not be permitted within the limits of safety areas of operational runways or taxiways. Coverings for open trenches or excavations shall be of sufficient strength to support the weight of the heaviest aircraft operating on the runway or taxiway.

4. CONSTRUCTION IN PROXIMITY TO RUNWAYS.

- (1). RUNWAY SIDES. If appropriate construction NOTAM has been issued, construction (using equipment under 10' tall) is permissible as close as 250-feet from the centerline of a runway.
- (2). If the foregoing clearance is not available or cannot be maintained, the runway segment involved (or the entire runway) must be closed.

5. CONSTRUCTION IN PROXIMITY TO TAXIWAYS/TAXILANES. If an appropriate construction/maintenance NOTAM has been issued, construction and/or maintenance activities are permissible up to pavement edge of active taxiways/taxilane provided:

- (1). Adequate wingtip/propeller/engine pod clearance exists at all points along taxiway/taxilane; and
- (2). Construction/maintenance areas are adequately marked and lighted for visibility to user pilots. If such clearance is not available, but aircraft could with guidance pass through, construction/maintenance is still permissible up to pavement edges provided wing walkers/aircraft directors are used to guide aircraft through. Otherwise the taxiway/taxilane must be closed for construction/maintenance.

6. CLOSED RUNWAY MARKING.

- (1) MARKING. If closed runway markings are required, they shall

conform to standards in AC 150/5340-1 and as required by the contract documents.

- (2) LIGHTING. Approach and visual navaid lighting on a closed runway shall be turned off and kept off during closure.

If barricades, flagging and flashers are required, they shall conform to FAA Standards and details as may be shown on the plans.

7. CONSTRUCTION AREA MARKING. Flaglines, traffic cones, flashers, and/or signs shall be used as necessary:

- (1) To clearly separate all construction/maintenance from other parts of air operations area,
- (2) To identify isolated hazards, such as open manholes, excavations, areas under repair, stockpiled material, waste areas, etc., and
- (3) To identify FAA, airport, and National Weather Service facilities, cables, power lines, ILS critical and other sensitive areas.

All barricades, temporary markers, flagline supports, and other objects placed/left in safety area of any open runway, taxiway, or taxilane shall be:

- (1) As low as feasible;
- (2) Of low mass;
- (3) Easily collapsible if impacted by an aircraft or component thereof;
- (4) Weighted down or attached to surface to reduce chance of movement by prop wash/jet blast/wing vortex or other wind currents; and
- (5) If affixed to the surface, frangible at ground level.

8. OTHER MARKING AND LIGHTING. Objects (whether fixed or mobile) above runway elevation that penetrate the applicable runway approach surface described in FAA Part 77.25, Paragraph (d), may be hazardous to aircraft operations. Construction/maintenance-related objects such as stockpiled materials or equipment within these distances may need airspacing and shall be marked with orange and white flags or paint and, if nearest runway is used at night, be well illuminated and/or obstruction lighted.

9. MOTORIZED VEHICLES.

- (1) When any vehicle other than those approved for use in the aircraft movement area and runway approach area is required to travel over any portion of that area, it shall be escorted by a vehicle properly identified to operate in the area and be provided with a flag on a staff attached to the vehicle. A flag or escort vehicle is not required for vehicles that have been painted, marked and lighted for routine use on aircraft movement areas. Any vehicle operating on the movement area during the hours of darkness shall be equipped with a flashing dome-type light. See AC 150/5210-5, "Painting, Marking and Lighting Vehicles used on Airports", current edition. Vehicle operation safety training may be required of any operator and shall be required of any operator driving without escort in the aircraft movement area.
- (2) Vehicular traffic crossing active movement areas shall be controlled by two-way radio with the control tower, and be escorted by properly authorized Contractor's or Owner's personnel. The clearance should be confirmed by the driver's personal observations that no aircraft is approaching his position.
- (3) It may be desirable to clearly identify the vehicles for control purposes by either assigned initials or numbers prominently displayed on each side. The identifying symbols should be of 8-inch minimum, block-type characters of a color easily read. They may be applied by use of tape or water-soluble paint to facilitate removal. In addition, all vehicles must display the identification media as specified in the approved security plan, if applicable.
- (4) Employee parking shall be as designated by the Engineer or as shown on the Plans.
- (5) CONSTRUCTION SITE ACCESS AND HAUL ROADS. Access to the job site shall be via the specific route(s) as designated by the Engineer.

10. CONTRACTOR'S RESPONSIBILITY FOR NAVIGATIONAL AIDES. The following statements concerning FAA cables and FAA NAVAID equipment shall apply to this project.

- (1) The local FAA Airway Facilities Sector Field Office (AFSFO) personnel will, upon notification, mark all FAA cables in the vicinity of construction once, prior to the start of work. The Contractor shall be responsible for any damage to cables within three feet of the marked cable route. Should it damage any cables, it shall immediately notify the Air Operations Office and take all steps necessary for the repair of the cable. If the repair necessitates any work on the part of the local FAA personnel, the Contractor will be billed for all costs incurred.
- (2) The Contractor shall minimize, as much as possible, locations where haul routes will cross earth buried FAA cable. At such crossing points, the cable

must be protected with steel boiler-plate or a similar structural device.

- (3) At times when either a runway threshold is displaced or equipment is operating in an ILS clear zone, then the affected ILS must be taken off the air. Also, when equipment is operating between a localizer antenna and its associated landing threshold, the localizer must be taken off the air. The work must be closely coordinated with the local AFSFO to eliminate unnecessary shutdowns.
- (4) When work is to be done in the vicinity of FAA cables, said cables shall be physically located by hand-digging and exposing the cables thru the full length of the construction zone. FAA cables shall be protected. No work shall be performed over direct earth buried FAA cable without first protecting the cable with steel boiler-plate or similar structural devices.

The Contractor shall not conduct any construction activity within the navigational aids (i.e., ILS components, VOR, ASR, ATCT) restricted areas shown on the plans without prior approval from the local FAA Airway Facilities Sector and the Engineer.

11. LIMITATION ON CONSTRUCTION.

- (1) Open-flame welding or torch-cutting operations are prohibited unless adequate fire and safety precautions are provided and have been approved by the Airport Owner. All vehicles are to be parked and serviced behind the building restriction line and/or in an area designated by the airport operator.
- (2) Open trenches, excavations and stockpiled material at the construction site shall be prominently marked with red flags and lighted by light units (acceptable to the Airport Owner and the FAA) during hours of restricted visibility and/or darkness. Under no circumstances are flare pots to be used for airport lighting.
- (3) Stockpiled material shall be constrained in a manner to prevent movement resulting from aircraft blast or wind conditions. Material shall not be stored near aircraft turning areas.

12. MARKING AND LIGHTING OF CLOSED HAZARDOUS AREAS ON AIRPORTS.

When areas on the Airport are closed or present hazards due to construction activities, they shall be marked and lighted according to paragraph 10 of AC 150/5340-1, "Marking of Paved Areas on Airports., current edition.

13. COORDINATION AND COMMUNICATIONS.

The Contractor shall keep the Engineer apprised of its scheduled construction activities in order to allow proper notification of the Owner, its airport management and airport operators. Daily meetings to discuss construction progress and location shall be required.

The Contractor shall have a functioning two-way radio at the job site at all times work is in progress to monitor ground control frequency 121.9 when in operation. Contractor's superintendent shall also have a cellular phone on him and at the site. In the event that the air traffic control tower should be closed during a portion of the nighttime hours, during such closure the Contractor shall keep in radio communication with the Common Traffic Advisory frequency (118.3 MHZ). In addition, Contractor shall comply with all communication requirements specified in this Section.

14. DEBRIS. Waste and loose material capable of causing damage to aircraft landing gears/ propellers or being ingested in jet engine, shall not be placed or permitted on active aircraft movement areas. Material tracked or blown on these areas shall be removed continuously during the work project.
15. TRASH RECEPTACLES. In accordance with Virginia's Anti-litter Law and the safety of aircraft operations, receptacles sufficient to contain worker's litter and construction wastes capable of being spread by wind or water shall be located on the construction site. The number and size of receptacles required shall be determined by the Contractor, subject to the additional requirements of the Engineer.
16. DUST CONTROL. The CONTRACTOR is advised that aircraft storage and aircraft maintenance operations are conducted adjacent to the project. Special attention to dust control will be required during the course of the project. The use of water shall be anticipated. The Engineer reserves the right to halt work or hauling in non-conforming areas, if corrective actions are not promptly taken by the CONTRACTOR to control dust.
17. AIRCRAFT OPERATIONS.
 - (1) It is the intent of the Owner to minimize interference with aircraft operations. The Contractor shall coordinate its activities while working near the aircraft operational area, so as to create minimal interference with aircraft operations. Before starting its operations at any location on the airport, the Contractor shall assure proper safety precautions and separations in accordance with the Plans, this Section and other applicable sections of these bid documents. Construction-related activities must maintain adequate horizontal and vertical clearance from active operational aircraft areas.
 - (2) When working on the airfield, safety is of paramount importance. Vehicles and personnel must give way to emergency equipment and moving or parked Aircraft at all times.

- (3) Prior clearance must be obtained from the Director of Operations and Maintenance or Operations Manager for any movement in the AOA (secured portion of the airport). For isolated or temporary AOA entries, a minimum of twenty-four (24) hour notice is required.
- (4) All vehicle movements within the AOA shall be controlled and/or escorted by personnel assigned by the Contractor who have been trained and specifically authorized to drive within the AOA and who are equipped with two-way radio capable of communicating with the FAA Control Tower.
- (5) A Runway, Taxiway, Apron, or any portion thereof, can be closed to aircraft movements if weather conditions and/or safe aircraft operations permit re-routing operational aircraft to other areas. During such periods, all ground personnel and equipment may move freely within the "closed" area; however, clearances to "active" areas must be strictly observed. An airfield area "closed" to aircraft operations must be NOTAMed, marked and lighted in accordance with specific standards.
- (6) A change of weather conditions, an emergency, or a change in the overall safe operational status of the airfield may be cause for the Director of Operations and Maintenance, Operations Manager, or their designee to order any or all personnel and equipment to immediately vacate any designated airfield area, including "closed" areas, without liability to the Commission.
- (7) Prior to closing or restricting, either horizontally or vertically, the use of any portion of the airfield to operational aircraft, all airfield users will be briefed of the proposed action, sufficiently far in advance to adjust schedules and maintain uninterrupted, near normal airfield operations. All such proposed actions will be coordinated through the Engineer and approved by the Airport Director of Operations and Maintenance or Operations Manager.
- (8) At the completion of each work day or night work session, any and all areas of construction activity within the Air Operations Area (AOA) shall be left in an "Operational Condition" as defined in Sections 24 of the General Provisions.

18. AIRPORT SECURITY.

- (1) Timing of Access: The Contractor shall coordinate access to secure areas with the Owner. All work in the secure area shall be under escort by Owner personnel.
- (2) Itinerant Workers or Suppliers: Personnel and/or suppliers requiring only occasional access to the site may be exempt from the safety/security/driver

training requirements provided they are under the direct supervision (within approximately 100 feet) of an appropriately badged escort. Vehicle convoys of no more than two vehicles shall be permitted. Escorted vehicles are not exempt from the marking requirements.

- (3) Maintaining Perimeter Fence Line: The CONTRACTOR shall maintain the perimeter fence on a continuous basis with any temporary opening being continuously observed by the CONTRACTOR'S badged and trained access guard. All temporary openings shall be secured at the completion of each day's work.
- (4) Delineation of Project Safety/Security Area: The CONTRACTOR shall delineate limits of construction with safety fence prior to beginning work each day. None of the CONTRACTOR'S personnel should be beyond the limits of construction without authorization from airport personnel. Violators are subject to removal from the jobsite and loss of the identification badge and/or working privileges inside the airfield area.
- (5) Security Plan: The Contractor shall submit a security plan two weeks prior to the pre-construction conference. The security plan shall outline the methods and means that the CONTRACTOR intends to apply in order to maintain airport security.
- (6) Additional Security Information: Additional information regarding security items is available through the Chief of Safety and Security at (540) 362-1999.

19. VEHICULAR ACCESS. All of vehicles of Contractor and subcontractors entering AOA shall have the company name on both sides of the vehicles using letters eight inches or greater in height. Contractor may also be required to affix a Commission issued vehicle decal to each such vehicle.

All persons driving such vehicles shall be trained and specifically authorized/badged to drive inside the security fence in an area where aircraft are operating, or be escorted by an employee of Contractor who has been so trained.

20. CONSTRUCTION FLAGS. The Contractor shall furnish aircraft warning flags in aeronautical areas, colored orange and white, three feet (3') by three feet (3') in a checkerboard pattern for equipment and flagmen use. Flags on equipment shall be mounted on a staff not less than eight feet (8') in length. Each truck or other piece of equipment of the Contractors shall have attached to it, in a vertical and clearly visible position, a warning flag.
21. RESIDENCE ON AIRPORT. No CONTRACTOR employee(s) will be permitted to reside at any location on the project site or airport property, including the Contractor's project trailer(s) or other temporary facilities.

BID FORM
SECTION C

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BID FORM

(Name of Bidder)

For

**REHABILITATE TAXIWAY B FROM TAXIWAY B1 TO B4
PROJECT**

AT

**ROANOKE REGIONAL AIRPORT
ROANOKE, VIRGINIA**

SUBMITTED TO THE

**ROANOKE REGIONAL AIRPORT COMMISSION
ROANOKE, VIRGINIA**

BID NO. 25-011

**THE BIDDER SHALL COMPLETE ALL ITEMS AND FILL IN ALL
BLANKS IN THESE BID FORM PAGES**

I. BID CONDITIONS AND PRICE:

In compliance with the Invitation for Bids, the undersigned hereby proposes to furnish the materials and labor and to perform the work for the completion of the Security Fence Upgrade Project in strict accordance with the Invitation to Bid, Instructions to Bidders, the General Conditions, Technical Specifications, Drawings, Supplementary Drawings, and all other contract documents for the consideration of the price quoted in the following bid form, and agrees, upon receipt of written notice of award, that it will execute a contract in accordance with the bid as accepted and give the required contract bonds with good and sufficient surety, within fifteen (15) calendar days after receipt of notice of formal award of contract and presentation of the prescribed forms.

It is agreed that the undersigned has informed itself fully in regard to all conditions pertaining to the place where the work is to be done; that it has examined the drawings and specifications for the work and contractual documents thereto, including the special provisions, prior to the opening of bids, and that it has satisfied itself relative to the work to be performed.

It is agreed that the description of each item, being stated, implies although it does not mention, all incidentals and that the price stated is intended to cover all such work, materials, labor, equipment, and incidentals as constitute the bidder's obligations as described in the specifications, and any details not specifically mentioned, but evidently included in the contract, shall be compensated for in the total _____ price bid.

It is understood that this bid is submitted for the purpose of obtaining the work included in subject project at the Roanoke Regional Airport.

Said work is described in the project contract documents which also include the place, date, and time of opening bids.

Except to the extent extended by manufacturer's warranties required by the specifications and drawings, it is understood that all workmanship and materials under all items of work are guaranteed for two years from the date of final acceptance.

It is understood that the Owner reserves the right to accept or reject any or all bids and waive informalities.

It is understood that the quantities of work to be done are approximate only and are intended principally to serve as a guide in evaluation of bids, with the right reserved by the Owner to delete all or any portion of minor bid items-

The undersigned agrees that if awarded the contract, it will commence and complete the work in accordance with the provisions, requirements and deadlines of Section 2 of the General Conditions.

It is understood and agreed that for each calendar day that the work remains incomplete after the contract time and/or the milestone times (including all extensions and adjustments as provided in the Contract Documents), the amount per day as specified in Section 4, Contract Sum and Liquidated Damages of the form Contract (see Section D of these Specifications) shall be liquidated damages and may be retained, deducted and/or offset from any amounts due or to become due to the Contractor or its Surety. Such liquidated damages shall not be a penalty, but shall be considered as an agreed liquidation of a reasonable portion of damages that will be incurred by Owner as a result of the Contractor failing to complete the Work in the time provided in the Contract Documents. It is understood and agreed that: (a) the actual damages that may result from failure to complete the Work within the required time are uncertain and difficult to determine with exactness and that the fixed amount is not out of proportion to the probable loss; (b) Owner retains the right to make such retentions, deductions and/or offsets for liquidated damages at any time and that Owner's imposition and the retention, deduction and/or offset of any liquidated damages hereunder shall not be subject to any prior notice or claim requirements; and, (c) **by submitting this Bid, Contractor acknowledges and agrees that Contractor waives any defenses as to the validity of any liquidated damages provisions in this Contract based on such liquidated damages being void as penalties or not being reasonably related to actual damages.** It is further agreed,

however, that application of liquidated damages hereunder shall not be Owner's exclusive remedy and shall not bar any other claim, cause of action, or remedy that Owner may have against Contractor under applicable law in the performance of this Contract.

It is understood that this project is funded by local and state government funds and the Contractor shall be subject to all laws and regulations applicable to recipients of such funds.

Enclosed is security as required, consisting of _____ (cash, certified check, or bid bond) payable to the Roanoke Regional Airport Commission, in the amount of \$_____.

This amount equals five percent of the total amount bid submitted by the Contractor.

The Contractor shall be a licensed Class A Contractor registered with the Commonwealth of Virginia, shall list its registration number at the end of the bid in the designated location and shall enclose a copy of its licensing certificate.

This bid will remain valid and binding on Bidder for a period of sixty (60) days from date of bid opening.

Total Price Bid for associated services on the Rehabilitate Taxiway B from Taxiway B1 to B4 Project in accordance with Contract Documents:

_____ (\$ _____)
(use words) (dollar figures)

Contract Time: Two hundred and forty (240) consecutive calendar days from Phase 1 Administrative Services Notice to Proceed and one hundred and fifty (150) consecutive calendar days from Phase 2 Performance of Work Notice to Proceed.

II. BIDDER CERTIFICATION OF LICENSURE AND LICENSURE OF SUBCONTRACTORS

The undersigned Bidder hereby covenants and agrees to comply with Title 54.1, Chapter 11, Code of Virginia (1950), as amended, with respect to licensure of Bidder and all subcontractors who may be employed to perform the Work for the Roanoke Regional Airport Commission.

Bidder further represents and covenants: (i) that Bidder has verified that all subcontractors, currently identified in the Bid to perform a portion of the Work hold, or prior to performing any work at the airport, will hold required Commonwealth of Virginia and local licenses, including, without limitation, Contractor and business licenses; and,

(ii) that if it is the Successful Bidder, Bidder shall verify that any additional subcontractors employed to perform the Work, subsequent to the date of this certification, shall hold all required Commonwealth of Virginia and local licenses, including, without limitation, Contractor and business licenses.

Bidder acknowledges and agrees that if it is awarded a contract for the Work, this Certification shall constitute a material part of Bidder's contract with the Commission and violation of the terms of this Certification shall constitute a breach of such Contract.

All persons signing this Bid, and thereby executing this Certification, on behalf of Bidder hereby warrant and represent that they have been duly authorized by proper action of Bidder to execute this Certification, and that upon such execution, this Certification shall be binding upon and enforceable against Bidder.

III. QUALIFICATION OF BIDDERS

Each bidder shall fully complete the information below, which may be used in determining Bidder's competency and responsibility in accordance with the General Conditions.

FIRM: _____

ADDRESS: _____

PHONE: _____ FAX: _____

Contact in your firm for inquiries: _____

Years of business under present name: _____

Date of Incorporation: _____

Place of Incorporation: _____

Contracting Specialties: _____

Years performing work specialties: _____

Maximum Bonding Limits of firm: _____

List equipment available for project: _____

Name of proposed on-site Superintendent and relevant project experience during last five (5) years: _____
(Complete next page for relevant project experience of proposed on-site project superintendent)

Relevant Project Experience for Proposed Superintendent

<u>Type of Project and Date</u>	<u>Responsibilities</u>	<u>Contact Name/Phone No.</u>

Bidder acknowledges and agrees that the Commission retains the absolute right to reject the above designated individual as the project superintendent for this work if it determines that the persons job experience and/or references are not adequate or good, and to require bidder to provide one or more alternative proposed superintendents, along with their relevant job experience and references, until the parties are in agreement as to the superintendent for the job.

Has Firm:

Failed to complete a contract? _____

Been involved in a bankruptcy or reorganization? _____

Pending judgment claims or suits against Firm? _____

(If answer is "yes" to any of the preceding, submit details on separate sheet).

Contractor and all proposed subcontractors are prequalified by VDOT to perform the work required by this contract Yes _____ No _____

List three (3) most recent contracts or subcontracts completed in the last five (5) years which included work similar to that required in this project.

<u>Type of Project</u>	<u>Contract With Contact Person/ Phone No.</u>	<u>Contract Amount</u>	<u>Date Completed</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

List of key subcontractors to be utilized on this project and their responsibilities:

IV. CERTIFICATION OF NON-COLLUSION

The undersigned bidder hereby certifies that the accompanying bid is not the result of or affected by, any act of collusion with another person or company engaged in the same line of business or commerce, or any act of fraud punishable under Title 18.2, Chapter 12, Article 1.1 of the Code of Virginia, 1950, as amended. Furthermore, I understand that fraudulent and collusive bidding is a crime under the Virginia Governmental Frauds Act, the Virginia Government Bid Rigging Act, the Virginia Antitrust Act, and Federal Law and can result in fines, prison sentences, and civil damage awards.

The undersigned bidder agrees to abide by all conditions of this bid and the person signing this bid on behalf of bidder hereby certifies that (s)he is authorized to sign this bid for the bidder.

V. COMMONWEALTH OF VIRGINIA WORKERS' COMPENSATION CERTIFICATE OF COVERAGE (Revised 04/05/12)

Section 2.2-4332, Code of Virginia, requires construction contractors and subcontractors to obtain and maintain workers' compensation insurance for the duration of the Work on behalf of the Commonwealth of Virginia, its departments, institutions or agencies, or local governmental entities.

Satisfactory evidence of coverage on this form must be provided to the Commission prior to commencement of work.

The undersigned organization stipulates that it:

- A. Has workers' compensation insurance and is in compliance with the Workers' Compensation statues of the Commonwealth of Virginia ___ Yes ___ No

Insurance Company _____

Policy expiration date _____, or

- B. Is self-insured for workers' compensation _____ Yes.

VI. COMPLIANCE WITH STATE LAW; FOREIGN AND DOMESTIC BUSINESSES AUTHORIZED TO TRANSACT BUSINESS IN THE COMMONWEALTH

Pursuant to Virginia Code Section 2.2-4311.2 (effective July 1, 2010), each bidder or offeror organized or authorized to transact business in the Commonwealth of Virginia pursuant to Title 13.1 or Title 50 of the Code of Virginia, (1950), as amended, or as otherwise required by law, is required to include in its bid or proposal its Virginia State Corporation Commission (SCC) Identification Number. Any bidder or offeror that is not required to be authorized to transact business in the Commonwealth of Virginia as a domestic or foreign business entity under title Title 13.1 or Title 50 or as otherwise required by law is required to include in its bid or proposal a statement describing why the bidder or offeror is not required to be so authorized.

Please complete the following:

A. _____ Bidder/Offeror is a Virginia business entity organized and authorized to transact business in Virginia and such bidder's/offeror's SCC Identification Number is:

_____.

B. _____ Bidder/Offeror is an out-of-state (foreign) business entity authorized to transact business in Virginia and such bidder's/offeror's SCC Identification Number is:

_____.

C. _____ Bidder/Offeror does not have an Identification Number issued to it by the SCC and such bidder/offeror is not required to be authorized to transact business in Virginia by the SCC for the following reason(s):

_____.

_____.

Please attach additional sheets of paper if more space is needed to explain why such bidder/offeror is not required to be authorized to transact business in Virginia.

The undersigned hereby acknowledges the receipt of the following Addenda to the Contract Documents.

Addendum No. One Issued _____(DATE)
Addendum No. Two Issued _____(DATE)
Addendum No. Three Issued _____(DATE)
Addendum No. Four Issued _____(DATE)
Addendum No. Five Issued _____(DATE)

**EACH BIDDER MUST COMPLETE AND SIGN THE INFORMATION
BLOCK BELOW OR ELSE ITS BID SHALL BE DETERMINED TO BE
NON-RESPONSIVE.**

Complete Firm Name of Bidder

Signature of Authorized Official

Name & Title of Signing Official

Business Address: _____

Telephone: () _____
Area Code

Telefax: () _____
Area Code

CONTRACTOR'S VIRGINIA "CLASS A" CONTRACTOR NO: _____

** END OF BID **

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BID FORM

Date: _____

Bid Proposal Summary For All Work Depicted In The Plans And Specifications

ITEM NO.	APPROX. QUANTITY	ITEM WITH UNIT PRICE WRITTEN IN WORDS	UNIT PRICES IN FIGURES	
			DOLLARS	CENTS
			EXTENDED TOTAL	DOLLARS
			CENTS	CENTS
1 C-100	1 LS	CONTRACTOR QUALITY CONTROL PROGRAM _____ _____ PER LUMP SUM		
2 C-102	5 EA	INLET PROTECTION _____ _____ PER EACH		
3 C-102	1 EA	CULVERT INLET PROTECTION _____ _____ PER EACH		
4 C-102	3 EA	CURB INLET PROTECTION _____ _____ PER EACH		
5 C-102	2,500 LF	INSTALLATION AND REMOVAL OF SILT SOCK _____ _____ PER LINEAR FOOT		
6 C-102	1 EA	STONE CONSTRUCTION ENTRANCE _____ _____ PER EACH		
7 C-105	1 LS	MOBILIZATION _____ _____ PER LUMP SUM		
8 P-101	5,000 SY	BITUMINOUS PAVEMENT REMOVAL _____ _____ PER SQUARE YARD		
9 P-101	20,000 LF	JOINT AND CRACK REPAIR (TYPE A) _____ _____ PER LINEAR FOOT		
10 P-101	5,000 LF	JOINT AND CRACK REPAIR (TYPE B) _____ _____ PER LINEAR FOOT		

BID FORM

Bid Proposal Summary For All Work Depicted In The Plans And Specifications

ITEM NO.	APPROX. QUANTITY	ITEM WITH UNIT PRICE WRITTEN IN WORDS	UNIT PRICES IN FIGURES	
			DOLLARS	CENTS
			EXTENDED TOTAL	DOLLARS
			DOLLARS	CENTS
11 P-101	20,000 SY	COLD MILLING (NOMINAL DEPTH) (3") <hr/> <hr/> <div style="text-align: right;">PER SQUARE YARD</div>		
12 P-101	450 SY	COLD MILLING (NOMINAL DEPTH) (4") <hr/> <hr/> <div style="text-align: right;">PER SQUARE YARD</div>		
13 P-101	21,000 SY	COLD MILLING (VARIABLE DEPTH) <hr/> <hr/> <div style="text-align: right;">PER SQUARE YARD</div>		
14 P-101	16 LF	REMOVAL OF PIPE <hr/> <hr/> <div style="text-align: right;">PER LINEAR FOOT</div>		
15 P-101	150 SY	REMOVAL OF CONCRETE DITCH <hr/> <hr/> <div style="text-align: right;">PER SQUARE YARD</div>		
16 P-101	2,500 LF	REMOVAL OF CONDUIT AND CABLE <hr/> <hr/> <div style="text-align: right;">PER LINEAR FOOT</div>		
17 P-101	6 EA	REMOVAL OF AIRFIELD GUIDANCE SIGN FOUNDATION <hr/> <hr/> <div style="text-align: right;">PER EACH</div>		
18 P-101	1 LS	MISCELLANEOUS DEMOLITION <hr/> <hr/> <div style="text-align: right;">PER LUMP SUM</div>		
19 P-152	1 LS	UNCLASSIFIED EXCAVATION <hr/> <hr/> <div style="text-align: right;">PER LUMP SUM</div>		
20 P-152	500 CY	MUCK EXCAVATION <hr/> <hr/> <div style="text-align: right;">PER CUBIC YARD</div>		

BID FORM

Bid Proposal Summary For All Work Depicted In The Plans And Specifications

ITEM NO.	APPROX. QUANTITY	ITEM WITH UNIT PRICE WRITTEN IN WORDS	UNIT PRICES IN FIGURES		EXTENDED TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
21 P-209	2,750 CY	CRUSHED AGGREGATE BASE COURSE PER CUBIC YARD				
22 P-209	1,500 SY	SEPARATION GEOTEXTILE PER SQUARE YARD				
23 P-401	12,100 TN	ASPHALT SURFACE COURSE PER TON				
24 P-407	3,800 SY	ASPHALT OVERLAY FABRIC PER SQUARE YARD				
25 M-103	2 EA	LIGHTED PORTABLE CLOSED RUNWAY MARKER (CONTRACTOR-FURNISHED) PER EACH				
26 M-103	2 EA	CLOSED TAXIWAY MARKER (CONTRACTOR FURNISHED) PER EACH				
27 M-107	1,900 LF	AVIATION BARRICADES (CONTRACTOR FURNISHED) PER LINEAR FOOT				
28 P-603	6,000 GL	EMULSIFIED ASPHALT TACK COAT PER GALLON				
29 P-605	1,800 LF	JOINT SEALING FILLER PER LINEAR FOOT				
30 P-619	1,000 SF	PAINT REMOVAL (85-90% LEVEL) PER SQUARE FOOT				

BID FORM

Bid Proposal Summary For All Work Depicted In The Plans And Specifications

ITEM NO.	APPROX. QUANTITY	ITEM WITH UNIT PRICE WRITTEN IN WORDS	UNIT PRICES IN FIGURES		EXTENDED TOTAL	
			DOLLARS	CENTS	DOLLARS	CENTS
31 P-619	4,500 SF	PAINT REMOVAL (95-100% LEVEL) PER SQUARE FOOT				
32 P-620	10,500 SF	MARKING (INITIAL YELLOW) PER SQUARE FOOT				
33 P-620	10,500 SF	MARKING (PERMANENT YELLOW) PER SQUARE FOOT				
34 P-620	200 SF	MARKING (INITIAL WHITE) PER SQUARE FOOT				
35 P-620	200 SF	MARKING (PERMANENT WHITE) PER SQUARE FOOT				
36 P-620	14,000 SF	MARKING (PERMANENT BLACK) PER SQUARE FOOT				
37 P-620	1 LS	REFLECTIVE MEDIA PER LUMP SUM				
38 P-620	6 EA	SURFACE PAINTED HOLDING MARKING PER EACH				
39 D-701	16 LF	48" RCP, CLASS V PER LINEAR FOOT				
40 D-705	2,200 LF	6" PVC UNDERDRAIN OR EDGE DRAIN PIPE (PERFORATED) PER LINEAR FOOT				

BID FORM

Bid Proposal Summary For All Work Depicted In The Plans And Specifications

ITEM NO.	APPROX. QUANTITY	ITEM WITH UNIT PRICE WRITTEN IN WORDS	UNIT PRICES IN FIGURES	EXTENDED TOTAL
			DOLLARS CENTS	DOLLARS CENTS
41 D-705	400 LF	6" PVC UNDERDRAIN OR EDGE DRAIN PIPE (SOLID) PER LINEAR FOOT		
42 D-751	10 EA	ADJUST DRAINAGE STRUCTURE PER EACH		
43 D-751	1 EA	INSTALL STORMWATER MANAGEMENT STRUCTURE PER EACH		
44 R-302	1 EA	REPLACE DROP INLET TOP PER EACH		
45 D-752	2 EA	UNDERDRAIN ENDWALL PER EACH		
46 D-754	150 SY	CONCRETE DITCH PER SQUARE YARD		
47 T-901	3 AC	SEEDING PER ACRE		
48 T-904	4,500 SY	SODDING PER SQUARE YARD		
49 T-908	3 AC	MULCHING PER ACRE		
50 L-108	5,000 LF	NO. 8 AWG, 5KV, L-824, TYPE C CABLE, INSTALLED IN TRENCH, DUCT BANK OR CONDUIT PER LINEAR FOOT		

BID FORM

Bid Proposal Summary For All Work Depicted In The Plans And Specifications

ITEM NO.	APPROX. QUANTITY	ITEM WITH UNIT PRICE WRITTEN IN WORDS	UNIT PRICES IN FIGURES	EXTENDED TOTAL
			DOLLARS CENTS	DOLLARS CENTS
51 L-108	2,400 LF	NO. 6 AWG, SOLID, BARE COPPER COUNTERPOISE WIRE, INSTALLED IN TRENCH, INCLUDING CONNECTIONS/TERMINATIONS PER LINEAR FOOT		
52 L-110	2,400 LF	NON-ENCASED ELECTRICAL CONDUIT, 1 WAY - 2" PVC CONDUIT PER LINEAR FOOT		
53 L-125	3 EA	RELOCATED L-858(L) AIRFIELD GUIDANCE SIGN (3-4 CHAR.) ON NEW FOUNDATION PER EACH		
54 L-125	1 EA	L-858(L) AIRFIELD GUIDANCE SIGN (3-4 CHAR.) ON NEW FOUNDATION PER EACH		
55 L-125	1 EA	L-861T(L) BASE MOUNTED MITL (LED) PER EACH		
56 L-125	6 EA	L-861T(L) BASE MOUNTED MITL (LED) BASE ONLY PER EACH		
57 L-125	48 EA	RELOCATED L-861T(L) BASE MOUNTED MITL (LED) PER EACH		
58 L-125	16 EA	ADJUST L-861T(L) BASE MOUNTED MITL (LED) PER EACH		
59 R-414	100 SY	RIPRAP, CLASS A1 PER SQUARE YARD		
60 R-606	700 SY	SOIL STABILIZATION MAT (STANDARD EC-2, TYPE 2) PER SQUARE YARD		

Total Bid Amount \$ _____

SP-1 Non-AIP Insurance Allowance \$ _____

**ROANOKE REGIONAL AIRPORT COMMISSION
BID BOND FOR CONSTRUCTION PROJECT**

KNOW ALL MEN BY THESE PRESENTS: that

as Principal (hereinafter referred to as "Contractor"), and

as Surety (hereinafter referred to as "Surety"),

a corporation duly organized under the laws of the State of _____ and legally authorized to do business in the Commonwealth of Virginia, are held and firmly bound unto the ROANOKE REGIONAL AIRPORT COMMISSION, 5202 Aviation Drive, Roanoke, Virginia 24012, as obligee (hereinafter referred to as "Commission"), in the amount of _____ DOLLARS (\$ _____ 00.00), for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein.

WHEREAS, Contractor has submitted to Commission a certain bid dated _____ (Bid. No. _____), to enter into a contract ("Contract") for the following construction project: Rehabilitate Taxiway B from Taxiway B1 to B4 Project at the Roanoke Regional Airport ("Bid"), including, without limitation and as may be applicable, the Invitation To Bid, Instructions to Bidders, General Conditions, completed Bid Forms, Specifications, Plans and Drawings, if any, which documents are referred to collectively as "Bid Documents" and are expressly incorporated herein by reference and made a part of this bond.

NOW, THEREFORE, THE CONDITIONS OF THIS OBLIGATION are as follows:

- a. If the Contractor's Bid shall be rejected, or if said Bid shall be accepted and the Contractor shall timely deliver to Commission the Contract and all required documentation fully completed and properly executed in the form required in the Bid and Contract Documents, including all documents necessary to form a valid and binding contract, as determined by Commission, and, if Contractor shall in all other respects perform the obligations created by the acceptance of said Bid, then this obligation shall be null and void, otherwise this obligation and all provisions of this bond shall remain in full force and effect, it being expressly understood and agreed that

the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penalty amount of this bond.

- b. If Contractor's bid shall be accepted but Contractor shall fail to timely deliver to Commission all required documentation fully completed and properly executed in the form and as required in the Bid and Contract documents, or in any other respect fail to perform the obligations created by the acceptance of said Bid, as determined by Commission, Contractor and Surety shall defend, indemnify, and hold Commission harmless from and against any and all liability, loss, cost, damage, or expense, including reasonable attorney's fees and/or the cost of any other professional services, which Commission may incur or which may result from or be imposed upon Commission by reason of such failure.
- c. The Surety, for value received, hereby stipulates and agrees that the obligations of the Surety and this bond shall be in no way impaired or affected by any extension by Commission of the time within which Commission may accept such Bid, and the Surety does hereby expressly waive any notice of any such extension.
- d. The provisions of this bond shall be governed by and are intended to be consistent with the laws of the Commonwealth of Virginia. In light of this express choice of law provision, Virginia law for determining governing law shall not apply to the provisions of this bond. Contractor, for itself and its successors and assigns, and the Surety, for itself and its successors and assigns, do hereby expressly waive any objection that might be interposed as to the right of Commission to require a bond containing the provisions contained herein and they hereby further expressly waive any defense which they or either of them might interpose to any action brought hereon upon the ground that there is no law authorizing the Commission to require the provisions herein.
- e. This bond shall continue in full force and effect and shall not be deemed canceled or to have expired unless and until written notice of cancellation or expiration from Surety is received by Commission at least 90 calendar days prior to the effective date of such cancellation or expiration.
- f. Wherever possible, each provision of this bond shall be interpreted in such manner as to be effective and valid under applicable law. If any provision of this bond is held illegal or unenforceable in a judicial proceeding, such provision shall be severed and shall be inoperative, and all remaining provisions of this bond shall remain operative and binding on the parties.
- g. Any suit or action hereunder shall be brought in a Virginia court of competent jurisdiction in and for the City of Roanoke, or in the United States District

Court for the Western District of Virginia, Roanoke Division, and not elsewhere.

- h. This bond shall be construed and interpreted without regard to the identity of the party which drafted its various provisions. Every provision of this bond shall be construed as if all parties participated equally in the drafting of that provision. Any legal principle or rule of construction that a document is to be construed or interpreted against the drafting party shall not be applicable in any legal or other proceeding involving the provisions of this bond, and such principle or rule is expressly waived by the parties to this bond.
- i. Each party to this bond represents and covenants that the individual executing this bond on its behalf has full, unconditional authority to execute this bond and that, upon the signing of the bond by the authorized individual for each party, this bond shall become binding upon all parties

SIGNED and SEALED this _____ day of _____, 20____, in the presence of:

_____ Contractor
WITNESS: By: _____ (Seal)

_____ (Type Name and Title)

_____ Surety
WITNESS: By: _____ (Seal)

_____ Attorney-In-Fact
_____ (Type Name and Title)

(SURETY: Affix seal and attach current power of attorney)

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Certification Regarding Federal Contract Language for AIP-Funded Projects

In addition to the specific Federal Contract Provisions listed within this proposal form, the bidder/offeror certifies by signing and submitting this bid or proposal, that they have read, understand, and will comply with all of the Federal Contract Provisions contained within the project documents as listed by reference and qualified below:

All Contracts Regardless of Funding Source

Civil Rights – General Provisions

Civil Rights – Title VI

All AIP Funded Contracts

Access to Records and Reports

Buy American Preference

Domestic Preferences for Procurements

Federal Fair Labor Standards Act (Minimum Wage)

Foreign Trade Restriction

Occupational Safety and Health Act

Prohibition on Certain Telecommunications and Video Surveillance Services or Equipment

Prohibition of Segregated Facilities

Rights to Inventions

Seismic Safety

Tax Delinquency and Felony Convictions

Veteran's Preference

Additional Provisions for AIP Funded Contracts that are \$2,000 and greater

Copeland Anti-Kickback Act

Davis-Bacon Requirements

Additional Provisions for AIP Funded Contracts that are \$10,000 and greater

Affirmative Action Requirement

Texting Messaging While Driving

Equal Employment Opportunity

Procurement of Recovered Materials

Termination of Contract

Additional Provisions for AIP Funded Contracts that are \$25,000 and greater

Debarment and Suspension

Additional Provisions for AIP Funded Contracts that are \$100,000 and greater

Breach of Contract

Clean Air and Water Pollution Controls

Contract Work Hours and Safety Standards

Disadvantaged Business Enterprise

Lobbying Federal Employees

Name of Bidder: _____

Signature: _____

Name: *(type or print)* _____

Official Title: _____ Date: _____

Certification of Compliance with FAA Buy American Preference (Construction)

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

- Bidder or offeror hereby certifies that it will comply with 49 USC § 50101, BABA, and other related U.S. statutes, guidance, and policies of the FAA by:
- a) Only installing iron, steel, and manufactured products produced in the United States;
 - b) Only installing construction materials defined as: an article, material, or supply – other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives that are or consist primarily of non-ferrous metals; plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables); glass (including optic glass); lumber or drywall that have been manufactured in the United States.
 - c) Installing manufactured products for which the Federal Aviation Administration (FAA) has issued a waiver as indicated by inclusion on the current FAA Nationwide Buy American Waivers Issued listing; or
 - d) Installing products listed as an Excepted Article, Material or Supply in Federal Acquisition Regulation Subpart 25.108.

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

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

- Bidder or offeror hereby certifies it cannot comply with the 100 percent Buy American Preferences of 49 USC § 50101(a) but may qualify for a Type 3 or Type 4 waiver under 49 USC § 50101(b). By selecting this certification statement, the apparent bidder or offeror with the apparent low bid agrees:
- a) To submit to the Airport Sponsor or FAA within 15 calendar days of being selected as the responsive bidder, a formal waiver request and required documentation that supports the type of waiver being requested.
 - b) That failure to submit the required documentation within the specified timeframe is cause for a non-responsive determination that may result in rejection of the proposal.

- c) To faithfully comply with providing U.S. domestic products at or above the approved U.S. domestic content percentage as approved by the FAA.
- d) To furnish U.S. domestic product for any waiver request that the FAA rejects.
- e) To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.

REQUIRED DOCUMENTATION

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

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

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

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

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

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

FALSE STATEMENTS

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

Date

Signature

Company Name

Title

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Certifications Regarding Debarment

CERTIFICATION OF OFFEROR/BIDDER REGARDING DEBARMENT

(2 CFR Part 180 (subpart B); 2 CFR Part 200, Appendix II(H); 2 CFR Part 1200; DOT Order 4200.5; Executive Orders 12549 and 12689)

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

CERTIFICATION OF LOWER TIER CONTRACTORS REGARDING DEBARMENT

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

- (1) Checking the System for Award Management at website: <http://www.sam.gov>.

- (2) Collecting a certification statement similar to the Certification of Offeror/Bidder Regarding Debarment, above.

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

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

Name of Bidder: _____

Signature: _____

Name: *(type or print)* _____

Official Title: _____ Date: _____

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Certification Regarding Lobbying

(31 USC Par 1352 – Byrd Anti-Lobbying Amendment; 2 CFR Part 200, Appendix II(I); 49 CFR Part 20, Appendix A)

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 of Lobbying Activities," 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.

Name of Bidder: _____

Signature: _____

Name: *(type or print)* _____

Official Title: _____ Date: _____

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Certification Regarding Trade Restriction

(49 USC Par 50104; 49 CFR Part 30)

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

- (1) is not owned or controlled by one or more citizens of a foreign country included in the list of countries that discriminate against U.S. firms as published by the Office of the United States Trade Representative (USTR);
- (2) has not knowingly entered into any contract or subcontract for this project with a person that is a citizen or national of a foreign country included on the list of countries that discriminate against U.S. firms as published by the USTR; and
- (3) has not entered into any subcontract for any product to be used on the Federal project that is produced in a foreign country included on the list of countries that discriminate against U.S. firms published by the USTR.

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

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

Name of Bidder: _____

Signature: _____

Name: *(type or print)* _____

Official Title: _____ Date: _____

Certification of Offeror/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

- (1) 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.

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

Note

If 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 USC § 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.

Name of Bidder: _____

Signature: _____

Name: (type or print) _____

Official Title: _____ Date: _____

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Disadvantaged Business Enterprise Utilization

The undersigned has satisfied the requirements of the specifications in the following manner (please check the appropriate space):

The bidder is committed to a minimum of 8.9% DBE utilization on this project.

The bidder (if unable to meet the goal of 8.9% DBE utilization) is committed to a minimum of _____% DBE utilization on this project and has submitted documentation showing good faith effort.

Name of Bidder: _____

Signature: _____

Name: *(type or print)* _____

Official Title: _____ Date: _____

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Bidder Data Collection Form

The U.S. Department of Transportation under *49 CFR Part 26 Subpart A* requires the Roanoke Regional Airport Commission to report specific bidders list information on federally assisted projects. Bidders must submit a completed Bidder Data Collection Form for itself and every firm it intends to subcontract with to perform work for the Rehabilitate Taxiway B from Taxiway B1 to B4 project. This applies to all firms regardless of DBE status. Make copies of this form as needed.

Name of Firm: _____

Contact Name: _____

Business Address: _____
(No P.O. Boxes)

Email Address: _____ **Telephone:** (____) _____

Project Role: Prime Subcontractor **Age of Firm:** _____ years

Annual Gross Receipts: Less than \$1 million
 \$1 million to \$3 million
 \$3 million to \$6 million
 \$6 million to \$10 million
 Greater than \$10 million

Gender/Race of Firm's Male Female
Majority Owner
(holds ≥ 51% ownership interest)

<input type="checkbox"/> Non-Minority	<input type="checkbox"/> Asian-Pacific American
<input type="checkbox"/> Black American	<input type="checkbox"/> Subcontinent Asian American
<input type="checkbox"/> Hispanic American	<input type="checkbox"/> Other (specify):
<input type="checkbox"/> Native American	_____

Description of work to be performed by the firm	Associated NAICS Code(s)
Dollar value of estimated work: \$ _____	
Vendor Type: <input type="checkbox"/> Service Provider <input type="checkbox"/> Supplier	

Is the firm DBE certified in Virginia for the work described above? No Yes

For DBE Suppliers only, complete the fields below AND complete the U.S. Department of Transportation DBE Regular Dealor/Distributor Affirmation Form:

Regular Dealers: Dollar value of estimated work x 60% = _____

Distributors: Dollar value of estimated work x 40% = _____

AFFIRMATION (This section is to be completed for DBE firms only):

Statement of Intent to Utilize DBE Firm

The Bidder affirms that it intends to subcontract the work described to the aforementioned DBE firm.

Bidder Name: _____

By: _____
 Bidder Signature Title Date

The aforementioned DBE firm affirms that it will perform the portion of the contract for the estimated dollar value(s) as stated.

By: _____
 Subcontractor Signature Title Date

DBE certification number for projects in Virginia: _____

If the Bidder is determined not to be the successful bidder, this statement of intent shall be null and void.

USDOT DBE Regular Dealer/Distributor Affirmation Form

Each DBE Supplier must complete the following U.S. Department of Transportation DBE Regular Dealer/Distributor Affirmation Form, and the completed form(s) must be included with the bid package.

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**DBE Regular Dealer/Distributor
Affirmation Form**

Bidder Name:

U.S. Department of
Transportation

Contract Name/Number:

Sections 26.53(c)(1) of Title 49 Code of Federal Regulations requires recipients to make a preliminary counting determination for each DBE listed as a regular dealer or distributor to assess its eligibility for 60 or 40 percent credit, respectively, of the cost of materials and supplies based on its demonstrated capacity and intent to perform as a regular dealer or distributor, as defined in section 26.55(e)(2)(iv)(A),(B),(C), and (3) under the contract at issue. The regulation requires the recipient's preliminary determination to be made based on the DBE's written responses to relevant questions and its affirmation that its subsequent performance of a commercially useful function will be consistent with the preliminary counting of such participation. The U.S. Department of Transportation is providing this form as a tool for recipients, prime contractors, regular dealers, and distributors to use to carry out their respective responsibilities under this regulation. The form may be used by each DBE supplier whose participation is submitted by a bidder for regular dealer or distributor credit on a federally-assisted contract with a DBE participation goal. The form may also be used by prime contractors in connection with DBE regular dealer or distributor participation submitted after a contract has been awarded provided such participation is subject to the recipient's prior evaluation and approval. If this form is used, it should be accompanied by the bidder's commitment, contract, or purchase order showing the materials the DBE regular dealer or distributor is supplying. Use of this tool is not mandatory. If a recipient chooses a different method for complying with Section 26.53(c)(1), it must include that method in its DBE Program Plan.

DBE Name:

Total Subcontract/Purchase Order Amount:

Authorized DBE Representative (Name and Title):

NAICS Code(s) Related to the Items to be Sold/Leased:

1. Will **all** items sold or leased be provided from the on-hand inventory at your establishment? **YES NO**
(If "YES," you have indicated that your performance will satisfy the regular dealer requirements and may be counted at 60%. **STOP here. Read and sign the affirmation below.** If "NO" Continue.)
- a) Are you selling bulk items (e.g., petroleum products, steel, concrete, concrete products, sand, gravel, asphalt, etc.) or items not typically stocked due to their unique characteristics (aka specialty items)? **YES NO (If "YES," Go to Question 2. If "NO" Continue.)**
- b) Will at least 51% of the items you are selling be provided from the inventory maintained at your establishment, and will the minor quantities of items delivered from and by other sources be of the general character as those provided from your inventory?
YES NO* (If "YES," you have indicated that your performance will satisfy the regular dealer requirements and may be counted at 60%. **STOP here. Read and sign the affirmation below.**)

*If 1., 1.a), and 1. b) above are "NO," your performance on the whole will not satisfy the regular dealer requirements; therefore, only the value of items to be sold or leased from inventory can be counted at 60%. (Go to Question 3. to determine if the items delivered from and by other sources are eligible for Distributor credit.)

2. Will you deliver all bulk or specialty items using distribution equipment you own (or under a long-term lease) and operate? **YES NO¹**
(If "YES," you have indicated that your performance will satisfy the requirements for a regular dealer of bulk items and may be counted at 60%. **STOP here. Read and sign the affirmation below.**)
¹ If "NO," your performance will not satisfy the requirements for a regular dealer of bulk items; the value of items to be sold or leased cannot be counted at 60%. (Go to Question 3.)
3. Will the written terms of your purchase order or bill of lading from a third party transfer responsibility, including risk for loss or damage, to your company at the point of origin (e.g. a manufacture's facility)? **YES² NO³**
- a) Will you be using sources **other than** the manufacturer (or other seller) to deliver or arrange delivery of the items sold or leased? **YES² NO³**
- ² If your responses to 3 and 3.a) are "YES," you have indicated that your performance will satisfy the requirements of a distributor; therefore, the value of items sold or leased **may** be counted at 40%.
- ³ If you responded "NO" to either 3 or 3.a), counting of your participation is limited to the reasonable cost of fees or commissions charged, including transportation charges for the delivery of materials or supplies; the cost of materials or supplies may not be counted.

I affirm that the information that I provided above is true and correct and that my company's subsequent performance of a commercially useful function will be consistent with the above responses. I further affirm that my company will independently negotiate price, order specified quantities, and pay for the items listed in the bidder's commitment. This includes my company's responsibility for the quality of such items in terms of necessary repairs, exchanges, or processing of any warranty claims for damaged or defective materials.

Printed Name and Signature of DBE Owner/Authorized Representative:

The bidder acknowledges its responsibility for verifying the information provided by the DBE named above and ensuring that the counting of the DBE's participation is accurate. Any shortfall caused by errors in counting are the responsibility of the bidder.

Printed Name and Signature of Bidder's Authorized Representative:

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CONTRACT FORMS

SECTION D

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**CONTRACT
FOR
REHABILITATE TAXIWAY B FROM TAXIWAY B1 TO B4
AT THE ROANOKE REGIONAL AIRPORT**

THIS CONTRACT, is made and entered into this ____ day of _____, 202__, between the Roanoke Regional Airport Commission, a body corporate, (hereinafter referred to as "Commission" or "Owner") and _____, (hereinafter referred to as "Contractor"), pursuant to Resolution No. _____ adopted by the Commission on _____, _____, 202__, whereby for good and valuable consideration, including the promises set forth herein, the parties agree as follows:

1. **WORK**

Contractor hereby agrees to provide all labor, equipment, materials, services, incidentals and warranties necessary to complete the Rehabilitate Taxiway B from Taxiway B1 to B4 Project ("the Work") at the Roanoke Regional Airport.

A more detailed description of the Work and its requirements is contained in other sections of the Contract Documents.

2. **CONTRACT DOCUMENTS**

This Contract shall consist of the following Contract Documents: this executed Contract form; the Invitation to Bid; the Instructions to Bidders; General Conditions; the Technical Specifications; Drawings; Supplementary Drawings; Appendices; Addenda; and Contractor's completed Bid Forms, which are attached hereto and incorporated herein by reference. In the event of any conflict or inconsistency between this executed Contract Form and the Contractor's completed Bid Form, the terms and conditions of this Contract shall control and prevail. Contractor has entered into Performance and Labor and Material Payment Bonds, with surety, each in the penal sum of One Hundred Percent (100%) of the Contract Sum, payable to the Roanoke Regional Airport Commission, conditioned upon the faithful performance and upon the payment for labor and material, respectively, pursuant to this Contract and the Contract Documents hereinafter set out, upon which the bid of said Contractor was offered.

3. **TERM (CONTRACT TIME)**

Contractor agrees that time is of the essence for completion of this Contract. All preliminary and administrative work shall be completed within two hundred and forty (240) consecutive calendar days after the effective date of the written Phase 1 Administrative Services Notice to Proceed. All Work at the Airport, including Rehabilitate Taxiway B from Taxiway B1 to B4, shall be completed within one hundred and fifty (150) consecutive calendar days and final acceptance issued within one hundred and eighty (180) consecutive calendar days after the effective date of the written Phase 2 Performance of Work Notice to Proceed. Contractor shall notify the Owner in writing received at least 48 hours in advance of the date

it desires to begin the Work at the site. The work, once begun in any area, must continue uninterrupted until completion.

4. **CONTRACT SUM AND LIQUIDATED DAMAGES**

A. Owner agrees to pay Contractor the Contract Price sum of _____ dollars (\$_____.00) upon satisfactory completion of the Work as provided for in this Contract and as solely determined by Commission. Contractor acknowledges and agrees that the Contract payment amount may be increased or decreased by additions to and/or reductions in the Work only as effected by prior written change orders or amendments signed by both parties. Contractor agrees not to initiate any additional work, not called for in the Contract Documents, for which Contractor intends to seek additional compensation without first notifying Engineer in writing and obtaining Owner's prior approval by properly executed written change order or Contract Amendment unless pursuant to a Construction Change Directive.

The Contract sum specified above shall be the full and only sum paid to Contractor for all Work, materials, expenses and costs specified herein or incidental thereto.

B. It is understood that for each calendar day that the work remains incomplete after the contract time for Phase 2 Performance of Work, including all extensions and adjustments as provided by written Change Order, liquidated damages as described in the Contract Documents may be claimed and retained, offset or deducted from any money due or to become due to the Contractor or its Surety. Such deducted sums may be assessed cumulatively, and such deducted sums shall not be considered to be a penalty but shall be considered as liquidation of a reasonable portion of damages that will be incurred by the Owner should the Contractor fail to complete the work in the time provided in its contract. It is understood and agreed that: (a) the actual damages that may result from failure to complete the work within the required time are uncertain and difficult to determine with exactness and that the fixed amount is not out of proportion to the probable loss; (b) Owner retains the right to make such retentions, deductions and/or offsets for liquidated damages at any time and that Owner's imposition and the retention, deduction and/or offset of any liquidated damages hereunder shall not be subject to any prior notice or claim requirements; and, (c) Contractor waives any defenses as to the validity of any liquidated damages provisions in this Contract based on such liquidated damages being void as penalties or not being reasonably related to actual damages. It is further agreed, however, that application of liquidated damages hereunder shall not be Owner's exclusive remedy and shall not bar any other claim, cause of action, or remedy that Owner may have against Contractor under applicable law in the performance of this Contract.

Reference is made to Subsection 41 DETERMINATION AND EXTENSION OF CONTRACT TIME of the General Conditions.

5. **PAYMENTS**

- A. Payment shall be made subject to and in accordance with Contractor's bid and the requirements of the Contract Documents.
- B. Contractor shall pay all applicable taxes, including sales tax on materials supplied.
- C. Contractor agrees that the Owner may withhold, deduct, or offset payment to Contractor under the Contract when the Owner's property is damaged or destroyed by poor performance or defective equipment or materials employed by Contractor, for the payment of fines or penalties by Owner as a result of Contractor's actions or failure to act, or for unsatisfactory performance under this Contract as determined by Engineer. Contractor also agrees that it shall be liable to the Owner for actual damages for replacement or repair of property, materials, or services caused by this damage or destruction to the Owner's property, or for unsatisfactory performance.

6. **COMPLIANCE WITH LAWS AND LICENSING REQUIREMENTS**

Contractor confirms that it and all of its subcontractors have all licenses and permits necessary to perform the Work and that they shall maintain all such licenses and permits as may be required by Federal, State, and local agencies during the term of this Contract.

The Contractor shall be solely responsible for paying all charges, fees, and taxes, and give all notices necessary and incidental to the due and lawful prosecution of the Work. The Contractor shall be responsible for arranging all inspections by local authorities for compliance with all building code requirements, ordinances and regulations.

No unnecessary delay shall be permissible in the completion of the Work due to the failure or delay in obtaining permits required for the Work.

Contractor expressly warrants that in the performance of the Work it shall comply with all applicable laws, codes, regulations, standards, etc., which may be required of it by all applicable local, state and federal jurisdictions and their respective agencies, offices, bureaus, and other administrative/regulatory entities, including, but not limited to, all local, state and federal ordinances, laws and regulations, concerning building and fire codes, solid waste and environmental matters, FAA, TSA and airport security regulations, and all applicable sections of the Occupational Safety and Health Act (OSHA), the Virginia Uniform Statewide Building Code.

7. **INDEMNIFICATION**

Contractor shall defend, indemnify and hold harmless Commission and its officials, officers, board members, agents, and employees, against any and all loss, cost, or expense, including reasonable attorney's fees, resulting from any claim, whether or not reduced to judgment, and for any liability of any nature whatsoever, that may

arise out of or result from the Work or its performance by Contractor or its sub-contractor or the violation of any of the terms and conditions of this Contract, including, without limitation, fines and penalties, violations of federal, state or local laws or regulations promulgated thereunder, personal injury, wrongful death or property damage claims, Contractor's breach of airport security or failure to comply with security regulations as required herein. Should Contractor inadequately remedy or fail to remedy a violation of this agreement after notification by Commission, Commission shall be authorized to take whatever corrective action Commission deems necessary to eliminate the violation, at the sole expense of Contractor.

8. **INSURANCE**

A. Liability Coverage

Prior to execution of this Contract by Commission, Contractor shall provide Owner's Executive Director suitable evidence of commercial general liability occurrence-type insurance that includes contractual liability and products and completed operations insurance, and automobile liability with "any auto" coverage, naming Contractor as insured and its employees, subcontractors, the Commission and its officials, officers, board members, agents, employees, and volunteers as additional insureds, providing coverage against any and all claims and demands made by any person or persons or any other entity whomsoever for injuries or death or property damage incurred in connection with or arising out of the Work, services, items and/or other matters to be performed hereunder and including contractual liability coverage for the terms and conditions of this contract, which policies shall provide limits of not less than **\$5,000,000.00**.

B. Workers Compensation

Prior to execution of this Contract by Commission, the Contractor shall obtain and provide evidence of statutory Worker's Compensation and Employer's Liability Insurance for all of its employees engaged in the Work, and maintain such coverage during the term of the Contract. In case any such work is subcontracted, the Contractor shall require the Subcontractor to provide such insurance for all of its employees engaged in the Work.

C. Notice to Commission

Contractor shall immediately notify the Commission in writing of any changes, modifications, expiration and/or termination of any insurance coverages and/or policies required by this Contract.

D. Umbrella Policy

The required limits of insurance for this Contract may be achieved by combining underlying primary coverage with an umbrella liability coverage to apply in excess of the general and automobile liability policies, provided that

such umbrella liability policy follows the form of the underlying primary coverage.

E. Insurance Company

Insurance coverage shall be in a form and with an insurance company approved by the Commission, which approval shall not be unreasonably withheld. Any insurance company providing coverage under this contract shall be authorized to do business in the Commonwealth of Virginia.

F. No Exclusions

The contractor's insurance policies and/or coverages shall not contain any exclusions for the Contractor's subcontractors.

G. Maintenance of Insurance

The continued maintenance of the insurance policies and coverages required by this Contract during the time that the Contractor is working for the Commission is a continuing obligation, and the lapse and/or termination of any such policies or coverages without approved replacement policies and/or coverages being obtained shall be grounds for termination of the Contractor for default.

H. Insurance Not To Be Limit On Liability

Nothing contained in the insurance requirements is to be construed as limiting the liability of the Contractor, and/or its subcontractors, or their insurance carriers may have under this Contract, including without limitation the indemnification provision contained herein. The Commission does not in any way represent that the coverages or limits of insurance specified are sufficient or adequate to protect the Contractor's interest or liabilities, but are merely minimums. The obligation of the contractor, and its subcontractors, to purchase insurance shall not in any way limit the obligations of the Contractor in the event that the Commission or any of those named above should suffer any injury or loss in excess of the amount actually recoverable through insurance. Furthermore, there is no requirement or obligation for the Commission to seek any recovery against the Contractor's insurance company before seeking recovery directly from the Contractor.

9. CANCELLATION

A. For Cause

The Owner's Executive Director may cancel the Contract upon written notice received by Contractor whenever Contractor's services fall below the quality of services generally provided by others for similar types of services, or Contractor has failed to perform in accordance with this Contract. Prior to any such cancellation, Contractor shall be given written notice and ten (10) calendar days to cure such failures. However, in the event that that Contractor's failure is a violation of law, and/or an act or condition that poses a risk of harm to people or their property, then Contractor shall immediately

take action to cure such failure and shall complete such cure within 24 hours. Default by Contractor hereunder shall constitute a basis for determining for future contracts that Contractor is not a responsible bidder and for Commission to refuse to award such future contracts to Contractor.

In the event that Contractor defaults in the performance of any of the terms, conditions or agreements contained in this Contract, and Owner places the enforcement of all or part of this Contract in the hands of an attorney for enforcement, including the filing of a suit upon the same, Contractor agrees to pay all of Owner's reasonable attorney's fees and costs related to any such proceeding.

B. Without Cause

The Executive Director of the Commission may cancel the contract without cause at any time upon ten (10) days advance written notice, and may stop the work at any time during the ten day period, provided that Contractor shall be paid for all work satisfactorily completed, as determined by Commission in its sole and exclusive discretion, on or before the effective date of the cancellation or stop work order, whichever is sooner.

10. **ENTIRE AGREEMENT**

This Contract embodies the entire understanding between the parties. There are no oral agreements or representations in connection herewith.

11. **SPECIAL CONTRACT TERMS**

A. Performance and Warranty

1. The Work shall be performed in a good, workmanlike and safe manner, consistent with industry standards and any applicable manufacturer's or vendor's warranty or product manufacturer's recommended guidelines.
2. Contractor shall protect the property of the Owner and tenants from any and all damage caused by the Contractor's operations.
3. Contractor shall maintain the work area in a neat, clean and safe condition at all times. Recognizing the Foreign Object Debris (FOD) could severely damage aircraft and jeopardize the lives of passengers, Contractor shall vigilantly comply with the requirements in the Contract Documents related to the clean up and removal of demolition/removal debris and waste materials.
4. Specific Warranty requirements for this Contract are contained in Section 33 of the General Conditions for the Contractor and in pertinent sections of the Technical Specifications, both of which are incorporated herein by reference. Nothing contained in this paragraph will be construed to establish a period of limitations with respect to any liability Contractor may have for breach of this Contract.

B. Inspection

A representative of the Owner shall have the right at all times to examine the supplies, materials and equipment used by Contractor, to observe the operations of the Contractor and its employees, to verify the Work being performed, and to do any act or thing which the Owner may be obligated or have the right to do under this contract.

C. Scheduling and Notification of Work

1. Prior to Contractor beginning any work at the airport, it shall participate in the pre-construction meeting which shall include representatives of the Commission and the Consultant and shall address many of the issues identified in Item 3. below. Such meeting should take place at least two weeks prior to the beginning of the Work.
2. The Work shall be scheduled at least 48 hours in advance with the Commission's Project Coordinator. Unless other arrangements have been made, any employee or representative of Contractor, prior to performing any work on Commission premises and before leaving Commission premises, shall notify Commission's designated representative who may desire to undertake a walk through inspection prior to Contractor's leaving the premises.
3. Issues of parking, access, dumpsters, storage of equipment and supplies, use of sanitary facilities, schedules for security badging and training and other related procedures shall be governed generally by the contract documents, however, specific issues or problems will be coordinated by Contractor with the Commission's Project Coordinator in order to minimize inconvenience to Contractor, airport businesses and the general public.
4. The Contractor shall schedule the work to suit the Owner's requirements. As indicated on the technical specifications, scheduling shall require restricted work time for some areas of the work.
5. Existing buildings will be occupied by the Owner and/or its tenants, and in full operation during construction. If at any time Contractor's activities create such noise, dust, fumes or noxious odors so as to substantially curtail or affect the operations of Owner, its tenants or passengers, then Contractor may be required to cease its operations until the affected activities cease for that work period or for the day.
6. Work necessary to be performed in, or otherwise affecting the use or comfort of, the existing buildings shall be coordinated with the occupants' schedules.
7. Under no circumstances shall any emergency or required means of ingress or egress be blocked, during hours the public is expected to be in the terminal.

12. **DETAILED DESCRIPTION AND REQUIREMENTS OF THE WORK**

The specific details of the Work are contained in the Technical Specifications which are incorporated herein by reference.

13. **NON-DISCRIMINATION**

A. 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, religion, color, sex or national origin, except where religion, sex or national origin is a bona fide occupational qualification reasonably necessary to the normal operation of the Contractor.

The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.

2. The Contractor, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, will state that such Contractor is an equal opportunity employer.
3. Notices, advertisements and solicitations places in accordance with federal law, rule or regulation shall be deemed sufficient for the purpose of meeting the requirements of this section.

B. The Contractor will include the provisions of the foregoing paragraphs 1. 2. and 3. in every subcontract or purchase order of over \$10,000, so that the provisions will be binding upon each subcontractor or vendor.

C. The Roanoke Regional Airport Commission does not discriminate against faith based organizations.

14. **IMMIGRATION REFORM AND CONTROL ACT OF 1986**

The Contractor does not and shall not during the performance of the Contract for goods and services in the Commonwealth knowingly employ an unauthorized alien as defined in the Federal Immigration Reform and Control Act of 1986.

15. The new regulations require that the EEO clause be made part of the Contract by Citation 41CFR 60-300.5(a) and 41CFR 60-741(a).

“This Contractor and subcontractor shall abide by the requirements of 41CFR 60-300.5(a) and 41CFR 60-741(a). These regulations prohibit discrimination against qualified individuals and protected veterans on the basis of disability or veteran status and requires affirmative action by covered prime Contractors and subcontractors to employ and advance in employment qualified individuals with disabilities and protected veterans.”

16. **GENERAL CIVIL RIGHTS PROVISIONS**

The contractor agrees that it will 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 handicap be excluded from participating in any activity conducted with or benefiting from Federal assistance.

Title VI Clauses for Compliance with Nondiscrimination Requirements

(Source: Appendix A of Appendix 4 of FAA Order 1400.11, Nondiscrimination in Federally-Assisted Programs at the Federal Aviation Administration)

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 Statutes 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. **Non-discrimination:** 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 Acts and the Regulations, 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 Acts and the Regulations relative to Non-discrimination 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 Acts, Regulations, 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 Authorities

(Source: Appendix E of Appendix 4 of FAA Order 1400.11, Nondiscrimination in Federally-Assisted Programs at the Federal Aviation Administration)

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

- Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d *et seq.*, 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin);
- 49 CFR part 21 (Non-discrimination In Federally-Assisted Programs of The Department of Transportation—Effectuation of Title VI of The Civil Rights Act of 1964);
- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);
- Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 *et seq.*), as amended, (prohibits discrimination on the basis of disability); and 49 CFR part 27;
- The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 *et seq.*), (prohibits discrimination on the basis of age);
- Airport and Airway Improvement Act of 1982, (49 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 U.S.C. §§ 12131 – 12189) as implemented by Department of Transportation regulations at 49 CFR parts 37 and 38;
- The Federal Aviation Administration’s Non-discrimination statute (49 U.S.C. § 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 discrimination 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 U.S.C. 1681 et seq).

17. **FEDERAL FAIR LABOR STANDARDS ACT**

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.

18. **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. Contractor must provide a work environment that is free from recognized hazards that may cause death or serious physical harm to the employee. The Contractor 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 (20CFR Part 1910). Contractor may address any claims or disputes that pertain to a referenced requirement directly with the U.S. Department of Labor-Occupational Safety and Health Administration.

19. **DRUG FREE WORKPLACE**

During the performance of this Contract, the Contractor agrees to (i) provide a drug-free workplace for the Contractor's employees; (ii) post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in the contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition; (iii) state in all solicitations or advertisements for employees placed by or on behalf of the Contractor that the Contractor maintains a drug-free workplace; and, (iv) include the provisions of the foregoing clauses in every subcontract or purchase order of over \$10,000.00 so that the provisions will be binding upon each such subcontractor or vendor. For purposes of this section, "drug-free workplace" means a site for the performance of work done in connection with a specific contract awarded to a contractor in accordance with the Roanoke Regional Airport Commission's Procurement Regulations and applicable Virginia procurement laws, the employees of whom are prohibited from engaging in the unlawful manufacture, sale, distribution, dispensation, possession or use of any controlled substance or marijuana during the performance of the contract.

20. **EVIDENCE OF AUTHORITY TO TRANSACT BUSINESS IN VIRGINIA**

Pursuant to 2.2-4311.2 (A) of the Code of Virginia (1950), as amended, if the Contractor is organized as a stock or non-stock corporation, limited liability company, business trust, or limited partnership or registered as a registered limited liability partnership, the Contractor shall provide documentation acceptable to Commission establishing that the contractor is authorized to transact business in the Commonwealth as a domestic or foreign business entity if so required by Title 13.1 or Title 50 of the Code of Virginia (1950), as amended, or as otherwise required by law. The Contractor shall not allow its existence or its certificate of authority or registration to transact business in the Commonwealth to lapse, if so required under Title 13.1 or Title 50, or to be revoked or cancelled at any time during the term of the contract. The Commission may void this contract if the Contractor fails to remain in compliance with the provisions of this section.

21. **GOVERNING LAW AND VENUE**

The provision of this Contract shall be governed by and are intended to be consistent with the laws of the Commonwealth of Virginia. In light of this express choice of law provision; Virginia law for determining governing law shall not apply to the provisions of this Contract. Every action brought under or related to this Contract shall be brought in a Virginia court of competent jurisdiction in the City of Roanoke or in the United States District Court for the Western District of Virginia, Roanoke, Virginia, and not elsewhere. In the event of any such litigation, the prevailing party, as determined by the adjudicating entity, shall have its costs, including all attorneys fees, paid by the non-prevailing party.

Notwithstanding the foregoing, the parties shall make their best efforts, in good faith, to resolve by negotiation all disputes concerning the interpretation and enforcement of this Contract by negotiation. The parties may resort to formal mediation via a professional mediating entity, licensed to conduct business in Virginia, in the event such inter-party negotiation fails. In the event either negotiation or mediation fail to resolve any such dispute, the parties hereby affirmatively agree to submit any action concerning the interpretation or enforcement of this Contract to binding arbitration, pursuant to Chapter 21 of Title 8.01 of the Code of Virginia, as currently existing or amended hereafter. Said arbitration shall be conducted by a professional arbitrating entity licensed to conduct business in Virginia. In the event the parties are unable to agree upon the arbitrating entity, selection shall be determined by a coin toss, choosing between one nominee respectively proposed by each party. The cost of the arbitration shall be shared equally by the parties. The party prevailing in any such arbitration, as determined by the arbitrator, shall have its costs, including all attorney's fees, paid by the non-prevailing party.

22. **SEVERABILITY**

Wherever possible, each provision of this Contract shall be interpreted in such manner as to be effective and valid under applicable law. If any provision of this Contract is held illegal or unenforceable in a judicial proceeding, such provision shall be severed and shall be inoperative, and all remaining provisions of this Contract shall remain operative and binding on the parties. This Contract shall be construed and interpreted without regard to the identity of the party which drafted its various provisions. Every provision of this Contract shall be construed as if all parties participated equally in the drafting of that provision. Any legal principle or rule of construction that a document is to be construed or interpreted against the drafting party shall not be applicable in any legal or other proceeding involving the provisions of this Contract, and such principle or rule is expressly waived by the parties to this Contract.

23. **SURVIVAL**

All representations, agreements, covenants, and indemnifications made in or given by Contractor in this Contract shall survive the completion of all services under this Contract and the termination of this Contract for any reason.

24. **DUPLICATE COPIES**

This Contract may be executed in any number of counterparts, each of which shall be deemed an original, and all of such counterparts together shall constitute one and the same instrument.

25. **CERTIFICATION**

The undersigned individual executing this Contract on behalf of Contractor certifies and warrants that he or she is authorized to enter into this Contract and bind Contractor to all of the terms and conditions contained herein.

26. **HEADINGS**

The headings used in this Contract are intended for convenience of reference only and do not define, expand, or limit the scope or meaning of any provision of this Contract.

27. **NOTICES**

A. Forms of Notice. Unless otherwise specified, all notices, consents and approvals required or authorized by this Contract to be given by or on behalf of either party to the other, shall be in writing and signed by a duly designated representative of the party by or on whose behalf they are given, and shall be deemed given three days after the time a certified letter, properly addressed, postage prepaid, is deposited in any United States Post Office, or upon delivery by hand, or upon delivery by overnight express carrier.

B. Notice to Commission. Notice to Commission shall be addressed to it and delivered at the office of the Executive Director, Roanoke Regional Airport Commission, 5202 Aviation Drive, Roanoke, Virginia 24012, or at such other office as Commission may hereafter designate by notice to contractor in writing.

C. Notice to Contractor. Notice to Permittee shall be addressed and delivered to

_____, or at such other office in the continental United States as Contractor may hereafter designate by notice to Commission in writing.

END OF CONTRACT PROVISIONS

WITNESS the following signatures:

Contractor: (To be completed after bid is awarded)

By: (Not for signature)
Title: N/A
Date: N/A

Attest: N/A
Title: _____

Roanoke Regional Airport Commission

By: N/A
Title: Executive Director
Date: _____

Attest: N/A
Title: Commission Secretary

Certification of funding

By: _____
Treasurer
Roanoke Regional Airport
Commission

Account Number

Approved for legal form

By: _____
General Counsel
Roanoke Regional Airport
Commission

** END OF CONTRACT **

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ROANOKE REGIONAL AIRPORT COMMISSION

PERFORMANCE BOND FOR CONSTRUCTION PROJECT

KNOW ALL MEN BY THESE PRESENTS: that

(Insert full name or legal title and address of Contractor)

as Principal (hereinafter referred to as “Contractor”), and

(Insert full name or legal title and address of Surety)

as Surety (hereinafter referred to as “Surety”)

a corporation duly organized under the laws of the State of _____ and legally authorized to do business in the Commonwealth of Virginia, are held and firmly bound unto the ROANOKE REGIONAL AIRPORT COMMISSION, 5202 Aviation Drive, Roanoke, Virginia 24012, as Obligee (hereinafter referred to as “Commission”), in the amount of

_____ DOLLARS (\$_____),
(Insert full dollar value of construction contract)

for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein.

WHEREAS, Contractor has entered into a contract with Commission, dated _____, as the successful bidder for Rehabilitate Taxiway B from Taxiway B1 to B4 Project (“Project”) at the Roanoke Regional Airport, Bid No. 25-011 in accordance with all contract documents for such Project, including, without limitation and as may be applicable, the Invitation to Bid, Instructions to Bidders, General Conditions, completed Bid Forms, Specifications, Plans and Drawings, if any, and the completed contract form, as well as all other covenants, agreements, and obligations to be performed or paid by Contractor, which documents are referred to collectively as the “Contract” and are expressly incorporated herein by reference and made a part of this bond.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if the Contractor shall promptly, faithfully, and fully perform the terms, conditions, and provisions of the Contract, in strict conformity with each and every requirement thereof, as determined by Commission, then this obligation shall be null and void; otherwise this obligation and provisions of this bond shall remain in full force and effect as stated herein.

- a. If the Contractor shall default, breach, or fail to promptly, faithfully, and fully perform any of the terms, conditions or provisions of the Contract, in strict conformity with each and every requirement thereof, as determined by Commission, Surety shall complete or provide for the completion of the Contract, subject to the approval of the Commission, in accordance with its terms and conditions, and Surety hereby agrees to defend, indemnify, and hold Commission harmless from and against any and all liability, loss, cost, damage or expense, including reasonable attorney's fees and/or the cost of any other professional services which Commission may incur or which may result from or be imposed upon Commission by reason of any default, breach, or failure of Contractor and/or its agents, servants, subcontractors or employees to so perform the Contract, and Surety shall pay and/or repay and reimburse the Commission promptly upon demand for any and all sums due to, paid out, or expended by or on behalf of Commission on account of or resulting from such default, breach, or failure to so perform any of the terms or conditions of the Contract within the time and in the manner therein provided, including, without limitation, any maintenance, warranty, or guarantee obligations in the Contract.
- b. Any alteration, amendment, modification, omission, addition, extension, or forbearance which may be made in or to the terms of the Contract, including, without limitation, the amount to be paid or the obligations to be performed under it, or the giving by the Commission of any extension of time for the performance of the Contract or any other forbearance of any nature whatsoever on the part of either the Commission or the Contractor to the other shall not in any way affect or release the Contractor and the Surety, or either of them, their heirs, executors, administrators, successors or assigns with regard to their obligations and liability hereunder. Notice of any such alteration, amendment, modification, omission, addition, extension, or forbearance is hereby expressly waived by Surety. Any delay, omission, or failure by Commission to call upon the Surety in any instance shall not release the Surety from any obligation hereunder.
- c. This Performance Bond shall be valid and continue in full force and effect and shall not be canceled or expire or be deemed to be canceled or have expired until all of Contractor's obligations under the Contract have been promptly, faithfully, and fully completed, as determined by Commission, including, without limitation, any maintenance, warranty, and guarantee obligations, as determined by Commission.
- d. The obligations evidenced herein shall constitute the joint and several obligations of the Contractor, the Surety, and their respective heirs, executors, administrators, successors and assigns.
- e. Any suit or action hereunder shall be brought in a Virginia court of competent jurisdiction in and for the City of Roanoke, Virginia, or in the United States District Court for the Western District of Virginia, Roanoke Division, and not elsewhere.
- f. The provisions of this bond shall be governed by and are intended to be consistent with the laws of the Commonwealth of Virginia. In light of this express choice of law provision, Virginia law for determining governing law shall not apply to the

provisions of this bond. The Contractor, for itself and its successors and assigns, and the Surety, for itself and its successors and assigns, do hereby expressly waive any objection that might be interposed as to the right of the Commission to require a bond containing the provisions contained herein, and they do hereby further expressly waive any defense which they or either of them might interpose to any action brought hereon upon the ground that there is no law authorizing the Commission to require the provisions herein.

- g. Wherever possible, each provision of this bond shall be interpreted in such manner as to be effective and valid under applicable law. If any provision of this bond is held illegal or unenforceable in a judicial proceeding, such provision shall be severed and shall be inoperative, and all remaining provisions of this bond shall remain operative and binding on the parties.
- h. This bond shall be construed and interpreted without regard to the identity of the party which drafted its various provisions. Every provision of this bond shall be construed as if all parties participated equally in the drafting of that provision. Any legal principle or rule of construction that a document is to be construed or interpreted against the drafting party shall not be applicable in any legal or other proceeding involving the provisions of this bond, and such principle or rule is expressly waived by the parties to this bond.
- i. Each party to this bond represents and covenants that the individual executing this bond on its behalf has full, unconditional authority to execute this bond and that, upon the signing of the bond by the authorized individual for each party, this bond shall become binding upon all parties

SIGNED and SEALED this _____ day of _____, 20____, in the presence of:

Contractor

WITNESS:

By: _____ (Seal)

(Type Name and Title)

Surety

WITNESS:

By: _____ (Seal)

Attorney-In-Fact

(Type Name and Title)

SURETY: Affix seal and attach current power of attorney)

ROANOKE REGIONAL AIRPORT COMMISSION

LABOR AND MATERIAL PAYMENT BOND FOR CONSTRUCTION PROJECT

KNOW ALL MEN BY THESE PRESENTS: that

(Insert full name or legal title and address of contractor)

as Principal (hereinafter referred to as "Contractor"), and

(Insert full name or legal title and address of surety)

as Surety (hereinafter referred to as "Surety")

a corporation duly organized under the laws of the State of _____ and legally authorized to do business in the Commonwealth of Virginia, are held and firmly bound unto the Roanoke Regional Airport Commission, 5202 Aviation Drive, Roanoke, Virginia 24012 as Obligee (hereinafter referred to as "Commission"), in the amount of _____ DOLLARS (\$_____.00), for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein.

WHEREAS, Contractor has entered into a contract with Commission dated _____ for Bid No. 25-011 for the Rehabilitate Taxiway B from Taxiway B1 to B4 Project ("Project") at Roanoke Regional Airport, in accordance with all contract documents for such Project, including, without limitation and as may be applicable, the Advertisement, Invitation to Bid, Instructions to Bidders, General Conditions, Supplementary Conditions, completed Bid Forms, Specifications, Plans and Drawings, if any, and the completed contract form, as well as all other covenants, agreements, and obligations to be performed or paid by Contractor, which documents are referred to collectively as the "Contract" and are expressly incorporated herein by reference and made a part of this bond.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that if the Contractor shall promptly pay or cause to be paid all persons and entities for all labor and materials furnished or supplied in furtherance of the Project and provided for in the Contract, as determined by Commission, then this obligation shall be null and void; otherwise, this obligation and all provisions of this bond shall remain in full force and effect as stated herein.

- a. If Contractor shall fail to promptly pay or cause to be paid all persons and entities for all labor and materials furnished or supplied in furtherance of the Project and provided for in the Contract, as determined by Commission, Surety shall defend, indemnify, and hold Commission harmless from and against any and all liability, loss, cost, damage, or expense, including reasonable attorney's fees, which Commission may incur or which may result from or be imposed upon Commission by reason of such failure.
- b. Any alteration, amendment, modification, omission, addition, extension, or forbearance which may be made in or to the terms of the Contract, including, without limitation, the amount to be paid or the obligations to be performed under it, or the giving by the Commission of any extension of time for the performance of the Contract or any other forbearance of any nature whatsoever on the part of either the Commission or the Contractor to the other shall not in any way affect or release the Contractor and/or the Surety, or their heirs, executors, administrators, successors or assigns with regard to their obligations and liability hereunder. Notice of any such alteration, amendment, modification, omission, addition, extension, or forbearance is hereby expressly waived by Surety. Any delay, omission, or failure by Commission to call upon the Surety in any instance shall not release the Surety from any obligation hereunder.
- c. Surety and Contractor hereby jointly and severally agree that this bond shall be for the protection of claimants who have and fulfill contracts to supply labor or materials, or both, to the Contractor or to any subcontractors, in furtherance of the work provided for in the Contract and shall be conditioned upon the prompt payment for all materials furnished or labor supplied or performed in furtherance of the work. "Labor and materials" hereunder shall include, without limitation, public utility services and reasonable rentals of equipment, but only for periods when the equipment rented is actually used at the Project site.

Any claimant who has a direct contractual relationship with the Contractor and who has performed labor or furnished material in accordance with the Contract in furtherance of the work provided in the Contract for which this bond has been given, and who has not been paid in full before the expiration of 90 days after the day on which the claimant performed the last of the labor or furnished the last of the materials for which it claims payment, may bring an action on this bond to recover any amount due it for the labor or material. The obligee named in the bond need not be named a party to the action.

Any claimant who has a direct contractual relationship with any subcontractor but who has no contractual relationship, express or implied, with the Contractor, may bring an action on this bond only if it has given written notice to the Contractor within 90 days from the day on which the claimant performed the last of the labor or furnished the last of the materials for which it claims payment, stating with substantial accuracy the amount claimed and the name of the person for whom the work was performed or to whom the material was furnished. Notice to the Contractor shall be served by registered or certified mail, postage prepaid, in an envelope addressed to such contractor at any place where its office is regularly maintained for the transaction of business. Claims for sums withheld as retainages with respect to labor performed or materials furnished, shall not be subject to the time limitations stated in this subsection.

Any action on this bond shall be brought within one year after the day on which the person bringing such action last performed labor or last furnished or supplied materials.

The parties intend that the provisions hereof describing who is entitled to bring an action as a claimant on this bond shall be consistent with sections 2.2-4337.A.2 and 2.2-4341 of the Virginia Public Procurement Act, Code of Virginia (1950), as amended ("Act"). To the extent any provision hereof describing who is entitled to bring an action as claimant on this bond is not consistent with any provision of sections 2.2-4337.A.2 and/or 2.2-4341, the provision(s) of those sections of the Act, as amended, shall govern and control.

- d. Any suit or action hereunder shall be brought in a Virginia court of competent jurisdiction in and for the City of Roanoke, Virginia or in the United States District Court for the Western District of Virginia, Roanoke Division, and not elsewhere.
- e. This bond shall continue in full force and effect and shall not be deemed canceled or to have expired unless and until all of Contractor's obligations to make payments for labor and materials provided, furnished or supplied in furtherance of the Project have been satisfactorily fulfilled, as determined by Commission, or this bond is otherwise terminated in accordance with its terms or applicable law.
- f. The obligations evidenced herein shall constitute the joint and several obligations of the Contractor, the Surety, and their respective heirs, executors, administrators, successors and assigns.
- g. The provisions of this bond shall be governed by and are intended to be consistent with the laws of the Commonwealth of Virginia. In light of this express choice of law provision, Virginia law for determining governing law shall not apply to the provisions of this bond. The Contractor, for itself and its successors and assigns, and the Surety, for itself and its successors and assigns, do hereby expressly waive any objection that might be interposed as to the right of the Commission to require a bond containing the provisions contained herein, and they do hereby further expressly waive any defense which they or either of them might interpose to any action brought hereon upon the ground that there is no law authorizing the Commission to require the provisions herein.
- h. Wherever possible, each provision of this bond shall be interpreted in such manner as to be effective and valid under applicable law. If any provision of this bond is held illegal or unenforceable in a judicial proceeding, such provision shall be severed and shall be inoperative, and all remaining provisions of this bond shall remain operative and binding on the parties.
- i. This bond shall be construed and interpreted without regard to the identity of the party which drafted its various provisions. Every provision of this bond shall be construed as if all parties participated equally in the drafting of that provision. Any legal principle or rule of construction that a document is to be construed or interpreted against the drafting party shall not be applicable in any legal or other proceeding involving the

provisions of this bond, and such principle or rule is expressly waived by the parties to this bond.

- j. Each party to this bond represents and covenants that the individual executing this bond on its behalf has full, unconditional authority to execute this bond and that, upon the signing of the bond by the authorized individual for each party, this bond shall become binding upon all parties

SIGNED and SEALED this _____ day of _____, 20_____, in the presence of:

Contractor

WITNESS:

By: _____ (Seal)

(Type Name and Title)

Surety

WITNESS:

By: _____ (Seal)

Attorney-In-Fact

(Type Name and Title)

(SURETY: Affix seal and attach current power of attorney)

(Rev 04/05/2012)

GENERAL TERMS AND CONDITIONS

SECTION E

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Part 1 – General Contract Provisions

Section 10 Definition of Terms

When the following terms are used in these specifications, in the contract, or in any documents or other instruments pertaining to construction where these specifications govern, the intent and meaning shall be defined as follows:

Paragraph Number	Term	Definition
10-01	AASHTO	The American Association of State Highway and Transportation Officials.
10-02	Access Road	The right-of-way, the roadway and all improvements constructed thereon connecting the airport to a public roadway.
10-03	Advertisement	A public announcement, as required by local law, inviting bids for work to be performed and materials to be furnished.
10-04	Airport	Airport means an area of land or water which is used or intended to be used for the landing and takeoff of aircraft; an appurtenant area used or intended to be used for airport buildings or other airport facilities or rights of way; airport buildings and facilities located in any of these areas, and a heliport.
10-05	Airport Improvement Program (AIP)	A grant-in-aid program, administered by the Federal Aviation Administration (FAA).
10-06	Air Operations Area (AOA)	The term air operations area (AOA) shall mean any area of the airport used or intended to be used for the landing, takeoff, or surface maneuvering of aircraft. An air operation area shall include such paved or unpaved areas that are used or intended to be used for the unobstructed movement of aircraft in addition to its associated runway, taxiway, or apron.

Paragraph Number	Term	Definition
10-07	Apron	Area where aircraft are parked, unloaded or loaded, fueled and/or serviced.
10-08	ASTM International (ASTM)	Formerly known as the American Society for Testing and Materials (ASTM).
10-09	Award	The Owner's notice to the successful bidder of the acceptance of the submitted bid.
10-10	Bidder	Any individual, partnership, firm, or corporation, acting directly or through a duly authorized representative, who submits a proposal for the work contemplated.
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.

Paragraph Number	Term	Definition
10-16	Contract	A written agreement between the Owner and the Contractor that establishes the obligations of the parties including but not limited to performance of work, furnishing of labor, equipment and materials and the basis of payment. The awarded contract includes but may not be limited to: Advertisement, Contract form, Proposal, Performance bond, payment bond, General provisions, certifications and representations, Technical Specifications, Plans, Supplemental Provisions, standards incorporated by reference and issued addenda.
10-17	Contract Item (Pay Item)	A specific unit of work for which a price is provided in the contract.
10-18	Contract Time	The number of calendar days or working days, stated in the proposal, allowed for completion of the contract, including authorized time extensions. If a calendar date of completion is stated in the proposal, in lieu of a number of calendar or working days, the contract shall be completed by that date.
10-19	Contractor	The individual, partnership, firm, or corporation primarily liable for the acceptable performance of the work contracted and for the payment of all legal debts pertaining to the work who acts directly or through lawful agents or employees to complete the contract work.
10-20	Contractors Quality Control (QC) Facilities	The Contractor's QC facilities in accordance with the Contractor Quality Control Program (CQCP).
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.

Paragraph Number	Term	Definition
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.
10-27	Extra Work	An item of work not provided for in the awarded contract as previously modified by change order or supplemental agreement, but which is found by the Owner's Engineer or Resident Project Representative (RPR) to be necessary to complete the work within the intended scope of the contract as previously modified.
10-28	FAA	The Federal Aviation Administration. When used to designate a person, FAA shall mean the Administrator or their duly authorized representative.
10-29	Federal Specifications	The federal specifications and standards, commercial item descriptions, and supplements, amendments, and indices prepared and issued by the General Services Administration.

Paragraph Number	Term	Definition
10-30	Force Account	<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	<p>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.</p>
10-33	Major and Minor Contract Items	<p>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.</p>
10-34	Materials	<p>Any substance specified for use in the construction of the contract work.</p>

Paragraph Number	Term	Definition
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 the Roanoke Regional 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. Plans may also be referred to as 'contract drawings.'

Paragraph Number	Term	Definition
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.

Paragraph Number	Term	Definition
10-52	Runway Safety Area (RSA)	A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to aircraft. See the construction safety and phasing plan (CSPP) for limits of the RSA.
10-53	Safety Plan Compliance Document (SPCD)	Details how the Contractor will comply with the CSPP.
10-54	Specifications	A part of the contract containing the written directions and requirements for completing the contract work. Standards for specifying materials or testing which are cited in the contract specifications by reference shall have the same force and effect as if included in the contract physically.
10-55	Sponsor	A Sponsor is defined in 49 USC § 47102(24) as a public agency that submits to the FAA for an AIP grant; or a private Owner of a public-use airport that submits to the FAA an application for an AIP grant for the airport.
10-56	Structures	Airport facilities such as bridges; culverts; catch basins, inlets, retaining walls, cribbing; storm and sanitary sewer lines; water lines; underdrains; electrical ducts, manholes, handholes, lighting fixtures and bases; transformers; navigational aids; buildings; vaults; and, other manmade features of the airport that may be encountered in the work and not otherwise classified herein.
10-57	Subgrade	The soil that forms the pavement foundation.
10-58	Superintendent	The Contractor's executive representative who is present on the work during progress, authorized to receive and fulfill instructions from the Engineer, and who shall supervise and direct the construction.

Paragraph Number	Term	Definition
10-59	Supplemental Agreement	A written agreement between the Contractor and the Owner that establishes the basis of payment and contract time adjustment, if any, for the work affected by the supplemental agreement. A supplemental agreement is required if: (1) in scope work would increase or decrease the total amount of the awarded contract by more than 25%; (2) in scope work would increase or decrease the total of any major contract item by more than 25%; (3) work that is not within the scope of the originally awarded contract; or (4) adding or deleting of a major contract item.
10-60	Surety	The corporation, partnership, or individual, other than the Contractor, executing payment or performance bonds that are furnished to the Owner by the Contractor.
10-61	Taxilane	A taxiway designed for low speed movement of aircraft between aircraft parking areas and terminal areas.
10-62	Taxiway	The portion of the air operations area of an airport that has been designated by competent airport authority for movement of aircraft to and from the airport's runways, aircraft parking areas, and terminal areas.
10-63	Taxiway/Taxilane Safety Area (TSA)	A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an aircraft. See the construction safety and phasing plan (CSPP) for limits of the TSA.
10-64	Work	The furnishing of all labor, materials, tools, equipment, and incidentals necessary or convenient to the Contractor's performance of all duties and obligations imposed by the contract, plans, and specifications.

Paragraph Number	Term	Definition
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.
	Owner Defined Terms:	
10-66	ADDENDA	Written or graphic instruments issued prior to the opening of bids which clarify, correct or change the bidding documents or the contract documents and become a part thereof.
10-67	FAA ADVISORY CIRCULAR (AC)	A document prepared by the Federal Aviation Administration to provide guidance and information in a designated aviation related subject area, including standards, materials, and/or methods. The most current edition of ACs, approved by the FAA, can be found on the FAA web site at https://www.faa.gov/regulations_policies/advisory_circulars/
10-68	INSTALL	Unless described otherwise in the plans or specifications, "install" shall mean to furnish the item(s) referenced and to provide all materials, labor, equipment, and tools necessary to establish the referenced items(s) in place and in the correct working order.
10-69	NOTICE OF AWARD	The written notice by the Owner to the apparent low bidder that they are the successful bidder and, that upon compliance with the contract conditions, the Owner intends to execute the contract with the apparent low bidder.
10-70	SHOP DRAWINGS	All drawings, diagrams, illustrations, schedules, and other data which are prepared by the Contractor, a subcontractor, manufacturer, supplier or distributor and which illustrate the equipment, material or some portion of the work. All shop drawings shall be approved by the Contractor and submitted to the Engineer for review and acceptance for reasonable conformance to the contract documents.

Paragraph Number	Term	Definition
10-71	SUBCONTRACTOR	An individual, firm or corporation having a direct contract with the Contractor or with any other subcontractor for the performance of a part of the work at the site.
10-72	SUBSTANTIAL COMPLETION	The work has progressed to the point where, in the opinion of the Owner as evidenced by the Engineer's definitive Certificate of Substantial Completion, it is sufficiently complete in accordance with the contract documents, so that the work can be utilized for the purposes for which it is intended.
10-73	VIRGINIA DEPARTMENT OF TRANSPORTATION ROAD AND BRIDGE SPECIFICATIONS, CURRENT EDITION	The Virginia Department of Transportation Road and Bridge Specifications, current edition, utilized for highway construction. These specifications may be incorporated by reference in some of the technical specifications for this project and shall have the same force and effect as if included in the contract physically.
10-74	VIRGINIA DEPARTMENT OF TRANSPORTATION STANDARD DRAWINGS, CURRENT EDITION	The Virginia Department of Transportation Standard Drawings, current edition, utilized for highway construction. These standards may be incorporated by reference in some of the plans and technical specifications for this project and shall have the same force and effect as if included in the contract physically.

END OF SECTION 10

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Section 20 Proposal Requirements and Conditions

20-01 Advertisement (Notice to Bidders).

A copy of the advertisement for the project has been incorporated in the front of these specifications.

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*.

Mobilization is limited to 10 percent of the total project cost.

A prebid conference will be held for 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 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 with regard to the character, quality, and quantities of work to be performed, materials to be furnished, and to the requirements of the proposed contract. The submission of a proposal shall be prima facie evidence that the bidder has made such examination and is satisfied to the conditions to be encountered in performing the work and the requirements of the proposed contract, plans, and specifications.

Boring logs and other records of subsurface investigations and tests are available for inspection of bidders. It is understood and agreed that such subsurface information, whether included in the plans, specifications, or otherwise made available to the bidder, was obtained and is intended for the Owner's design and estimating purposes only. Such information has been made available for the convenience of all bidders. It is further understood and agreed that each bidder is solely responsible for all assumptions, deductions, or conclusions which the bidder may make or obtain from their own examination of the boring logs and other records of subsurface investigations and tests that are furnished by the Owner.

20-07 Preparation of proposal. See Instructions to Bidders.

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. See Instructions to Bidders.

20-11 Delivery of proposal. See Instructions to Bidders.

20-12 Withdrawal or revision of proposals. See Instructions to Bidders.

20-13 Withdrawal or revision of proposals. See Instructions to Bidders.

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. See Instructions to Bidders.

END OF SECTION 20

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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. See General Conditions.

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. See Instructions to Bidders.

30-07 Approval of contract. See Instructions to Bidders.

30-08 Failure to execute contract. See Instructions to Bidders.

END OF SECTION 30

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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 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 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 Engineer's opinion, is necessary for completion of the extra work.

When determined by the Engineer to be in the Owner's best interest, the Engineer 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, Engineer 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 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.

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 Engineer 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 Engineer; 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 Engineer's approval in advance of such use.

Should the Engineer 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 Engineer 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 Engineer. The Engineer has final authority regarding the interpretation of project specification requirements. The Engineer 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 Engineer 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 Engineer 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 Engineer will advise the Owner of their determination that the affected work be accepted and remain in place. The Engineer 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 Engineer 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 Engineer'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 Engineer'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 Engineer'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 Engineer 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 Engineer 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 Engineer for an interpretation and decision, and such decision shall be final.

The Contractor shall not take advantage of any apparent error or omission on the plans or specifications. In the event the Contractor discovers any apparent error or discrepancy, Contractor shall immediately notify the Owner or the designated representative in writing requesting their written interpretation and decision.

50-04 List of Special Provisions. See the Special Provisions section of the specification.

50-05 Cooperation of Contractor. The Contractor shall be supplied with four hard copies or an electronic PDF of the plans and specifications. The Contractor shall have available on the construction site at all times one hardcopy each of the plans and specifications. Additional hard copies of plans and specifications may be obtained by the Contractor for the cost of reproduction.

The Contractor shall give constant attention to the work to facilitate the progress thereof and shall cooperate with the Engineer 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 Engineer or their authorized representative.

50-06 Cooperation between Contractors. See General Conditions.

50-07 Construction layout and stakes. The Engineer 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 the Engineer. 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 Engineer 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 Engineer. The Contractor is responsible to establish all layout required for the construction of the project.

Copies of survey notes will be provided to the Engineer for each area of construction and for each placement of material as specified to allow the Engineer 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 Engineer 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 2018 or newer.

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 Engineer 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 Engineer 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 Engineer 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 Engineer 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 Engineer 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. See General Conditions.

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 Engineer 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 Engineer'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. See General Conditions.

50-15 Final acceptance. See General Conditions.

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 Engineer 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 Engineer 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 Engineer 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 Engineer who will present it to the Owner for consideration in accordance with local laws or ordinances.

Nothing in this subsection shall be construed as a waiver of the Contractor's right to dispute final payment based on differences in measurements or computations.

END OF SECTION 50

Section 60 Control of Materials

60-01 Source of supply and quality requirements. The materials used in the work shall conform to the requirements of the contract, plans, and specifications. Unless otherwise specified, such materials that are manufactured or processed shall be new (as compared to used or reprocessed).

In order to expedite the inspection and testing of materials, the Contractor shall furnish documentation to the Engineer 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 Engineer'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 Engineer before incorporation in the work unless otherwise designated. Any work in which untested materials are used without approval or written permission of the Engineer 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 Engineer, 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 Engineer. 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 Engineer.

A copy of all Contractor QC test data shall be provided to the Engineer 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 Engineer showing all test data reports, plus an analysis of all results showing ranges, averages, and corrective action taken on all failing tests.

The Contractor shall employ a Quality Control (QC) testing organization to perform all Contractor required QC tests in accordance with Item C-100 Contractor Quality Control Program (CQCP).

60-03 Certification of compliance/analysis (COC/COA). The Engineer 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 Engineer.

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 Engineer shall be the sole judge as to whether the proposed “or equal” is suitable for use in the work.

The Engineer reserves the right to refuse permission for use of materials or assemblies on the basis of certificates of compliance.

60-04 Plant inspection. The Engineer 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 Engineer conduct plant inspections, the following conditions shall exist:

- a. The Engineer shall have the cooperation and assistance of the Contractor and the producer with whom the Contractor has contracted for materials.
- b. The Engineer 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 Engineer, 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 Engineer 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.

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 Engineer. 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 Engineer. 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 Engineer 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 Engineer.

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 Engineer 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:~~

A LISTING OF UTILITIES OR OTHER FACILITIES WHICH MAY BE ENCOUNTERED DURING THE WORK HAS BEEN PROVIDED BELOW.

Facility or Utility	Person to Contact (Name and Title)	Telephone/Email
Airport Operations	BJ Nipper	(540) 797-3094
FAA NAVAIDS / FAA Sector Field Office	Arnold Fouch	(540) 265-2294
Airfield Runway and Taxiway Lighting	Jay Ball	(540) 362-1999
FAA Control Tower	Trisha Newberry	(540) 265-2280
National Weather Service	William Riehl	(540) 552-0084
Virginia 811 / Miss Utility of Virginia	N/A	811 or 1-800-552-7001 www.va811.com
Verizon	Business Office	(800) 837-4966
Appalachian Power Company	Business Office	(800) 956-4237
Roanoke Gas Co.	Gas Leak Reporting	(540) 777-0623
Cox Cable Roanoke	Technical Support	(866) 272-5111

Except as AUTHORIZED BY THE OWNER 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 Engineer.

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 Engineer, 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 Engineer. If the Engineer 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 Engineer 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 included in the Appendices.

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. If it is necessary for the Contractor to complete portions of the contract work for the beneficial occupancy of the Owner prior to completion of the entire contract, such “phasing” of the work ~~must be specified below and~~ SHALL BE indicated on the approved Construction Safety and Phasing Plan (CSPP) and the project plans. When so specified, the Contractor shall complete such portions of the work on or before the date specified or as otherwise specified.

Upon completion of any portion of work ~~listed above~~ INDICATED IN THE CSPP AND THE PROJECT PLANS, 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 Engineer, 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 Engineer'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.

See paragraph 70-04 for a list of all known services or utility providers with associated contact information.

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 Engineer.

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 Engineer.

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 Engineer 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 Engineer continuously until such damage has been repaired and service restored to the satisfaction of the utility or facility owner.

The Contractor shall bear all costs of damage and restoration of service to any utility service or facility due to their operations whether due to negligence or accident. The Owner reserves the right to deduct such costs from any monies due or which may become due the Contractor, or their own surety.

70-15.1 FAA facilities and cable runs. The Contractor is hereby advised that the construction limits of the project include existing facilities and buried cable runs that are owned, operated and maintained by the FAA. The Contractor, during the execution of the project work, shall comply with the following:

a. The Contractor shall permit FAA maintenance personnel the right of access to the project work site for purposes of inspecting and maintaining all existing FAA owned facilities.

b. The Contractor shall provide notice to the FAA Air Traffic Organization (ATO)/Technical Operations/System Support Center (SSC) Point-of-Contact through the airport Owner 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 Engineer. The Engineer 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. See General Conditions and Contract Forms.

END OF SECTION 70

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 Engineer.

The Contractor shall perform, with his organization, an amount of work equal to at least 51 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 Engineer 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). See General Conditions.

80-03 Execution and progress. Unless otherwise specified, the Contractor shall submit their coordinated construction schedule showing all work activities for the Engineer's review and acceptance at least 10 days prior to the start of work. The Contractor's progress schedule, once accepted by the Engineer, will represent the Contractor's baseline plan to accomplish the project in accordance with the terms and conditions of the Contract. The Engineer 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 Engineer'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 Engineer at least 48 hours in advance of resuming operations.

The Contractor shall not commence any actual construction prior to the date on which the NTP is issued by the Owner.

The project schedule shall be prepared as a network diagram in Critical Path Method (CPM), Program Evaluation and Review Technique (PERT), or other format, or as otherwise specified. It shall include information on the sequence of work activities, milestone dates, and activity duration. The schedule shall

show all work items identified in the project proposal for each work area and shall include the project start date and end date.

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 Engineer) at least 48 hours prior to commencement of such work. The Contractor shall not close an AOA until so authorized by the Engineer 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 DETAILED IN THE CONSTRUCTION SAFETY AND PHASING PLAN. ~~follows:~~

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 Engineer, does not perform his work in a proper and skillful manner or is intemperate or disorderly shall, at the written request of the Engineer, 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 Engineer.

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 Engineer 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 Engineer. 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 Engineer 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 Engineer 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 Engineer 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 Engineer within the time period stated in the Engineer's order to resume work. The Contractor shall submit with their own claim information substantiating the amount shown on the claim. The Engineer 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.

Schedule	Liquidated Damages Cost	Allowed Construction Time
SEE PLANS		

~~The maximum construction time allowed for Schedules [] will be the sum of the time allowed for individual schedules but not more than [] 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. See General Conditions.

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 Engineer.

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 Engineer 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

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Section 90 Measurement and Payment

90-01 Measurement of quantities. All work completed under the contract will be measured by the Engineer, 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 Engineer.

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 Engineer 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 Engineer 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 Engineer. 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 Engineer 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.

Term	Description
<p>Scales</p>	<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 the Engineer 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 Engineer 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>

Term	Description
Rental Equipment	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 Payment for Extra Work.
Pay Quantities	When the estimated quantities for a specific portion of the work are designated as the pay quantities in the contract, they shall be the final quantities for which payment for such specific portion of the work will be made, unless the dimensions of said portions of the work shown on the plans are revised by the Engineer. If revised dimensions result in an increase or decrease in the quantities of such work, the final quantities for payment will be revised in the amount represented by the authorized changes in the dimensions.

90-02 Scope of payment. The Contractor shall receive and accept compensation provided for in the contract as full payment for furnishing all materials, for performing all work under the contract in a complete and acceptable manner, and for all risk, loss, damage, or expense of whatever character arising out of the nature of the work or the execution thereof, subject to the provisions of Section 70, paragraph 70-18, *No Waiver of Legal Rights*.

When the “basis of payment” subsection of a technical specification requires that the contract price (price bid) include compensation for certain work or material essential to the item, this same work or material will not also be measured for payment under any other contract item which may appear elsewhere in the contract, plans, or specifications.

90-03 Compensation for altered quantities. When the accepted quantities of work vary from the quantities in the proposal, the Contractor shall accept as payment in full, so far as contract items are concerned, payment at the original contract price for the accepted quantities of work actually completed and accepted. No allowance, except as provided for in Section 40, paragraph 40-02, *Alteration of Work and Quantities*, will be made for any increased expense, loss of expected reimbursement, or loss of anticipated profits suffered or claimed by the Contractor which results directly from such alterations or indirectly from their own unbalanced allocation of overhead and profit among the contract items, or from any other cause.

90-04 Payment for omitted items. As specified in Section 40, paragraph 40-03, *Omitted Items*, the Engineer 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 Engineer 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 Engineer’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 Engineer’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 Engineer'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 Engineer, 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, five (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 Engineer 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. Payments to Subcontractors. See General Conditions.

c. When at least 95% of the work has been completed to the satisfaction of the Engineer, the Engineer 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 Engineer 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 Engineer at or on an approved site.
- b. The Contractor has furnished the Engineer with acceptable evidence of the quantity and quality of such stored or stockpiled materials.
- c. The Contractor has furnished the Engineer 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 Engineer will prepare the final estimate of the items of work actually performed. The Contractor shall approve the Engineer's final estimate or advise the Engineer 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 Engineer 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 Engineer's final estimate. If, after such 30-day period, a dispute still exists, the

Contractor may approve the Engineer'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 Engineer's final estimate, and after the Engineer's receipt of the project closeout documentation required in paragraph 90-11, *Contractor Final Project Documentation*, final payment will be processed based on the entire sum, or the undisputed sum in case of approval under protest, determined to be due the Contractor less all previous payments and all amounts to be deducted under the provisions of the contract. All prior partial estimates and payments shall be subject to correction in the final estimate and payment.

If the Contractor has filed a claim for additional compensation under the provisions of Section 50, paragraph 50-16, *Claims for Adjustments and Disputes*, or under the provisions of this paragraph, such claims will be considered by the Owner in accordance with local laws or ordinances. Upon final adjudication of such claims, any additional payment determined to be due the Contractor will be paid pursuant to a supplemental final estimate.

90-10 Construction warranty.

a. In addition to any other warranties in this contract, the Contractor warrants that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, workmanship, or design furnished, or performed by the Contractor or any subcontractor or supplier at any tier.

b. This warranty shall continue for a period of one year from the date of final acceptance of the work, except as noted. If the Owner takes possession of any part of the work before final acceptance, this warranty shall continue for a period of one year from the date the Owner takes possession. However, this will not relieve the Contractor from corrective items required by the final acceptance of the project work. Light Emitting Diode emitting diode (LED) light fixtures with the exception of obstruction lighting, must be warranted by the manufacturer for a minimum of four (4) years after date of installation inclusive of all electronics.

c. The Contractor shall remedy at the Contractor's expense any failure to conform, or any defect. In addition, the Contractor shall remedy at the Contractor's expense any damage to Owner real or personal property, when that damage is the result of the Contractor's failure to conform to contract requirements; or any defect of equipment, material, workmanship, or design furnished by the Contractor.

d. The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for one year from the date of repair or replacement.

e. The Owner will notify the Contractor, in writing, within seven (7) days after the discovery of any failure, defect, or damage.

f. If the Contractor fails to remedy any failure, defect, or damage within 14 days after receipt of notice, the Owner shall have the right to replace, repair, or otherwise remedy the failure, defect, or damage at the Contractor's expense.

g. With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall: (1) Obtain all warranties that would be given in normal commercial practice; (2) Require all warranties to be executed, in writing, for the benefit of the Owner, as directed by the Owner, and (3) Enforce all warranties for the benefit of the Owner.

h. This warranty shall not limit the Owner's rights with respect to latent defects, gross mistakes, or fraud.

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 Engineer 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

Federal Contract Provisions for AIP-Funded Projects

Federal laws and regulations require that a Sponsor (a recipient of federal assistance) include specific provisions in certain contracts, solicitations, or specifications, regardless of whether the project is federally funded, to remain compliant with its obligations.

Unless otherwise stated, the following federally required contract provisions also flow down to subcontracts and sub-tier agreements. The Contractor (including all subcontractors) is required to insert these contract provisions in each lower tier contract (e.g., subcontract or sub-agreement). For work done under any purchase orders, rental agreements, and other agreements for supplies or services, the Contractor (including all subcontractors) is required to incorporate the requirements of these contract provisions by reference.

The prime Contractor is responsible for compliance with these contract provisions by any subcontractor, lower-tier subcontractor, or service provider.

A1: ACCESS TO RECORDS AND REPORTS

Sources: *2 CFR § 200.334; 2 CFR § 200.337; FAA Order 5100.38*

Contract Dollar Threshold: \$0

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.

A2: AFFIRMATIVE ACTION REQUIREMENT: NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY

Sources: *41 CFR Part 60-4; Executive Order 11246*

Contract Dollar Threshold: \$10,000

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:	10.2%
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 nonfederally 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 Roanoke County, Roanoke City, Virginia.

A3: BREACH OF CONTRACT TERMS

Source: *2 CFR § 200 Appendix II (A)*

Contract Dollar Threshold: \$250,000

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

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

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

A4: BUY AMERICAN PREFERENCE

Sources: *Title 49 USC § 50101; Executive Order 14005, Ensuring the Future is Made in All of America by All of America's Workers; Bipartisan Infrastructure Law (Pub. L. No. 117-58), Build America, Buy America (BABA)*

Contract Dollar Threshold: \$0

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

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

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

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

Certification of Compliance with FAA Buy American Preference – Construction Projects

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

- Bidder or offeror hereby certifies that it will comply with 49 USC § 50101, BABA and other related U.S. statutes, guidance, and policies of the FAA by:
- a) Only installing iron, steel and manufactured products produced in the United States;
 - b) Only installing construction materials defined as: an article, material, or supply – other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives that are or consist primarily of non-ferrous metals; plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables); glass (including optic glass); lumber or drywall that have been manufactured in the United States.
 - c) Installing manufactured products for which the Federal Aviation Administration (FAA) has issued a waiver as indicated by inclusion on the current FAA Nationwide Buy American Waivers Issued listing; or
 - d) Installing products listed as an Excepted Article, Material or Supply in Federal Acquisition Regulation Subpart 25.108.
- By selecting this certification statement, the bidder or offeror agrees:
- a) To provide to the Airport Sponsor or the FAA evidence that documents the source and origin of the iron, steel, and/or manufactured product.
 - b) To faithfully comply with providing U.S. domestic products.
 - c) To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.
 - d) Certify that all construction materials used in the project are manufactured in the U.S. The bidder or offeror hereby certifies it cannot comply with the 100 percent Buy American Preferences of 49 USC § 50101(a) but may qualify for a Type 3 or Type 4 waiver under 49 USC § 50101(b). By selecting this certification statement, the apparent bidder or offeror with the apparent low bid agrees:
 - a) To submit to the Airport Sponsor or FAA within 15 calendar days of being selected as the responsive bidder, a formal waiver request and required documentation that supports the type of waiver being requested.
 - b) That failure to submit the required documentation within the specified timeframe is cause for a non-responsive determination that may result in rejection of the proposal.
 - c) To faithfully comply with providing U.S. domestic products at or above the approved U.S. domestic content percentage as approved by the FAA.
 - d) To furnish U.S. domestic product for any waiver request that the FAA rejects.
 - e) To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.

Required Documentation

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

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

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

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

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

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

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

Date

Signature

Company Name

Title

A5: GENERAL CIVIL RIGHTS PROVISIONS

Source: *49 USC § 47123*

Contract Dollar Threshold: \$0

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

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

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

A6: TITLE VI SOLICITATION NOTICE

Sources: *49 USC § 47123; FAA Order 1400.11*

Contract Dollar Threshold: \$0

The Roanoke Regional Airport Commission, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 USC §§ 2000d to 2000d-4) and the Regulations, hereby notifies all bidders or offerors that it will affirmatively ensure that for any contract entered into pursuant to this advertisement, businesses (including disadvantaged business enterprises) will be afforded full and fair opportunity to submit bids in response to this invitation and no businesses will be discriminated against on the grounds of race, color, national origin (including limited English proficiency), creed, sex (including sexual orientation and gender identity), age, or disability in consideration for an award.

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 (Nondiscrimination on the Basis of Disability in Programs or Activities Receiving Federal Financial Assistance);
- 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 § 47123), as amended (prohibits discrimination based on race, creed, color, national origin, or sex);

- The Civil Rights Restoration Act of 1987 (PL 100-259) (broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, the Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms “programs or activities” to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);
- Titles II and III of the Americans with Disabilities Act of 1990 (42 USC § 12101, et seq) (prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities) as implemented by U.S. Department of Transportation regulations at 49 CFR parts 37 and 38;
- 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 (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. 74087 (2005)];
- 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).

Compliance with Nondiscrimination Requirements

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

1. **Compliance with Regulations:** The Contractor (hereinafter includes consultants) will comply with the Title VI List of Pertinent Nondiscrimination Acts and Authorities, as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.
2. **Nondiscrimination:** The Contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, national origin (including limited English proficiency), creed, sex (including sexual orientation and gender identity), age, or disability in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The Contractor will not participate directly or indirectly in the discrimination prohibited by the Nondiscrimination Acts and Authorities, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR part 21.

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.

A7: CLEAN AIR AND WATER POLLUTION CONTROL

Sources: *2 CFR § 200 Appendix II (G); 42 USC § 7401, et seq; 33 USC § 1251, et seq*

Contract Dollar Threshold: \$150,000

Contractor agrees to comply with all applicable standards, orders, and regulations issued pursuant to the Clean Air Act (42 USC §§ 7401-7671q) and the Federal Water Pollution Control Act as amended (33 USC §§ 1251-1387). The Contractor agrees to report any violation to the Owner immediately upon discovery. The Owner assumes responsibility for notifying the Environmental Protection Agency (EPA) and the Federal Aviation Administration.

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

A8: CONTRACT WORKHOURS AND SAFETY STANDARDS ACT REQUIREMENTS

Sources: *2 CFR § 200, Appendix II (E); 2 CFR § 5.5(b); 40 USC § 3702; 40 USC § 3704*

Contract Dollar Threshold: \$100,000

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 \$29 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.

A9: COPELAND “ANTI-KICKBACK” ACT

Sources: *2 CFR Part 200, Appendix II(D); 29 CFR Parts 3 and 5*

Contract Dollar Threshold: \$2,000

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. The 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 covered work during the prior week. The Owner must report any violations of the Act to the Federal Aviation Administration.

A10: DAVIS-BACON REQUIREMENTS

Sources: 2 CFR Part 200, Appendix II(D); 29 CFR Part 5; 49 USC § 47112(b); 40 USC §§ 3141-3144, 3146, and 3147

Dollar Threshold: \$2,000

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 § 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, U.S. Department of Labor,

Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

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

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

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

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

2. Withholding.

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

3. Payrolls and Basic Records.

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

(ii)(A) The Contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the Federal Aviation Administration if the agency is a party to the contract, but if the agency is not such a party, the Contractor will submit the payrolls to the applicant, Sponsor, or Owner, as the case may be, for transmission to the Federal Aviation Administration. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR § 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead, the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <https://www.dol.gov/agencies/whd/government-contracts/construction/payroll-certification> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker and shall provide them upon request to the Federal Aviation Administration if the agency is a party to the contract, but if the agency is not such a party, the Contractor will submit them to the applicant, Sponsor, or Owner, as the case may be, for transmission to the Federal Aviation Administration, the Contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the sponsoring government agency (or the applicant, Sponsor, or Owner).

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

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

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

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

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (3)(ii)(B) of this section.

(D) The falsification of any of the above certifications may subject the Contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.

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

4. Apprentices and Trainees.

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

(ii) Trainees. Except as provided in 29 CFR § 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at 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 §§ 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 § 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.

A11: DEBARMENT AND SUSPENSION

Sources: *2 CFR Part 180 (Subpart B); 2 CFR Part 200, Appendix II(H); 2 CFR Part 1200; DOT Order 4200.5; Executive Orders 12549 and 12689*

Contract Dollar Threshold: \$25,000

Certification of Offeror/Bidder Regarding Debarment

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

Certification of Lower Tier Contractors Regarding Debarment

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

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

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

A12: DISADVANTAGED BUSINESS ENTERPRISES REQUIRED PROVISIONS

Source: *49 CFR Part 26*

Dollar Threshold: \$0

A12.1: Proposal Requirements

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

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

- 1) The names and addresses of Disadvantaged Business Enterprise (DBE) firms that will participate in the contract;
- 2) A description of the work that each DBE firm will perform;
- 3) The dollar amount of the participation of each DBE firm listed under (1);
- 4) Written statement from Bidder or Offeror that attests their commitment to use the DBE firm(s) listed under (1) to meet the Owner’s project goal
- 5) Written confirmation from each listed DBE firm that it is participating in the contract in the kind and amount of work provided in the prime contractor's commitment; and

- 6) If Bidder or Offeror cannot meet the advertised project DBE goal, evidence of good faith efforts undertaken by the Bidder or Offeror as described in appendix A to 49 CFR part 26. The documentation of good faith efforts must include copies of each DBE and non-DBE subcontractor quote submitted to the bidder when a non-DBE subcontractor was selected over a DBE for work on the contract.

A12.2: Prime Contracts Covered by a DBE Program

Contract Assurance (49 CFR § 26.13)

The Contractor, subrecipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The Contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of DOT-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 recipient deems appropriate, which may include, but is not limited to:

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

Prompt Payment (49 CFR § 26.29)

The prime contractor agrees to pay each subcontractor under this prime contract for satisfactory performance of its contract no later than seven (7) days from the receipt of each payment the prime contractor receives from the Roanoke Regional Airport Commission. The prime contractor agrees further to return retainage payments to each subcontractor within 30 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 Roanoke Regional Airport Commission. This clause applies to both DBE and non-DBE subcontractors.

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

The prime contractor must not terminate a DBE subcontractor listed in response to the solicitation as required in A12.1 (or an approved substitute DBE firm) without prior written consent of the Roanoke Regional Airport Commission. This includes, but is not limited to, instances in which the prime contractor seeks to perform work originally designated for a DBE subcontractor with its own forces or those of an affiliate, a non-DBE firm, or with another DBE firm.

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

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

Before transmitting to the Roanoke Regional Airport Commission its request to terminate and/or substitute a DBE subcontractor, the prime contractor must give notice in writing to the DBE

subcontractor, with a copy to the Roanoke Regional Airport Commission, of its intent to request to terminate and/or substitute, and the reason for the request.

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

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

A13: TEXTING WHEN DRIVING

Sources: *Executive Order 13513; DOT Order 3902.10*

Contract Dollar Threshold: \$10,000

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 \$10,000 that involve driving a motor vehicle in performance of work activities associated with the project.

A14: PROHIBITION ON CERTAIN TELECOMMUNICATIONS AND VIDEO SURVEILLANCE SERVICES OR EQUIPMENT

Sources: *2 CFR § 200, Appendix II(K); 2 CFR § 200.216*

Contract Dollar Threshold: \$0

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

A15: DRUG-FREE WORKPLACE REQUIREMENTS

Sources: *49 CFR Part 32; Drug-Free Workplace Act of 1988 (41 USC § 8101-8106, as amended)*

Not applicable to this contract.

A16: EQUAL OPPORTUNITY CLAUSE

Sources: 2 CFR 200, Appendix II(C); 41 CFR § 60-1.4; 41 CFR § 60-4.3; Executive Order 11246

Contract Dollar Threshold: \$10,000

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, sexual orientation, gender identity, 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 identity, 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 consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.
- (3) The contractor will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with the contractor's legal duty to furnish information.
- (4) 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 by the agency contracting officer, advising the labor union or workers' representative of the Contractor's commitments under this section 202 of Executive Order 11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- (5) 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.
- (6) The Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the contracting agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
- (7) In the event of the Contractor's noncompliance with the nondiscrimination clauses of this contract or with any such 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 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.

(8) The Contractor will include the provisions of paragraphs (1) through (8) 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 may be directed by the Secretary of Labor as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, that in the event the contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction, 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 must 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 geographical areas 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 nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must 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 therefor, 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 woman 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 work force.
- 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 nonsegregated 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 group 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, the Contractor may be in violation of the Executive Order if a 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, sexual orientation, gender identity, 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 numbers, 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).

A17: FEDERAL FAIR LABOR STANDARDS ACT (FEDERAL MINIMUM WAGE)

Sources: *29 USC § 201, et seq; 2 CFR § 200.430*

Contract Dollar Threshold: \$0

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

The Contractor has full responsibility to monitor compliance with 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.

A18: CERTIFICATION REGARDING LOBBYING

Source: *31 USC §1352 - Byrd Anti-Lobbying Amendment; 2 CFR Part 200 Appendix II(I); 49 CFR Part 20, Appendix A*

Contract Dollar Threshold: \$100,000

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.

A19: PROHIBITION OF SEGREGATED FACILITIES

Sources: *2 CFR Part 200, Appendix II(C); 41 CFR Part 60-1*

Contract Dollar Threshold: \$0

(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, sexual orientation, gender identity, or national origin because of written or oral policies or employee custom. The term does not include separate or single-user restrooms 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.

A20: OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970

Source: *29 CFR Part 1910*

Contract Dollar Threshold: \$0

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 (29 CFR Part 1910). The employer must address any claims or disputes that pertain to a referenced requirement directly with the U.S. Department of Labor – Occupational Safety and Health Administration.

A21: PROCUREMENT OF RECOVERED MATERIALS

Sources: *2 CFR § 200.323; 2 CFR Part 200, Appendix II(J); 40 CFR Part 247; 42 USC § 6901, et seq (Resource Conservation and Recovery Act (RCRA))*

Contract Dollar Threshold: \$10,000

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

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

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

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

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

A22: RIGHT TO INVENTIONS

Sources: *2 CFR Part 200, Appendix II(F); 37 CFR Part 401*

Contract Dollar Threshold: \$0

Contracts or agreements that include the performance of experimental, developmental, or research work must provide for the rights of the Federal Government and the Owner in any resulting invention as established by 37 CFR part 401, Rights to Inventions Made by Non-profit Organizations and Small Business Firms under Government Grants, Contracts, and Cooperative Agreements. This contract incorporates by reference the patent and inventions rights as specified within 37 CFR § 401.14. Contractor must include this requirement in all sub-tier contracts involving experimental, developmental, or research work.

A23: SEISMIC SAFETY

Source: *49 CFR Part 41*

Contract Dollar Threshold: \$0

The Contractor agrees to ensure that all work performed under this contract, including work performed by subcontractors, conforms to a building code standard that provides a level of seismic safety substantially equivalent to standards established by the National Earthquake Hazards Reduction Program (NEHRP).

Local building codes that model their code after the current version of the International Building Code (IBC) meet the NEHRP equivalency level for seismic safety.

A24: CERTIFICATION OF OFFEROR/BIDDER REGARDING TAX DELINQUENCY AND FELONY CONVICTIONS

Sources: *Section 8113 of the Consolidated Appropriations Act, 2022 (Public Law 117-103) and similar provisions in subsequent appropriations acts; DOT Order 4200.6 – Appropriations Act Requirements for Procurement and Non-Procurement Regarding Tax Delinquency and Felony Convictions*

Contract Dollar Threshold: \$0

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

- 1) 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.
- 2) The applicant represents that it is () is not () a corporation that was convicted of a criminal violation under any Federal law within the preceding 24 months.

Note

If 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 USC § 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.

A25: TERMINATION OF CONTRACT

Sources: 2 CFR § 200 Appendix II (B); FAA Advisory Circular 150/5370-10, Section 80-09

Contract Dollar Threshold: \$10,000

Termination for Convenience

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

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

Owner agrees to pay Contractor for:

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

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

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

Termination for Cause (Construction)

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

A26: TRADE RESTRICTION CERTIFICATION

Sources: *49 USC §50104; 49 CFR Part 30*

Contract Dollar Threshold: \$0

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

- 1) is not owned or controlled by one or more citizens of a foreign country included in the list of countries that discriminate against U.S. firms as published by the Office of the United States Trade Representative (USTR);
- 2) has not knowingly entered into any contract or subcontract for this project with a person that is a citizen or national of a foreign country included on the list of countries that discriminate against U.S. firms as published by the USTR; and
- 3) has not entered into any subcontract for any product to be used on the Federal project that is produced in a foreign country included on the list of countries that discriminate against U.S. firms published by the USTR.

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

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

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

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

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

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

This certification is a material representation of fact upon which reliance was placed when making an award. If it is later determined that the Contractor or subcontractor knowingly rendered an erroneous

certification, the Federal Aviation Administration (FAA) may direct through the Owner cancellation of the contract or subcontract for default at no cost to the Owner or the FAA.

A27: VETERAN'S PREFERENCE

Source: *49 USC § 47112(c)*

Contract Dollar Threshold: \$0

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.

A28: CERTIFICATION REGARDING DOMESTIC PREFERENCES FOR PROCUREMENTS

Sources: *2 CFR § 200.322; 2 CFR Part 200, APPENDIX II(L)*

Contract Dollar Threshold: \$0

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

End of Federal Contract Provisions for AIP-Funded Projects

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Davis-Bacon Wage Rates

for

Rehabilitate Taxiway B from Taxiway B1 to B4

at

Roanoke-Blacksburg Regional Airport

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Superseded General Decision Number: VA20240188

State: Virginia

Construction Type: Highway

Counties: Roanoke, Roanoke* and Salem* Counties in Virginia.

*including the independent cities of Roanoke and Salem

HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects & railroad construction; bascule, suspension & spandrel arch bridges designed for commercial navigation, bridges involving marine construction; and other major bridges).

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	. Executive Order 14026 generally applies to the contract. . The contractor must pay all covered workers at least \$17.75 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 2025.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	. Executive Order 13658 generally applies to the contract. . The contractor must pay all covered workers at least \$13.30 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2025.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at <http://www.dol.gov/whd/govcontracts>.

Modification Number Publication Date
 0 01/03/2025

ELEC0080-011 12/01/2021

	Rates	Fringes
ELECTRICIAN, Includes Traffic Signalization.....	\$ 30.55	11.51

 SUVA2016-073 07/02/2018

	Rates	Fringes
CARPENTER, Includes Form Work....	\$ 17.65 **	0.00
CEMENT MASON/CONCRETE FINISHER...	\$ 19.94	0.00
IRONWORKER, REINFORCING.....	\$ 22.71	0.00
IRONWORKER, STRUCTURAL.....	\$ 27.38	0.00
LABORER: Asphalt, Includes Raker, Shoveler, Spreader and Distributor.....	\$ 15.40 **	0.00
LABORER: Common or General.....	\$ 14.34 **	0.00
LABORER: Grade Checker.....	\$ 15.07 **	0.00
LABORER: Pipelayer.....	\$ 13.14 **	0.00
LABORER: Power Tool Operator....	\$ 15.69 **	0.00
OPERATOR: Backhoe/Excavator/Trackhoe.....	\$ 17.29 **	0.34
OPERATOR: Bobcat/Skid Steer/Skid Loader.....	\$ 19.16	4.45
OPERATOR: Broom/Sweeper.....	\$ 14.32 **	0.25
OPERATOR: Crane.....	\$ 25.82	0.00
OPERATOR: Drill.....	\$ 24.66	0.00
OPERATOR: Gradall.....	\$ 18.65	0.00
OPERATOR: Grader/Blade.....	\$ 26.13	0.00
OPERATOR: Hydroseeder.....	\$ 16.64 **	0.00
OPERATOR: Loader.....	\$ 15.86 **	0.00
OPERATOR: Mechanic.....	\$ 20.00	0.00
OPERATOR: Milling Machine.....	\$ 23.12	3.60
OPERATOR: PAVEMENT PLANER.....	\$ 17.01 **	0.00
OPERATOR: Paver (Asphalt, Aggregate, and Concrete).....	\$ 16.85 **	0.00

OPERATOR: Piledriver.....	\$ 21.83	4.08
OPERATOR: Roller (Finishing)....	\$ 14.31 **	0.00
OPERATOR: Roller.....	\$ 14.81 **	0.00
OPERATOR: Screed.....	\$ 22.13	4.89
OPERATOR: Asphalt Spreader and Distributor.....	\$ 16.44 **	0.00
OPERATOR: Bulldozer, Including Utility.....	\$ 17.81	0.00
TRAFFIC CONTROL: Flagger.....	\$ 11.84 **	0.00
TRUCK DRIVER : HEAVY 7CY & UNDER.....	\$ 15.36 **	0.00
TRUCK DRIVER: 1/Single Axle Truck.....	\$ 15.95 **	0.00
TRUCK DRIVER: Fuel and Lubricant Service.....	\$ 18.25	0.00
TRUCK DRIVER: HEAVY OVER 7 CY.....	\$ 16.60 **	0.00
TRUCK DRIVER: MULTI AXLE.....	\$ 17.53 **	0.00

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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 ** Workers in this classification may be entitled to a higher minimum wage under Executive Order 14026 (\$17.75) or 13658 (\$13.30). Please see the Note at the top of the wage determination for more information. Please also note that the minimum wage requirements of Executive Order 14026 are not currently being enforced as to any contract or subcontract to which the states of Texas, Louisiana, or Mississippi, including their agencies, are a party.

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 <https://www.dol.gov/agencies/whd/government-contracts>.

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) (iii)).

The body of each wage determination lists the classifications and wage rates that have been found to be prevailing for the type(s) of construction and geographic area covered by the wage determination. The classifications are listed in alphabetical order under rate identifiers indicating whether the particular rate is a union rate (current union negotiated rate), a survey rate, a weighted union average rate, a state adopted rate, or a supplemental classification rate.

Union Rate Identifiers

A four-letter identifier beginning with characters other than ""SU"", ""UAVG"", ?SA?, or ?SC? denotes that a union rate was prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2024. PLUM is an identifier of the union whose collectively bargained rate 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. The date, 07/01/2024 in the example, is the effective date of the most current negotiated rate.

Union prevailing wage rates are updated to reflect all changes over time that are reported to WHD in the rates in the collective bargaining agreement (CBA) governing the classification.

Union Average Rate Identifiers

The UAVG identifier indicates that no single rate prevailed for those classifications, but that 100% of the data reported for the classifications reflected union rates. EXAMPLE: UAVG-OH-0010 01/01/2024. UAVG indicates that the rate is a weighted union average rate. OH indicates the State of Ohio. The next number, 0010 in the example, is an internal number used in producing the wage determination. The date, 01/01/2024 in the example, indicates the date the wage determination was updated to reflect the most current union average rate.

A UAVG rate will be updated once a year, usually in January, to reflect a weighted average of the current rates in the collective bargaining agreements on which the rate is based.

Survey Rate Identifiers

The ""SU"" identifier indicates that either a single non-union rate prevailed (as defined in 29 CFR 1.2) for this classification in the survey or that the rate was derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As a weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SUFL2022-007 6/27/2024. SU indicates the rate is a single non-union prevailing rate or a weighted average of survey data for that classification. FL indicates the State of Florida. 2022 is the year of the 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. The date, 6/27/2024 in the example, indicates the survey completion date for the classifications and rates under that identifier.

?SU? wage rates typically remain in effect until a new survey is conducted. However, the Wage and Hour Division (WHD) has the discretion to update such rates under 29 CFR 1.6(c)(1).

State Adopted Rate Identifiers

The ""SA"" identifier indicates that the classifications and prevailing wage rates set by a state (or local) government were adopted under 29 C.F.R 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 01/03/2024 in the example, reflects the date on which the classifications and rates under the ?SA? identifier took effect under state law in the state from which the rates were adopted.

WAGE DETERMINATION APPEALS PROCESS

1) Has there been an initial decision in the matter? This can be:

- a) a survey underlying a wage determination
- b) an existing published wage determination
- c) an initial WHD letter setting forth a position on a wage determination matter
- d) an initial conformance (additional classification and rate) determination

On survey related matters, initial contact, including requests for summaries of surveys, should be directed to the WHD Branch of Wage Surveys. Requests can be submitted via email to davisbaconinfo@dol.gov or by mail to:

Branch of Wage Surveys
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

Regarding any other wage determination matter such as conformance decisions, requests for initial decisions should be directed to the WHD Branch of Construction Wage Determinations. Requests can be submitted via email to BCWD-Office@dol.gov or by mail 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 an initial decision has been issued, then any interested party (those affected by the action) that disagrees with the decision can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7).

Requests for review and reconsideration can be submitted via email to dba.reconsideration@dol.gov or by mail 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 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.

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END OF GENERAL DECISION"

Superseded General Decision Number: VA20240208

State: Virginia

Construction Type: Heavy

Counties: Botetourt, Craig, Franklin and Roanoke Counties in Virginia.

Including the independent cities of Roanoke* and Salem*.

HEAVY CONSTRUCTION PROJECTS

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	<ul style="list-style-type: none">◆ Executive Order 14026 generally applies to the contract.◆ The contractor must pay all covered workers at least \$17.75 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 2025.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	<ul style="list-style-type: none">◆ Executive Order 13658 generally applies to the contract.◆ The contractor must pay all covered workers at least \$13.30 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours performing on that contract in 2025.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at <http://www.dol.gov/whd/govcontracts>.

ENGI0147-026 06/01/2022

	Rates	Fringes
POWER EQUIPMENT OPERATOR (Crane).....	\$ 34.16	11.50

IRON0028-003 06/01/2023

	Rates	Fringes
IRONWORKER.....	\$ 28.73	20.10

* UAVG-VA-0002 01/01/2025

	Rates	Fringes
ELECTRICIAN.....	\$ 38.80	14.70

* SUVA2018-013 01/05/2023

	Rates	Fringes
CARPENTER.....	\$ 22.74	7.82
CEMENT MASON/CONCRETE FINISHER...	\$ 22.72	5.49
LABORER: Common or General.....	\$ 11.86 **	0.00
LABORER: Pipelayer.....	\$ 18.19	5.09
OPERATOR: Backhoe/Excavator/Trackhoe.....	\$ 18.33	2.03
OPERATOR: Bobcat/Skid Steer/Skid Loader.....	\$ 21.37	3.83
OPERATOR: Bulldozer.....	\$ 24.43	8.89
OPERATOR: Loader.....	\$ 18.62	7.07
TRUCK DRIVER: Dump Truck.....	\$ 15.00 **	1.84

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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** Workers in this classification may be entitled to a higher minimum wage under Executive Order 14026 (\$17.75) or 13658 (\$13.30). Please see the Note at the top of the wage determination for more information. Please also note that the minimum wage requirements of Executive Order 14026 are not currently being enforced as to any contract or subcontract to which the states of Texas, Louisiana, or Mississippi, including their agencies, are a party.

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 <https://www.dol.gov/agencies/whd/government-contracts>.

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) (iii)).

The body of each wage determination lists the classifications and wage rates that have been found to be prevailing for the type(s) of construction and geographic area covered by the wage determination. The classifications are listed in alphabetical order under rate identifiers indicating whether the particular rate is a union rate (current union negotiated rate), a survey rate, a weighted union average rate, a state adopted rate, or a supplemental classification rate.

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A UAVG rate will be updated once a year, usually in January, to reflect a weighted average of the current rates in the

collective bargaining agreements on which the rate is based.

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WAGE DETERMINATION APPEALS PROCESS

1) Has there been an initial decision in the matter? This can be:

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Branch of Wage Surveys
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

Regarding any other wage determination matter such as

conformance decisions, requests for initial decisions should be directed to the WHD Branch of Construction Wage Determinations. Requests can be submitted via email to BCWD-Office@dol.gov or by mail 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 an initial decision has been issued, then any interested party (those affected by the action) that disagrees with the decision can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Requests for review and reconsideration can be submitted via email to dba.reconsideration@dol.gov or by mail 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 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.

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END OF GENERAL DECISION"

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OTHER FORMS

SECTION F

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Electronic File Release Agreement

_____ (RECIPIENT) has requested that Delta Airport Consultants, Inc., (ENGINEER) provide electronic files for the RECIPIENT's use on the Rehabilitate Taxiway B from Taxiway B1 to B4 project at Roanoke-Blacksburg Regional Airport, subject to the following terms and conditions. Electronic files are available only to the successful low bidder.

The ENGINEER's electronic files are compatible with AutoCAD 2018 or newer releases. The ENGINEER makes no representation as to the compatibility of these files with your hardware or your software.

Data contained in these electronic files is part of the ENGINEER's instruments of service, who shall be deemed the author and shall retain all common law, statutory law, and other rights, without limitation, including copyrights, and shall not be used by you or anyone else receiving this data through or from you for any purpose other than _____. Any other use or reuse by you or others will be at your sole risk and without liability or legal exposure to the ENGINEER. The RECIPIENT agrees to make no claim and hereby waive, to the fullest extent permitted by law, any claim or cause of action of any nature against the ENGINEER, its officers, directors, employees, agents or subconsultants which may arise out of or in conjunction with the RECIPIENT's use or reuse of the electronic files for any purpose.

Furthermore, the RECIPIENT shall, to the fullest extent permitted by law, indemnify and hold harmless the ENGINEER from all claims, damages, losses, and expenses, including attorney's fees, arising out of or resulting from such use or reuse, by the RECIPIENT or others, of these electronic files.

These electronic files are not contract documents, nor are they considered as being the engineering drawings for the project. Significant differences may exist between these electronic files and corresponding hard copy contract documents (project engineering drawings) due to addenda, change orders, or other revisions. The ENGINEER makes no representation regarding the accuracy or completeness of the electronic files received by the RECIPIENT. In the event a conflict arises between the signed contract documents prepared by the ENGINEER and electronic files, the signed contract documents shall govern. The RECIPIENT is responsible for determining if any conflicts exist. By the RECIPIENT's use of these electronic files, the RECIPIENT is not relieved of his duty to fully comply with the contract documents, including and without limitation, the need to check, confirm, and coordinate all dimensions and details, take measurements, verify field conditions and coordinate your work with that of other contractors for the project.

Because of the potential that the information presented on the electronic files can be modified, unintentionally or otherwise, the ENGINEER reserves the right to remove all indicia of its ownership and/or involvement from each electronic display or file.

Signature of this agreement shall cover any and all digital correspondence released from the ENGINEER to the RECIPIENT.

Under no circumstances shall delivery of the electronic files for use by the RECIPIENT be deemed a sale by the ENGINEER and the ENGINEER makes no warranties, either express or implied, of merchantability and fitness for any particular purpose. In no event shall the ENGINEER be liable for any loss of profit or any consequential damages as a result of your use or reuse of these electronic files.

RECIPIENT (please print name of company)

RECIPIENT's Representative Signature

RECIPIENT's Representative Name (please print)

Witness Signature

RECIPIENT's Email Address (please print)

RECIPIENT's Phone Number

Warranty of Construction

Project: Rehabilitate Taxiway B from Taxiway B1 to B4
Airport: Roanoke-Blacksburg Regional Airport
Location: Roanoke, Virginia
AIP Project No.: 3-51-0045-71-2024 (Design)
AIP Project No.: 3-51-0045-Pending (Construction)
RRAC Bid No.: 25-011
Date of Final Acceptance: _____

_____ (Contractor), located at _____, hereby guarantees that all labor and material furnished and work performed under the above Contract are in accordance with the contract drawings and specifications and authorized alterations and additions thereto, and that all of the work under the Contract is free from faulty materials and improper workmanship, and guaranteed against injury from proper and usual wear, and agreeing (and we do hereby so agree) that should any defect develop during the contract guarantee period, as hereinafter defined, due to improper materials, workmanship or arrangement, we will, upon written notice, replace or re-execute such defective work, together with any other work affected in making good such defects, at the convenience of, and without expense to the Owner.

The Contractor further warrants that all manufacturer's or other warranties on all materials and equipment furnished by Contractor shall run directly to or be specifically assigned to Owner on demand. The Contractor warrants that the installation of any and all materials and equipment shall be in strict accordance with manufacturer's requirements. In the event Owner seeks to enforce a claim based upon a manufacturer's warranty and should such manufacturer then fail to honor its warranty based, in whole or in part, on a claim of defective installation, Owner shall be entitled to enforce said warranty against Contractor in accordance with the terms of said warranty, except that a claim of defective installation shall not be a defense to any such warranty claim by Owner against Contractor.

The contract guarantee period shall be a period of one (1) year from final acceptance, as noted above, except in the cases of LED light fixtures, manufacturer's or other required extended warranties that extend for periods greater than one year from final acceptance, whereby the contract guarantee period shall extend to match for the items that are so warranted.

All LED light fixtures with the exception of obstruction lighting (AC 150/5345-43) must be warranted for a minimum of four (4) years after date of installation inclusive of all electronics.

The warranty for any work repaired or replaced during the guarantee period shall run for a period of one (1) year from the date of repair or replacement.

Contractor's Signature

Subscribed and sworn before me in the Commonwealth of Virginia, this _____ day of _____, 20_____.

Notary Public

My Commission Expires

Lien and Claims Release

Project: Rehabilitate Taxiway B from Taxiway B1 to B4
Airport: Roanoke-Blacksburg Regional Airport
Location: Roanoke, Virginia
AIP Project No.: 3-51-0045-071-2024 (Design)
AIP Project No.: 3-51-0045-Pending (Construction)
RRAC Bid No.: 25-011

_____ (Contractor), located at _____,
hereby certifies that the work for the above project has been completed in accordance with the Contract Documents, and that all previous progress payments received from the Owner on account of work performed under the Contract referred to has been applied by the undersigned to discharge in full all obligations of the undersigned incurred in connection with the work covered by prior requisitions for payment under said Contract and that all materials and equipment covered by the final requisition for payment are free and clear of all liens, claims, security interests and encumbrances. All persons, firms and partnerships who have furnished labor and/or material to date on said project have been paid.

Contractor's Signature

Subscribed and sworn before me in the Commonwealth of Virginia, this _____ day of _____, 20_____.

Notary Public

My Commission Expires

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Certificate of Substantial Completion

Project: Rehabilitate Taxiway B from Taxiway B1 to B4
Airport: Roanoke-Blacksburg Regional Airport
Location: Roanoke, Virginia
AIP Project No.: 3-51-0045-071-2024 (Design)
AIP Project No.: 3-51-0045-Pending (Construction)
RRAC Bid No.: 25-011
Contract Date: _____

This Certificate of Substantial Completion applies to all Work under the Contract Documents and approved Change Orders for the Rehabilitate Taxiway B from Taxiway B1 to B4 project completed by _____ (CONTRACTOR) for Roanoke Regional Airport Commission (OWNER).

The Work to which this Certificate applies has been inspected by authorized representatives of OWNER, CONTRACTOR, and ENGINEER, and that Work is hereby declared to be substantially complete in accordance with the Contract Documents as of _____.

A tentative list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include an item in it does not alter the responsibility of CONTRACTOR to complete all the Work in accordance with the Contract Documents. The items in the tentative list shall be completed or corrected by the CONTRACTOR within thirty (30) calendar days of the above Date of Substantial Completion.

This certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of CONTRACTOR's obligation to complete the Work in accordance with the Contract Documents.

ENGINEER: Delta Airport Consultants, Inc. _____

Name: *(print)* _____

Signature: _____ Date: _____

CONTRACTOR: _____

Name: *(print)* _____

Signature: _____ Date: _____

OWNER: Roanoke Regional Airport Commission _____

Name: *(print)* _____

Signature: _____ Date: _____

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Certificate of Final Acceptance

Project: Rehabilitate Taxiway B from Taxiway B1 to B4
Airport: Roanoke-Blacksburg Regional Airport
Location: Roanoke, Virginia
AIP Project No.: 3-51-0045-071-2024 (Design)
AIP Project No.: 3-51-0045-Pending (Construction)
RRAC Bid No.: 25-011
Contract Date: _____

This Certificate of Final Acceptance applies to all Work under the Contract Documents and approved Change Orders for the Rehabilitate Taxiway B from Taxiway B1 to B4 project completed by _____ (CONTRACTOR) for Roanoke Regional Airport Commission (OWNER).

The Work to which this Certificate applies has been inspected by authorized representatives of OWNER, CONTRACTOR, and ENGINEER, and that Work is hereby accepted as complete on _____.

The following documents and information are attached to and made a part of this Certificate:

- (1) Warranty of Construction
- (2) Lien and Claims Release
- (3) Final DBE Accomplishments

This certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of CONTRACTOR's obligation to complete the Work in accordance with the Contract Documents.

ENGINEER: Delta Airport Consultants, Inc.

Name: *(print)* _____

Signature: _____ Date: _____

CONTRACTOR: _____

Name: *(print)* _____

Signature: _____ Date: _____

OWNER: Roanoke Regional Airport Commission

Name: *(print)* _____

Signature: _____ Date: _____

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TECHNICAL SPECIFICATIONS

SECTION G

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AS-BID
MARCH 2025

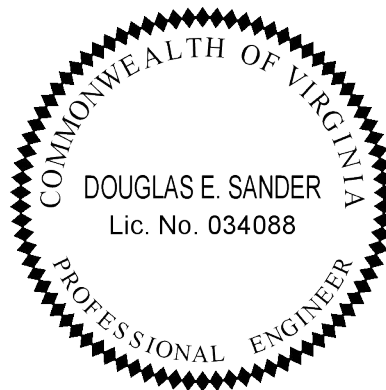
TECHNICAL SPECIFICATIONS

REHABILITATE TAXIWAY B FROM TAXIWAY B1 TO B4

ROANOKE-BLACKSBURG REGIONAL AIRPORT
ROANOKE, VIRGINIA

AIP PROJECT NO. 3-51-0045-71-2024 (DESIGN)
AIP PROJECT NO. 3-51-0045-PENDING (CONSTRUCTION)
RRAC BID NO. 25-011

PREPARED FOR:
ROANOKE REGIONAL AIRPORT COMMISSION



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APPENDICES

Appendix A - Sample Submittal Form

Appendix B - Construction Safety and Phasing Plan

Appendix C - Geotechnical Report

All sections and/or volumes of this project manual, including all associated plans sheets and addenda, comprise the contract documents for the Rehabilitate Taxiway B from Taxiway B1 to B4 project at Roanoke-Blacksburg Regional Airport.

Special Provisions

01.SP Additional Insured Requirements

The Contractor shall specify the Owner and the Engineer as named additional insured in all insurance required under the provisions of Section 70-21 *Insurance Requirements*. The Contractor shall provide an allowance for the cost, if any, of providing this additional insurance. Upon receipt documenting the actual amount and proof of payment, the Contractor can submit for the actual cost under Special Provision Item "Non-AIP Insurance" up to the allowance amount. Any additional cost above the allowance shall be at the Contractor's expense.

02.SP FAA Specifications

All FAA specifications are denoted with the AC reference and date of revision at the beginning of each specification section. The title of any non-FAA specification will be in all capital letters (EXAMPLE). Modifications by way of additions to the FAA standard text are denoted in all capital letters (EXAMPLE).

03.SP Conflict With Other Controls

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 Contractor shall be responsible for assuring compliance to the extent that construction practices, construction operations, and construction work are involved.

04.SP Pavement Loading

The existing airport pavements are designed for aircraft on single and dual gear configurations. The Contractor shall preserve and/or protect existing and new pavements from damage due to construction operations. Existing pavements which are damaged shall be replaced or repaved at the Contractor's expense. The Contractor shall take immediate action to alleviate the problem.

05.SP Communications

The Contractor shall keep the Engineer and/or Resident Project Representative apprised of his/her scheduled construction activities in order to allow proper notification of the airport manager and airport operators. As a minimum, weekly meetings to discuss construction progress and location should be anticipated.

The Contractor shall have a two-way radio at the jobsite at all times work is in progress. The Contractor shall monitor the ground control frequency or the Common Traffic Advisory Frequency (CTAF) or Airport UNICOM frequency.

06.SP Aircraft Operations

It is the intent of the Owner to minimize interference with aircraft operations. The Contractor shall coordinate his/her activities while working near the aircraft operational area, so as to create minimal interference with aircraft operations. Before starting his/her operations at any location on the airport, the Contractor shall assure proper safety precautions and separations are in place in accordance with the Plans, Construction Safety Phasing Plan (CSPP) and the contractor's Safety Plan Compliance Document (SPCD), all prepared in accordance with FAA Advisory Circular (AC) 150/5370-2G, *Operational Safety on Airports During Construction*.

07.SP Contractor's Responsibility for Utility Service And Facilities Of Others

The following statements concerning FAA cables and FAA NAVAID equipment shall apply to this project.

1. The local FAA Airway Facilities Sector Field Office (AFSFO) personnel, will, upon notification, mark all FAA cables in the vicinity of construction once, prior to the start of work. The Contractor shall be responsible for any damage to cables within three feet of the marked cable route. Should he/she damage any cables he/she shall immediately take all steps necessary for the repair of the cable. If the repair necessitates any work on the part of the local FAA personnel, the Contractor will be billed for all costs incurred.

2. The Contractor shall minimize, as much as possible, locations where haul routes will cross earth buried FAA cable. At such crossing points, the cable must be protected with steel boilerplate or a similar structural device.

3. At times when either threshold is displaced or equipment is operating in an ILS clear zone, that respective ILS must be taken off the air. Also, when equipment is operating between a localizer antenna and its associated landing threshold, that localizer must be taken off the air. The work must be closely coordinated with the local AFSFO to eliminate unnecessary shutdowns.

08.SP Record Drawings

The Contractor shall maintain during the work and shall provide the Engineer with one set of marked prints showing any modifications between the original plans and final "as-constructed" conditions. The Contractor shall provide the marked set of drawings to the Engineer at the final inspection. The cost for providing the record drawings shall be considered incidental to the cost of the project.

Required Contractor Deliverable: Plan set with red-line as-built markups and surveys

09.SP Final Inspections

The Engineer will attend a final inspection and if necessary, one follow-up final inspection of the completed work and the completed punch list items, respectively. These inspections will be scheduled when the Contractor indicates that the work is complete and ready for final inspection or that the punch list is totally complete, and the final inspection can be made. If the Engineer is required to conduct more than two (2) final inspections outlined above, the charges for the Engineer's services associated with such additional inspections shall be deducted by the Owner from the Contractor's final payment for the project.

10.SP Existing Airfield Features

The Contractor shall protect existing items on the airfield that are not identified to be removed or modified. This may include pavements, markings, lighting fixtures, signs, survey monuments, etc. An inventory of conditions of the project and all items that are to remain shall be taken before construction begins and the Contractor shall be responsible for the cost of replacement of any fixtures damaged by his/her operations. The cost for providing the existing airfield features inventory list shall be considered incidental to the cost of the project.

Required Contractor Deliverable: Existing Features Inventory List

11.SP Project Schedule

The Contractor shall submit prior to the Preconstruction Conference a detailed progress schedule for the entire project. The schedule shall be developed in a "Critical Path Method" (CPM) format to include production rates per work period and time for mobilization and demobilization. Once the Contractor's schedule has been reviewed by the Engineer, any deviations must be incorporated into an updated schedule and submitted for review by the Engineer. The initial schedule will be used as a baseline for

determining impacts to the critical path items of the schedule due to weather or other items as may be documented by the contractor that is potentially a reason to extend the contract time period.

The Contractor shall review the project schedule with the Engineer and/or Resident Project Representative (RPR) prior to submittal of the monthly Contractor Pay Request. Any update deemed necessary by the Engineer, RPR or Contractor shall be incorporated into an updated schedule. The updated schedule shall be submitted with the pay request. The Pay Request will not be processed unless an accurate up-to-date schedule is on file with the Engineer. The cost for providing and maintaining the project schedule shall be considered incidental to the cost of the project.

Required Contractor Deliverable: Project Schedule

12.SP Contract Time Extensions

The Contractor shall be responsible for providing justification and documentation for proposed time extensions. The Contractor shall submit the justification and documentation along with a copy of the original and updated project schedules to the Engineer for review.

The Engineer will furnish the Contractor with a copy of his/her weekly statement of the number of calendar days available for productive work. The Contractor will be allowed one (1) week in which to file a written protest setting forth his/her objections to the Engineer's weekly statement. If no objection is filed within such specified time, the weekly statement shall be considered as acceptable to the Contractor.

No provisions of this article shall be construed as entitling the Contractor to compensation for delays due to inclement weather, for suspensions made at the request of the Contractor, for any other delay provided for in the contract, plans, or specifications.

13.SP Construction Flags and Amber Lights

During work in the Air Operation Area (AOA), the Contractor shall furnish amber flashing hazard beacons or aircraft warning flags on all vehicles and equipment in accordance with Advisory Circular (AC) 150/5210-5D, *Painting, Marking, and Lighting of Vehicles Used on an Airport*. Amber flashing hazard beacons or aircraft warning flags may be used during the day. Amber flashing hazard beacons are required for nighttime operations.

The beacons shall be mounted on the uppermost part of the vehicle structure or equipment so that it will be visible from any direction, day and night, including from the air.

The flags shall be at least a 3-foot square having a checkered pattern of international orange and white squares at least 1 foot on each side in accordance with AC 150/5210-5D. Flags on equipment shall be mounted on a staff not less than 8 feet in length.

14.SP Employment History

The Contractor shall provide background information concerning the ten (10) year employment history on all its employees or affiliated personnel who will be involved with work inside the security fence. Based upon background information on an employee, the Owner reserves the right to restrict the access of an employee of the Contractor from working inside the security fence for reasons of airport security. Identification badges will be required for all personnel entering the aircraft operational areas (AOA) and can be obtained from the Airport Manager. A nominal fee may be charged to cover the cost of the materials for these identification badges. The cost for providing and maintaining the employment history shall be considered incidental to the cost of the project.

Required Contractor Deliverable: Employment History

15.SP Utility Conflicts

The Contractor should anticipate conflicts with existing utilities. Where conflicts are encountered, the Contractor shall reroute electrical conduits, ducts, water pressure lines and/or force mains around gravity

lines which will take precedence over pressure lines for maintaining vertical alignment as shown on plans. Conflicts between pressure lines shall be resolved as ordered by the Engineer. No additional payment will be made for rerouting utilities due to conflicts.

The Contractor shall be responsible for repair to utilities in service which are damaged by the Contractor's men and equipment. The Contractor shall assume all risk and liability for any inconvenience, delay, or expense that may be occasioned by public utilities. No additional compensation will be allowed for delays, inconvenience, or damage sustained by the Contractor due to interference from the said utility appurtenances or the operations of moving them. The time for completion may be extended if it is determined by the owner that a project delay to critical path work items has occurred.

16.SP Testing General

The Contractor shall inform the Engineer when work in progress or an area will be subject to or has been prepared for testing. Timely communication between the Contractor and the Engineer will be required to schedule needed testing. All quality assurance testing will be performed by the Owner's testing laboratory under the direction of the Engineer. The Contractor is advised that the cost of failing tests requiring additional tests to confirm compliance will be deducted from the monies due to the Contractor through the Progress Payment Process. For materials requiring test strips (P-401, P-403, etc.), this shall include costs incurred after two (2) failing test strips. The testing laboratory shall not be used by the Contractor for quality control purposes. The Contractor shall provide quality control testing in accordance with Item C-100.

17.SP Materials Testing

The Contractor shall provide actual test results and/or certifications for all materials incorporated into the work to assure his/her compliance with the contract specifications. Current ASTM, AASHTO, and/or federal specifications on the date of advertisement for bids shall be used. The latest edition of other referenced specifications, handbooks or documents shall be used. Prior to installing, placing, or incorporating any materials into the work, the Contractor shall provide four (4) copies of the materials tests and/or certifications required by the specifications to the Engineer.

The Testing/Certification submittals required by the specifications shall be provided by the Contractor to the Engineer at the Contractor's expense. The required submittals shall be all tests and certifications required by the specifications.

18.SP Dust Control

The Contractor is advised that aircraft maintenance operations are conducted adjacent to the project. Special attention to dust control will be required during the course of the project. The use of water shall be anticipated. The Engineer reserves the right to halt work or hauling in non-conforming areas if corrective actions are not promptly taken by the Contractor to control dust.

19.SP Storm Water Pollution Prevention Plan

The Contractor shall be responsible for developing and executing a Storm Water Pollution Prevention Plan (SWPPP) in accordance with location and state regulations. A copy of the SWPPP shall be submitted to the Engineer for approval and one (1) copy of the approved and executed plan shall be kept on-site at all times. The cost of completing the SWPPP and implementing its practices shall be considered incidental to the cost of the project.

Required Contractor Deliverable: Storm Water Pollution Prevention Plan (SWPPP)

20.SP On-Site Contractor Supervision

The Contractor shall keep on the project at all times during its progress, a competent resident superintendent whose name and qualifications shall be furnished to the Engineer at the Pre-Construction

Meeting and who shall not be replaced without prior written notice to the Engineer, except under extraordinary circumstances, in which event immediate written notice shall be given to the Engineer. The superintendent will be the Contractor's representative at the site and shall have the authority to act on behalf of the Contractor and to receive any and all notices or instructions given pursuant to the Contract Documents. The superintendent shall be an employee of the Contractor. The Contractor shall provide competent and suitable personnel, equipment and supplies to perform the work required by the Contract Documents. He/she shall at all times maintain good discipline and order at the site. The cost for providing the superintendent qualifications shall be considered incidental to the cost of the project.

Required Contractor Deliverable: Superintendent Qualifications

21.SP Storage / Staging Area

All construction material storage, equipment, and vehicle parking will be designated by the Owner. Under no circumstances shall material, equipment, and/or vehicles be stored in such a place as to create an obstruction to vehicular traffic. All storage shall be limited to the designated area(s) on the project site; no storage of any equipment or material shall be allowed at any place other than the project site unless otherwise approved by the Owner. Climate conditioning for stored materials shall be the responsibility of the Contractor.

22.SP Security

The Contractor shall be responsible for the security of his/her equipment and materials, as well as the security of the equipment and materials of the Contractor's agents and Subcontractors. Further, the Contractor shall be responsible for the security of all entrances to the project site.

The Contractor shall provide the Owner or its designated representative a list of all his employees as well as a list of all the employees of his Subcontractors and shall, during the work of the project, advise such designated agent of changes to the list of personnel working on the project. The Contractor shall be responsible for the direct supervision of his employees, those of his agents and Subcontractors at all times while on the project site.

The Contractor shall exercise and take all precautions in the storage and dispensing of all flammable liquids such as, but not limited to, gasoline, fuel, and lubricants.

Required Contractor Deliverable: List of Contractor and Subcontractor Employees

23.SP Motorized Vehicles

The Contractor shall be responsible for the actions of his/her employees, agents, and Subcontractors. Personnel who do not abide by the applicable rules and regulations shall be subject to prosecution.

All motorized vehicles and equipment operating on the project site and anywhere else on the Airport shall not exceed a speed of 15 mph, and all aircraft shall have priority over all motorized vehicles and equipment.

24.SP Debris

Waste and loose material shall be removed immediately and continuously during the construction work of the project. The removal and disposal of all debris shall be the responsibility of the Contractor. All debris shall be disposed of off the project site and the Airport property in conformance with prevailing local ordinances, codes, and Federal laws.

25.SP Contractor's Contact Persons

The Contractor shall provide the name and mobile phone number of at least two (2) people to be contacted in case of emergencies at the work site during non-working hours. The contact people must be

qualified and have the authority to make decisions on behalf of the Contractor. There must be at least one (1) contact person on-call and available to be at the site within one (1) hour. This item is to be considered incidental to the project and no additional or separate payment will be made.

The Contractor shall provide the name of the Project Manager. This person will be the Contractor's representative to whom the Engineer and Owner shall address all relevant correspondence or communications. The Contractor shall not change the Project Manager without approval of the Engineer and/or Owner.

The names of the Project Manager and the two (2) Emergency Contact Persons shall be provided at the Preconstruction Conference.

The cost for providing and maintaining the emergency contact list shall be considered incidental to the cost of the project.

Required Contractor Deliverable: Emergency Contact List

26.SP Safety Plan Compliance Document (SPCD)

Introduction:

The Contractor is responsible for compliance with FAA Advisory Circular (AC) 150/5370-2G, *Operational Safety on Airports During Construction* and the project Construction Safety and Phasing Plan (CSPP) and is responsible for preparing a project specific Safety Plan Compliance Document (SPCD) describing their plan for said compliance.

Definitions and References:

AC 150/5370-2G – Operational Safety on Airports During Construction

This FAA Advisory Circular document outlines the responsibilities and requirements for CSPPs and SPCDs, as well as operational safety requirements. A copy is attached as an appendix to these specifications.

CSPP – Construction Safety & Phasing Plan

This Owner document is prepared in accordance with AC 150/5370-2G and outlines the project specific requirements for airfield operational safety, work area milestones, and sequencing during construction of the project. It is a project specific document that is prepared by the Owner. A copy is attached as an appendix to these specifications.

SPCD – Safety Plan Compliance Document

This Contractor document is prepared in accordance with AC 150/5370-2G and outlines the specific methods and actions to be taken by the Contractor to ensure compliance with the CSPP. The Contractor is responsible for developing a project specific SPCD and submitting it to the Owner for review prior to the start of construction. The document shall include the items listed in AC 150/5370-2G, Chapter 2.4.2.

Summary:

The Contractor is responsible for complying with AC 150/5370-2G, the Owner prepared CSPP, and the Contractor prepared SPCD.

In accordance with the contract documents, jobsite safety is the sole responsibility of the Contractor. The Engineer is not responsible for the Contractor's means, methods, techniques, sequences, or procedures of construction or the safety precautions incident thereto. In reviewing any documents prepared by the Contractor, neither the Owner nor Engineer assumes any responsibility for jobsite safety.

The cost for providing and maintaining the SPCD, and compliance with the three noted documents, shall be considered incidental to the cost of the project.

Required Contractor Deliverable: Safety Plan Compliance Document (SPCD)

27.SP Shop Drawings and Samples

The Contractor shall review and approve all shop drawings and submittals for conformance to the contract documents before submittal to the Engineer. After reviewing the plans and specifications and/or verifying all field measurements, the Contractor shall submit to the Engineer for review and approval copies of all shop drawings, certificates, and samples. These drawings shall bear a stamp or specific written indication that the Contractor has satisfied the Contractor's responsibilities under the Contract Documents with respect to the review of the submission. The Contractor shall certify the following by placing a stamp or specific written indication on the shop drawings.

“This shop drawing has been reviewed by NAME OF CONTRACTOR and approved with respect to the means, methods, techniques, sequences, procedures of construction, safety precautions and programs incidental thereto. NAME OF CONTRACTOR also warrants that this shop drawing complies with the contract documents and comprises no variations thereto, unless noted below.”

“NAME OF CONTRACTOR certifies that this shop drawing complies with Buy American requirements as established under 49 USC Section 50101. Steel products must be 100% U.S. domestic product Manufactured Products. Preference shall be given to products that are 100% manufactured and assembled in the U.S. Manufactured products not meeting the 100% U.S. domestic preference may only be used on the project if the FAA has officially granted a permissible waiver to Buy American Preferences.”

All submissions shall be identified as the Engineer may require. The data shown on the shop drawings shall be complete with respect to quantities, dimensions, specified performance and design criteria, materials and similar data to enable the Engineer to review the information.

The Contractor shall also submit to the Engineer for review and approval with such promptness as to cause no delay in work, all samples required by the Contract Documents. All samples will have been checked by and accompanied by a specific written indication that the Contractor has satisfied the Contractor's responsibilities under the Contract Documents with respect to the review of the submission and shall be identified clearly as to material, Supplier, pertinent data such as catalog numbers and the use for which intended.

Before submission of each shop drawing or sample, the Contractor shall have determined and verified all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers and similar data with respect thereto and reviewed or coordinated each shop drawing or sample with other shop drawings and samples and with the requirements of the work and the Contract Documents.

At the time of each submission, the Contractor shall give the Engineer specific written notice of each variation that the shop drawings or samples may have from the requirements of the Contract Documents, and, in addition, shall cause a specific notation to be made on each shop drawing submitted to the Engineer for review and approval of each such variation.

For each shop drawing or sample submittal, the Contractor shall utilize a cover sheet similar in format and content to the “Sample Submittal Form” attached as an appendix to these specifications.

The Engineer will review with reasonable promptness, shop drawings and samples, but the Engineer's review will be only for conformance with the design concept of the Project and for compliance with the information given in the Contract Documents and shall not extend to means, methods, techniques, sequences or procedures of construction or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions. The Contractor shall make corrections required by the Engineer and shall return the required number of corrected copies of shop drawings and submit as required new samples for review and approval. The Contractor shall direct specific attention, in writing, to revisions other than the corrections called for by the Engineer on previous submittals.

The Engineer's review of the shop drawings or samples shall not relieve the Contractor from responsibility for any variation from the requirements of the Contract Documents unless the Contractor has, in writing, called the Engineer's attention to each such variation at the time of submission and the Engineer has given written concurrence of each such variation by a specific written notation thereof, incorporated in, or accompanying the shop drawings or sample approval; nor will any review by the Engineer relieve the Contractor from responsibility for errors or omissions in the shop drawings.

Where a shop drawing or sample is required by the Specifications, any related work performed prior to the Engineer's review of the pertinent submission will be the sole expense and responsibility of the Contractor.

The Contractor shall submit shop drawings electronically, via the Engineers Newforma/Info Exchange site.

Contractor shall submit electronic versions of each individual submittal to the Engineer in a printable PDF format. Submittals that are larger than 11x17 shall be submitted with one hard copy in addition to the electronic version. Formatting of the PDF drawings shall be of the same size as the hard copy submittal.

The Contractor will be provided access to the Engineer's secured project hosting site (Newforma) via a personalized password protected account. This site utilizes a web browser interface that requires internet access, and an individual email account. The Engineer will provide the Contractor with submittal protocol and process documentation for the hosting site when the account information is verified and configured by the Engineer.

The Engineer will return submittals electronically in PDF format.

28.SP Engineer's Field Office

The Contractor shall furnish, erect, and maintain a building for use as the Engineer's field office for the duration of the project. In addition to the requirements outlined in Section 60-05, the building shall be tightly floored and roofed, constructed with an air space above the ceiling for ventilation, and supported above the ground. The width of the office shall not be less than 8 feet and the floor-to-ceiling height shall not be less than 7 feet 6 inches, unless a trailer is provided in which event the width shall not be less than 7 feet 6 inches and the floor-to-ceiling height shall not be less than 6 feet 6 inches. The building shall have a meeting space with a minimum of 240 square feet. The inside walls and ceiling shall be constructed of plywood, masonite, gypsum board or other suitable materials. Walls and ceiling shall be insulated.

The office shall contain at least 3 windows, each having an area of not less than 540 square inches, and all of which shall be capable of being easily opened and secured from the inside only. Further, the office shall contain at least two (2) doors, having dimensions of not less than 30 inches in width and 78 inches in height. Window screens shall be provided. The door(s) shall be equipped with lock(s) and at least 2 keys therefore shall be furnished to the Engineer or Resident Project Representative. Steps shall conform to the State Building Code and shall be maintained free of obstructions to provide safe passage.

The office shall include the following furniture and equipment:

- Desk (60 inches by 34 inches minimum)
- Plan and Drawing Table (30 inches by 96 inches minimum)
- Metal 4-Drawer File Cabinet (15-inch Drawer Width)
- Desk Chair
- Wastebasket (2 minimum)
- Printer/Copier/Scanner
- Conference Table (84 inches by 35 inches minimum) with Chairs (8 minimum)

The office shall have satisfactory lighting, water, heating equipment, exhaust fan, air-conditioner and electrical outlets connected to an operational power source. At least one of the light fixtures shall be a fluorescent light situated over the plan and drawing table.

Fuel for the heating equipment and electrical current shall be furnished by the Contractor. The Contractor shall also furnish and maintain one chemical type and one 2 1/2-gallon pressurized water fire extinguisher of standard commercial quality.

The Contractor shall install a toilet facility for the Field Office, which may be either indoor or outdoor. When separate facilities for men and women are not available, a sign with the wording, "Restroom" (letter heights of 1-inch minimum) shall be placed over the doorway and an adequate positive locking system shall be provided on the inside of the doorway to insure privacy. The Contractor shall maintain the toilet facility in a clean and sanitary condition. As a minimum, weekly service and cleaning shall be provided.

All requirements of the State and Local Boards of Health, or of other bodies or courts having jurisdiction in the area, shall be provided. An adequate positive locking system shall be provided on the inside of the doorway to insure privacy.

The Contractor shall provide a chilled drinking water dispenser and water supply in the field office. Bottled water is satisfactory.

The Contractor shall provide and maintain a stand-alone, mobile hotspot device to provide Wifi access to the Internet via a cellular network for the exclusive use of the Resident Project Representative (RPR). The network selected by the Contractor shall provide 5G service or a minimum of 4G service in areas where 5G service is unavailable. Wifi service at the project site shall have a good (3-bars) signal or better unless otherwise approved in writing by the Engineer. Device shall be a Verizon Inseego MiFi X PRO 5G UW, AT&T Netgear Nighthawk M6 Pro, T-Mobile JEXTREAM RG2100 5G or approved equal, and shall be provided with an unlimited data plan. Device and data plan shall be active at the start of the project and shall remain active for the duration of the project through Final Inspection and completion of all punch list items by the Contractor. Device and data plans shall remain in the Contractor's name and will be returned to the Contractor when an RPR is no longer required on the project. The cost for providing the mobile hotspot shall be considered incidental to the mobilization for the project.

29.SP Subgrade Drainage

Subgrades and construction areas are highly susceptible to damage from intrusion of surface water. Surface water should not be allowed to collect in or on prepared subgrades during or after construction. The Contractor shall be responsible for protection of the subgrade from standing water by constructing drainage ditches or by grading the site to sheet flow towards natural or artificial drainage features. Excavated areas should be sloped toward one corner to facilitate removal of any collected rainwater, groundwater, or surface water. Subgrades should be crowned or sloped to prevent collection of water and a means of escape provided for runoff. Subgrades shall be sealed with a smooth-drum roller, or covered with a mud-mat of lean concrete or other easily removable materials if the possibility of precipitation arises. Positive site drainage should be provided throughout the construction area to reduce infiltration of surface water around the perimeter of the site.

Subgrade repairs or undercut resulting from the Contractor's failure to provide positive site drainage shall be the responsibility of the Contractor and shall be completed as ordered by the Engineer at no cost to the Owner.

30.SP De-Watering During Construction

The Contractor shall provide de-watering during construction. All impounded water required to be pumped shall be pumped to the nearest acceptable receiving inlet or ditch and not allowed to discharge across pavement. Sediment shall be filtered as necessary to meet local requirements. All de-watering costs

shall be considered incidental to the project. Saturated subgrade or subbase materials shall be recompacted as required by the specifications prior to placing subsequent pavement layers.

31.SP Subgrade Repair

This item shall consist of undercut of soft or yielding subgrade soils beneath areas of embankment and/or new/removed pavement, placement of ground stabilization fabric, and backfilling with approved materials in accordance with the plans and specifications or as ordered by the Engineer.

The subgrade under areas to receive embankment or be paved shall be tested using the proof rolling method as outlined in "Item P-152 Excavation, Subgrade, and Embankment" to identify any weak areas in the subgrade that require repair. Areas determined to require repair shall be reworked to conform to the moisture and compaction requirements outlined in Item P-152.

If after attempts to rework or as ordered by the Engineer, the Contractor shall undercut the area to the depth necessary, but not less than 12 inches, to reach firm support as determined in the field (no more than 36 inches). The subgrade shall be uniformly excavated to a smooth line and grade by the Contractor.

In areas to be paved, or as ordered by the Engineer, a woven separation geotextile shall be installed in accordance with "P-209 Crushed Aggregate Base Course" and the area backfilled with crushed aggregate base course in accordance with "P-209 Crushed Aggregate Base Course." The material shall be placed and compacted in accordance with "P-209 Crushed Aggregate Base Course" or as ordered by the Engineer.

Payment for the undercutting of the subgrade shall be made under this special provision at the contract unit price per cubic yard for "Muck Excavation" in accordance with "Item P-152 Excavation, Subgrade, and Embankment" of the specifications. This price shall be full compensation for excavation, disposal, and for all labor, equipment, tools, and incidentals necessary to complete the work.

Payment for furnishing and placing separation geotextile shall be made at the contract unit price per square yard for "P-209 Crushed Aggregate Base Course," which price shall be full compensation for furnishing all materials, for all preparation, hauling, placing of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the work.

Payment for furnishing and placing the subbase material for subgrade repair shall be made at the contract unit price per cubic yard for "P-209 Crushed Aggregate Base Course," which price shall be full compensation for furnishing all materials, for all preparation, hauling, placing, of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the work.

No payment will be made for delays due to weather including, but not limited to, materials, equipment, labor, profit, etc., unless specifically allowed by the contract documents. All de-watering costs shall be considered incidental to the project and paid for in other items of work. Reference is directed to Special Provision Item "De-Watering During Construction."

32.SP Cost Breakdown – Lump Sum Items

A cost breakdown of all lump sum bid item costs shall be submitted to the Owner and Engineer for review a minimum of 10 days prior to the Preconstruction Meeting. Unless otherwise noted in the specifications, the cost breakdown schedule (Schedule of Values) will be the basis for determining the value of the monthly progress payment as applicable. The total value of all construction activities shall equal the total lump sum bid amount for that bid item. The cost for providing the lump sum bid item cost breakdowns shall be considered incidental to the cost of the project.

Required Contractor Deliverable: Lump Sum Bid Item Cost Breakdowns

33.SP Contract Time

The Contractor shall have the following contract time to complete the project:

- 150 Calendar Days

34.SP Liquidated Damages

Liquidated damages for failure to complete the project within the allotted contract time shall be as follows:

- Three Thousand Dollars (\$3,000.00) per calendar day will be assessed against the Contractor for each calendar day or portion thereof that the total contract time is exceeded.
- See plans for liquidated damages associated with specific work area milestones.

35.SP Documentation

The Contractor shall maintain daily records of all work, inspections, and tests performed. These records shall include a summary of the work performed and factual evidence that the required inspections or tests (as applicable) have been performed, including type and number of inspections or tests involved; results of inspections or tests; nature of defects, deviation, causes for rejection, etc.; proposed remedial action; and corrective action.

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 Engineer daily. The records shall cover all work placed subsequent to the previously furnished records and shall be verified and signed by the Contractor's Project Superintendent. The cost for providing the noted documentation shall be considered incidental to the cost of the project.

Required Contractor Deliverable: Records of daily reports, inspections, tests, etc.

36.SP Bidders Notice

Bidders are hereby notified and agree by submission of their bid that should, after award of the contract, additional items not listed in the bid become necessary and require unit prices not established by their bid, that the unit prices of such items shall be negotiated and shall be directly proportional to the established unit prices of similar bid items.

37.SP Contractor's Application for Payment Form

The Contractor shall provide a Contractor's Application for Payment Form to submit for payment. At a minimum, the form shall include the following:

- Name of Project
- Name and address of Owner
- Name and address of Contractor
- Application number and date
- Applicable Project Numbers (Owner, Engineer, Contractor, etc.)
- Original contract amount
- Sum of approved change orders
- Total value of work completed to date
- Total value of materials stored on hand in accordance with Section 90-07 of the Specifications
- Amount retained in accordance with Section 90-06 of the Specifications
- Total amount earned to date
- Total amount received to date
- Amount currently due

- Balance to finish
- Contractor's Certification
- Line item for each bid item from the Bid Proposal with the following included:
 - Item No.
 - Specification No.
 - Description
 - Unit
 - Unit Price
 - Contract Quantity
 - Quantity this Request
 - Quantity to Date
 - Amount this Request
 - Amount to Date
- Total DBE participation to date
- Total DBE participation current application
- Signature blocks for the Contractor, Resident Project Representative (as applicable), and Engineer

The Contractor shall submit a draft Contractor's Pay Application Form prior to the Preconstruction Conference for review and approval prior to use. The cost for providing the Contractor's Pay Application Form shall be considered incidental to the cost of the project.

Required Contractor Deliverable: Contractor's Application for Payment Form

38.SP Wage Rate Determination

These specifications include U.S. Department of Labor wage determinations per Davis-Bacon Wage Act requirements. When multiple wage determinations are included, the Contractor shall comply with the requirements of all wage determinations and pay the higher of the wage rates.

END OF SPECIAL PROVISIONS

Part 2 – General Construction Items

Item C-100 Contractor Quality Control Program (CQCP)

DESCRIPTION

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 Engineer. 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 Engineer 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 Engineer 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 Engineer prior to the start of any production, construction, or off-site fabrication. The written CQCP shall be submitted to the Engineer 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 Engineer 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 Engineer 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 Engineer 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 Engineer 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 Engineer 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 Engineer. All items of material and equipment are subject to inspection and/or observation by the Engineer 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 Engineer at the site for the same purpose.

Inspection and/or observations by the Engineer 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 Engineer 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 Engineer will recommend the Owner take the following actions:

- (1) Order the Contractor to replace ineffective or unqualified QC personnel or subcontractors and/or
- (2) Order the Contractor to stop operations until appropriate corrective actions are taken.

METHOD OF MEASUREMENT

100-13 Basis of measurement and payment. Contractor Quality Control Program (CQCP) is for the personnel, tests, facilities and documentation required to implement the CQCP. The CQCP will be paid as a lump sum with the following schedule of partial payments:

- a. With first pay request, 25% with approval of CQCP and completion of the Quality Control (QC)/Quality Assurance (QA) workshop.
- b. When 25% or more of the original contract is earned, an additional 25%.
- c. When 50% or more of the original contract is earned, an additional 20%.
- d. When 75% or more of the original contract is earned, an additional 20%.
- e. After final inspection and acceptance of project, the final 10%.

BASIS OF PAYMENT

100-14 Payment will be made under:

Item C-100 Contractor Quality Control Program (CQCP)

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-102 Temporary Air and Water Pollution, Soil Erosion, and Siltation Control

DESCRIPTION

102-1.1 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.

MATERIALS

102-2.1 Grass. Grass that will not compete with the grasses sown later for permanent cover per Item T-901 shall be a quick-growing species (such as ryegrass, Italian ryegrass, or cereal grasses) suitable to the area providing a temporary cover. Selected grass species shall not create a wildlife attractant.

102-2.2 Mulches. Mulches may be hay, straw, fiber mats, netting, bark, wood chips, or other suitable material reasonably clean and free of noxious weeds and deleterious materials per Item T-908. Mulches shall not create a wildlife attractant.

102-2.3 Fertilizer. Section not used.

102-2.4 Slope drains. Section not used.

102-2.5 Silt fence. Section not used.

102-2.6 Other. All other materials shall meet commercial grade standards and shall be approved by the Engineer before being incorporated into the project.

CONSTRUCTION REQUIREMENTS

102-3.1 General. In the event of conflict between these requirements and pollution control laws, rules, or regulations of other federal, state, or local agencies, the more restrictive laws, rules, or regulations shall apply.

The Engineer shall be responsible for assuring compliance to the extent that construction practices, construction operations, and construction work are involved.

102-3.2 Schedule. Prior to the start of construction, the Contractor shall submit schedules in accordance with the approved Construction Safety and Phasing Plan (CSPP) and the plans for accomplishment of temporary and permanent erosion control work for clearing and grubbing; grading; construction; paving; and structures at watercourses. The Contractor shall also submit a proposed method of erosion and dust

control on haul roads and borrow pits and a plan for disposal of waste materials. Work shall not be started until the erosion control schedules and methods of operation for the applicable construction have been accepted by the Engineer.

102-3.3 Construction details. The Contractor will be required to incorporate all permanent erosion control features into the project at the earliest practicable time as outlined in the plans and approved CSPP. Except where future construction operations will damage slopes, the Contractor shall perform the permanent seeding and mulching and other specified slope protection work in stages, as soon as substantial areas of exposed slopes can be made available. Temporary erosion and pollution control measures will be used to correct conditions that develop during construction that were not foreseen during the design stage; that are needed prior to installation of permanent control features; or that are needed temporarily to control erosion that develops during normal construction practices but are not associated with permanent control features on the project.

Where erosion may be a problem, schedule and perform clearing and grubbing operations so that grading operations and permanent erosion control features can follow immediately if project conditions permit. Temporary erosion control measures are required if permanent measures cannot immediately follow grading operations. The 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.

102-3.4 Installation, maintenance and removal of silt fence. Silt fences shall extend a minimum of 16 inches (41 cm) and a maximum of 34 inches (86 cm) above the ground surface. Posts shall be set no more than 10 feet (3 m) on center. Filter fabric shall be cut from a continuous roll to the length required minimizing joints where possible. When joints are necessary, the fabric shall be spliced at a support post with a minimum 12-inch (300-mm) overlap and securely sealed. A trench shall be excavated approximately 4 inches (100 mm) deep by 4 inches (100 mm) wide on the upslope side of the silt fence. The trench shall be backfilled and the soil compacted over the silt fence fabric. The Contractor shall remove and dispose of silt that accumulates during construction and prior to establishment of permanent erosion control. The fence shall be maintained in good working condition until permanent erosion control is established. Silt fence shall be removed upon approval of the Engineer.

METHOD OF MEASUREMENT

102-4.1 Temporary erosion and pollution control work required will be performed as scheduled or directed by the Engineer. Completed and accepted work will be measured as follows:

- ~~a. Temporary seeding and mulching will be measured by the square yard.~~
- ~~b. Temporary slope drains will be measured by the linear foot.~~
- ~~c. Temporary benches, dikes, dams, and sediment basins will be measured by the cubic yard of excavation performed, including necessary cleaning of sediment basins, and the cubic yard of embankment placed as directed by the Engineer.~~
- ~~d. All fertilizing will be measured by the ton.~~
- ~~e. Installation and removal of silt fence will be measured by the linear foot.~~
- f. Culvert inlet protection will be measured per each.
- g. Inlet protection will be measured per each.
- h. Curb inlet protection will be measured per each
- i. Installation and removal of silt sock will be measured by the linear foot.
- j. Stone construction entrance will be measured per each

102-4.2 Control work performed for protection of construction areas outside the construction limits, such as borrow and waste areas, haul roads, equipment and material storage sites, and temporary plant sites, will not be measured and paid for directly but shall be considered as a subsidiary obligation of the Contractor.

BASIS OF PAYMENT

102-5.1 Accepted quantities of temporary water pollution, soil erosion, and siltation control work ordered by the Engineer and measured as provided in paragraph 102-4.1, INCLUDING INSTALLATION, MAINTENANCE, AND REMOVAL UNLESS OTHERWISE NOTED, will be paid for under:

- Item C-102-5.1f Inlet Protection - per each
- Item C-102-5.1g Culvert Inlet Protection - per each
- Item C-102-5.1h Curb Inlet Protection - per each
- Item C-102-5.1i Installation and Removal of Silt Sock - per linear foot
- Item C-102-5.1j Stone Construction Entrance - per each

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*.

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

AC 150/5200-33 Hazardous Wildlife Attractants on or Near Airports

AC 150/5370-2 Operational Safety on Airports During Construction

ASTM International (ASTM)

ASTM D6461 Standard Specification for Silt Fence Materials

United States Department of Agriculture (USDA)

FAA/USDA Wildlife Hazard Management at Airports, A Manual for Airport Personnel

END OF ITEM C-102

Item C-105 Mobilization

DESCRIPTION

105-1 Description. This item of work shall consist of, but is not limited to, work and operations necessary for the movement of personnel, equipment, material and supplies to and from the project site for work on the project except as provided in the contract as separate pay items.

105-2 Mobilization limit. Mobilization shall be limited to 10 percent of the total project cost. THE MOBILIZATION AMOUNT SHALL BE DOCUMENTED IN ACCORDANCE WITH THE SPECIAL PROVISIONS. ANY MOBILIZATION COSTS OVER THE STATED PERCENTAGE WILL BE PAID FOR ON AN AS-INCURRED BASIS. ANY NON-INCURRED COSTS WILL NOT BE PAID.

105-3 Posted notices. Prior to commencement of construction activities, the Contractor must post the following documents in a prominent and accessible place where they may be easily viewed by all employees of the prime Contractor and by all employees of subcontractors engaged by the prime Contractor: Equal Employment Opportunity (EEO) Poster “Equal Employment Opportunity is the Law” in accordance with the Office of Federal Contract Compliance Programs Executive Order 11246, as amended; Davis Bacon Wage Poster (WH 1321) - DOL “Notice to All Employees” Poster; and Applicable Davis-Bacon Wage Rate Determination. These notices must remain posted until final acceptance of the work by the Owner.

105-4 Engineer/RPR field office. The Contractor shall provide dedicated space for the use of the field RPR and inspectors, as a field office for the duration of the project. This space shall be located conveniently near the construction and shall be separate from any space used by the Contractor. The Contractor shall furnish water, sanitary facilities, heat, air conditioning, and electricity in accordance with local building codes.

METHOD OF MEASUREMENT

105-5 Basis of measurement and payment. Based upon the contract lump sum price for “Mobilization” partial payments will be allowed as follows:

- a. With first pay request, 25%.
- b. When 25% or more of the original contract is earned, an additional 25%.
- c. When 50% or more of the original contract is earned, an additional 40%.
- d. After Final Inspection, Staging area clean-up and delivery of all Project Closeout materials as required by Section 90, paragraph 90-11, *Contractor Final Project Documentation*, the final 10%.

BASIS OF PAYMENT

105-6 Payment will be made under:

Item C-105 Mobilization

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Office of Federal Contract Compliance Programs (OFCCP)

Executive Order 11246, as amended

EEOC-P/E-1 – Equal Employment Opportunity is the Law Poster

United States Department of Labor, Wage and Hour Division (WHD)

WH 1321 – Employee Rights under the Davis-Bacon Act Poster

END OF ITEM C-105

Item C-110 Method of Estimating Percentage of Material Within Specification Limits (PWL)

DESCRIPTION

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:

$$Q_L = (\bar{X} - L) / S_n$$

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:

$$Q_L = (\bar{X} - L) / S_n$$

and

$$Q_U = (U - \bar{X}) / S_n$$

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 (measurement - average)/(standard deviation) is less than test criterion,
then the measurement is not considered an outlier.

For A-3, check if (99.30 - 97.95) / 1.15 is greater than 1.463.

Since 1.174 is less than 1.463, the value is not an outlier.

b. For measurements less than the average:

If (average - measurement)/(standard deviation) is less than test criterion,
then the measurement is not considered an outlier.

For A-1, check if (97.95 - 96.60) / 1.15 is greater than 1.463.

Since 1.435 is less than 1.463, the value is not an outlier.

Note: In this example, a measurement would be considered an outlier if the density were:

Greater than $(97.95 + 1.463 \times 1.15) = 99.63\%$

OR

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
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
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 (PL and PU)	Negative Values of Q (Q _L and Q _U)							
	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10
49	-0.0363	-0.0300	-0.0281	-0.0272	-0.0267	-0.0264	-0.0262	-0.0260
48	-0.0725	-0.0600	-0.0562	-0.0544	-0.0534	-0.0528	-0.0524	-0.0521
47	-0.1087	-0.0900	-0.0843	-0.0817	-0.0802	-0.0793	-0.0786	-0.0781

46	-0.1447	-0.1200	-0.1125	-0.1090	-0.1070	-0.1057	-0.1049	-0.1042
45	-0.1806	-0.1500	-0.1406	-0.1363	-0.1338	-0.1322	-0.1312	-0.1304
44	-0.2164	-0.1800	-0.1688	-0.1636	-0.1607	-0.1588	-0.1575	-0.1566
43	-0.2519	-0.2100	-0.1971	-0.1911	-0.1877	-0.1855	-0.1840	-0.1829
42	-0.2872	-0.2400	-0.2254	-0.2186	-0.2147	-0.2122	-0.2105	-0.2093
41	-0.3222	-0.2700	-0.2537	-0.2461	-0.2418	-0.2391	-0.2372	-0.2358
40	-0.3568	-0.3000	-0.2822	-0.2738	-0.2691	-0.2660	-0.2639	-0.2624
39	-0.3911	-0.3300	-0.3107	-0.3016	-0.2964	-0.2931	-0.2908	-0.2892
38	-0.4251	-0.3600	-0.3392	-0.3295	-0.3239	-0.3203	-0.3179	-0.3161
37	-0.4586	-0.3900	-0.3679	-0.3575	-0.3515	-0.3477	-0.3451	-0.3432
36	-0.4916	-0.4200	-0.3967	-0.3856	-0.3793	-0.3753	-0.3725	-0.3705
35	-0.5242	-0.4500	-0.4255	-0.4139	-0.4073	-0.4030	-0.4001	-0.3980
34	-0.5563	-0.4800	-0.4545	-0.4424	-0.4355	-0.4310	-0.4280	-0.4257
33	-0.5878	-0.5100	-0.4836	-0.4710	-0.4638	-0.4592	-0.4560	-0.4537
32	-0.6187	-0.5400	-0.5129	-0.4999	-0.4924	-0.4877	-0.4844	-0.4820
31	-0.6490	-0.5700	-0.5423	-0.5290	-0.5213	-0.5164	-0.5130	-0.5105
30	-0.6787	-0.6000	-0.5719	-0.5582	-0.5504	-0.5454	-0.5419	-0.5394
29	-0.7077	-0.6300	-0.6016	-0.5878	-0.5798	-0.5747	-0.5712	-0.5686
28	-0.7360	-0.6600	-0.6316	-0.6176	-0.6095	-0.6044	-0.6008	-0.5982
27	-0.7636	-0.6900	-0.6617	-0.6477	-0.6396	-0.6344	-0.6308	-0.6282
26	-0.7904	-0.7200	-0.6921	-0.6781	-0.6701	-0.6649	-0.6613	-0.6587
25	-0.8165	-0.7500	-0.7226	-0.7089	-0.7009	-0.6958	-0.6922	-0.6896
24	-0.8417	-0.7800	-0.7535	-0.7401	-0.7322	-0.7271	-0.7236	-0.7211
23	-0.8662	-0.8100	-0.7846	-0.7716	-0.7640	-0.7590	-0.7556	-0.7531
22	-0.8897	-0.8400	-0.8160	-0.8036	-0.7962	-0.7915	-0.7882	-0.7858
21	-0.9124	-0.8700	-0.8478	-0.8360	-0.8291	-0.8245	-0.8214	-0.8192
20	-0.9342	-0.9000	-0.8799	-0.8690	-0.8625	-0.8583	-0.8554	-0.8533
19	-0.9550	-0.9300	-0.9123	-0.9025	-0.8966	-0.8928	-0.8901	-0.8882
18	-0.9749	-0.9600	-0.9452	-0.9367	-0.9315	-0.9281	-0.9258	-0.9241
17	-0.9939	-0.9900	-0.9785	-0.9715	-0.9671	-0.9643	-0.9624	-0.9610
16	-1.0119	-1.0200	-1.0124	-1.0071	-1.0037	-1.0015	-1.0000	-0.9990
15	-1.0288	-1.0500	-1.0467	-1.0435	-1.0413	-1.0399	-1.0389	-1.0382
14	-1.0448	-1.0800	-1.0817	-1.0808	-1.0800	-1.0794	-1.0791	-1.0789
13	-1.0597	-1.1100	-1.1173	-1.1192	-1.1199	-1.1204	-1.1208	-1.1212
12	-1.0736	-1.1400	-1.1537	-1.1587	-1.1613	-1.1630	-1.1643	-1.1653
11	-1.0864	-1.1700	-1.1909	-1.1995	-1.2043	-1.2075	-1.2098	-1.2115
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

Part 3 – Sitework

Item P-101 Preparation/Removal of Existing Pavements

DESCRIPTION

101-1 This item shall consist of preparation of existing pavement surfaces for overlay, surface treatments, removal of existing pavement, and other miscellaneous items. The work shall be accomplished in accordance with these specifications and the applicable plans.

EQUIPMENT AND MATERIALS

101-2 All equipment and materials shall be specified here and in the following paragraphs or approved by the Engineer. The equipment shall not cause damage to the pavement to remain in place.

CONSTRUCTION

101-3.1 Removal of existing pavement. The Contractor's removal operation shall be controlled to not damage adjacent pavement structure, and base material, cables, utility ducts, pipelines, or drainage structures which are to remain under the pavement.

a. Concrete pavement removal. Section not used.

b. Asphalt pavement removal. Asphalt pavement to be removed shall be cut to the full depth of the asphalt pavement around the perimeter of the area to be removed. ASPHALT PAVEMENT SHALL BE REMOVED OF OFFSITE.

c. Repair or removal of Base, Subbase, and/or Subgrade. Section not used.

101-3.2 Preparation of joints and cracks prior to overlay/surface treatment. Remove all vegetation and debris from cracks to a minimum depth of 1 inch (25 mm). If extensive vegetation exists, treat the specific area with a concentrated solution of a water-based herbicide approved by the Engineer.

Fill all cracks greater than 1/4 inch (6 mm) wide with a crack sealant as shown on the plans. The crack sealant, preparation, and application shall be compatible with the surface treatment/overlay to be used. To minimize contamination of the asphalt with the crack sealant, underfill the crack sealant a minimum of 1/8 inch (3 mm), not to exceed 1/4 inch (6 mm). Any excess joint or crack sealer shall be removed from the pavement surface.

101-3.3 Removal of Foreign Substances/contaminates prior to overlay. Removal of foreign substances/contaminates from existing pavement that will affect the bond of the new treatment shall consist of removal of rubber, fuel spills, oil, crack sealer, at least 90% of paint, and other foreign substances from the surface of the pavement. Areas that require removal are designated on the plans and as directed by the Engineer in the field during construction.

High-pressure water, Heater scarifier (asphaltic concrete only), Cold milling, Rotary grinding, or Sandblasting may be used.

If chemicals are used, they shall comply with the state's environmental protection regulations.

Removal methods used shall not cause major damage to the pavement, or to any structure or utility within or adjacent to the work area. Major damage is defined as changing the properties of the pavement, removal of asphalt causing the aggregate to ravel, or removing pavement over 1/8 inch (3 mm) deep. If it is deemed by the Engineer that damage to the existing pavement is caused by operational error, such as permitting the application method to dwell in one location for too long, the Contractor shall repair the damaged area without compensation and as directed by the Engineer.

Removal of foreign substances shall not proceed until approved by the Engineer. Water used for high-pressure water equipment shall be provided by the Contractor at the Contractor's expense. No material shall be deposited on the pavement shoulders. All wastes shall be disposed of in areas indicated in this specification or shown on the plans.

101-3.4 Concrete spall or failed asphaltic concrete pavement repair. Section not used.

101-3.5 Cold milling. Milling shall be performed with a power-operated milling machine or grinder, capable of producing a uniform finished surface. The milling machine or grinder shall operate without tearing or gouging the underlying surface. The milling machine or grinder shall be equipped with grade and slope controls, and a positive means of dust control.

All millings shall be removed and disposed off Airport property. If the Contractor mills or grinds deeper or wider than the plans specify, the Contractor shall replace the material removed with new material at the Contractor's Expense.

a. Patching. The milling machine shall be capable of cutting a vertical edge without chipping or spalling the edges of the remaining pavement and it shall have a positive method of controlling the depth of cut. The Engineer shall layout the area to be milled with a straightedge in increments of 1-foot (30 cm) widths. The area to be milled shall cover only the failed area. Any excessive area that is milled because the Contractor doesn't have the appropriate milling machine, or areas that are damaged because of his negligence, shall be repaired by the Contractor at the Contractor's Expense.

b. Profiling, grade correction, or surface correction. The milling machine shall have a minimum width of 7 feet and it shall be equipped with electronic grade control devices that will cut the surface to the grade specified. The tolerances shall be maintained within +0 inch and -1/4 inch (+0 mm and -6mm) of the specified grade. The machine must cut vertical edges and have a positive method of dust control. The machine must have the ability to remove the millings or cuttings from the pavement and load them into a truck. All millings shall be removed and disposed of off the Airport.

c. Clean-up. The Contractor shall sweep the milled surface daily and immediately after the milling until all residual materials are removed from the pavement surface. Prior to paving, the Contractor shall wet down the milled pavement and thoroughly sweep and/or blow the surface to remove loose residual material. Waste materials shall be collected and removed from the pavement surface and adjacent areas by sweeping or vacuuming. Waste materials shall be removed and disposed off Airport property.

101-3.6. Preparation of asphalt pavement surfaces prior to surface treatment. Section not used.

101-3.7 Maintenance. The Contractor shall perform all maintenance work necessary to keep the pavement in a satisfactory condition until the full section is complete and accepted by the Engineer. The surface shall be kept clean and free from foreign material. The pavement shall be properly drained at all times. If cleaning is necessary or if the pavement becomes disturbed, any work repairs necessary shall be performed at the Contractor's expense.

101-3.8 Preparation of Joints in Rigid Pavement prior to resealing. Section not used.

101-3.9 Preparation of Cracks in Flexible Pavement prior to sealing. Prior to application of sealant material, clean and dry the joints of all scale, dirt, dust, old sealant, curing compound, moisture and other

foreign matter. The Contractor shall demonstrate, in the presence of the Engineer, that the method used cleans the cracks and does not damage the pavement.

a. Preparation of Crack. Widen crack with router by removing a minimum of 1/16 inch (2 mm) from each side of crack. Immediately before sealing, cracks will be blown out with a hot air lance combined with oil and water-free compressed air.

b. Removal of Existing Crack Sealant. Existing sealants will be removed by routing. Following routing, any remaining debris will be removed by use of a hot lance combined with oil and water-free compressed air.

c. Crack Sealant. Crack sealant material and installation will be in accordance with the details as shown on the plans.

101-3.10 Removal of Pipe and other Buried Structures.

a. Removal of Existing Pipe Material. Remove the types of pipe as indicated on the plans. The pipe material shall be legally disposed of off-site in a timely manner following removal. Trenches shall be backfilled with material equal to or better in quality than adjacent embankment. Trenches under paved areas must be compacted to 95% of ASTM D1557.

b. Removal of Inlets/Manholes. Where indicated on the plans or as directed by the Engineer, inlets and/or manholes shall be removed and legally disposed of off-site in a timely fashion after removal. Excavations after removal shall be backfilled with material equal or better in quality than adjacent embankment. When under paved areas must be compacted to 95% of ASTM D1557, when outside of paved areas must be compacted to 95% of ASTM D698.

c. Removal of Lights, Signs, and Systems. Removal of electrical items shall include the transformers, cans, extensions, flanges, concrete bases, poles, cable, etc., that are to be replaced as part of this project. All fixtures desired by the Owner shall remain the property of the Owner and be stored on-site at a location designated by the Owner. All other electrical demolition items shall be disposed of off-site by the Contractor in a lawful manner.

d. Miscellaneous Demolition. Any miscellaneous demolition items shown on the plans shall be demolished or removed, and all materials therefrom shall be removed from the site. The remaining or existing foundations, and all like structures, shall be destroyed by breaking out, or breaking down, the materials of which the foundations, etc., are built to a depth at least 2 feet below proposed subgrade elevations, bottom of foundation elevations, or the existing surrounding ground. All broken concrete, blocks, or other objectionable material shall be removed and disposed of off-site by the Contractor. The holes or openings shall be backfilled with acceptable material and properly compacted in accordance with P-152.

METHOD OF MEASUREMENT

101-4.1 Pavement removal. The unit of measurement for pavement removal shall be the number of square yards removed by the Contractor. Any pavement removed outside the limits of removal because the pavement was damaged by negligence on the part of the Contractor shall not be included in the measurement for payment. No direct measurement or payment shall be made for saw cutting. Saw cutting shall be incidental to pavement removal. ~~Dowel bar installation shall be incidental to pavement removal.~~

101-4.2 Joint and crack repair. The unit of measurement for joint and crack repair shall be the linear foot of joint.

101-4.3 Removal of Foreign Substances/contaminates. Foreign substances/contaminates removal shall be incidental to the project. No measurement shall be made.

101-4.4 Spalled and failed asphalt pavement repair. Not required.

101-4.5 Concrete Spall Repair. Not required.

101-4.6 Cold milling. The unit of measure for cold milling shall be at the depth specified ~~inches of~~ ~~milling~~ per square yard. The location and average depth of the cold milling shall be as shown on the plans. If the initial cut does not correct the condition, the Contractor shall re-mill the area and will be paid for the total depth of milling.

101-4.7 Removal of Existing Pipe Material. The unit of measurement for removal of pipe will be made at the contract unit price per linear foot completed and accepted. This price shall be full compensation for all labor, equipment, tools, and incidentals necessary to complete this item in accordance with paragraph 101-3.10.

101-4.8 Removal of Concrete Ditch. The unit of measurement for removal of concrete ditch will be made at the contract unit price per square yard completed and accepted. This price shall be full compensation for all labor, equipment, tools, and incidentals necessary to complete this item.

101-4.9 Removal of Conduit and Cable. The unit of measurement for remove cable and conduit will be per linear foot of the trench. The trench should be cleared of all conduit, cable, counterpoise, warning tape, spacers, etc. The contract unit price per each foot shall be full compensation for all labor, material, equipment, tools, and incidentals necessary to complete this item.

101-4.10 Removal of Airfield Guidance Foundation. The unit of measurement for remove airfield guidance foundation will be made per each foundation removed. The contract unit price per each shall be full compensation for all labor, materials, equipment, tools, and incidentals necessary to complete this item.

101-4.11 Miscellaneous Demolition. The unit of measurement for miscellaneous demolition shall be lump sum. Miscellaneous demolition is demolition that is not otherwise specified in this section as a pay item.

BASIS OF PAYMENT

101-5.1 Payment. Payment shall be made at the contract unit price for the unit of measurement as specified above. This price shall be full compensation for furnishing all materials and for all preparation, REMOVAL, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

Item P-101-5.1 Bituminous Pavement Removal – per square yard

Item P-101-5.2 Joint and Crack Repair (Type) – per linear foot

Item P-101-5.6 Cold Milling (Depth) – per square yard

Item P-101-5.7 Removal of Pipe – per linear foot

Item P-101-5.8 Removal of Concrete Ditch – per square yard

Item P-101-5.10 Removal of Conduit and Cable – per linear foot

Item P-101-5.11 Removal of Airfield Guidance Foundation – per each

Item P-101-5.12 Miscellaneous Demolition – lump sum

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

AC 150/5380-6 Guidelines and Procedures for Maintenance of Airport Pavements

ASTM International (ASTM)

ASTM D6690 Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements

END OF ITEM P-101

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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:

b. Muck Excavation. Muck excavation shall consist of the removal and disposal of deposits or mixtures of soils and organic matter not suitable for foundation material. Muck shall include materials that will decay or produce subsidence in the embankment. It may consist of decaying stumps, roots, logs, humus, or other material not satisfactory for incorporation in the embankment.

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 Engineer.

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 Engineer. 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 Engineer.

When the Contractor's excavating operations encounter artifacts of historical or archaeological significance, the operations shall be temporarily discontinued and the Engineer notified per Section 70, paragraph 70-20. At the direction of the Engineer, 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 Engineer, 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 Engineer has obtained from the Contractor the survey notes of the elevations and measurements of the ground surface. The Contractor and Engineer 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.

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 Engineer. 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 Engineer. 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 Engineer 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 (300 mm) below the subgrade or to the depth specified by the Engineer. Muck, peat, matted roots, or other yielding material, unsatisfactory for subgrade foundation, shall be removed to the depth specified. Unsuitable materials shall be disposed of at locations shown on the plans. This excavated material shall be paid for at the contract unit price per cubic yard for "Muck Excavation." 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 "Muck 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 Engineer. All over-break shall be graded or removed by the Contractor and disposed of as directed by the Engineer. The Engineer 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 Engineer determines as avoidable. Unavoidable over-break will be classified as "Unclassified Excavation."

d. Removal of utilities. The removal of existing structures and utilities required to permit the orderly progress of work will be accomplished by the Contractor as indicated on the plans. All existing foundations shall be excavated at least 2 feet (60 cm) below the top of subgrade or as indicated on the plans, and the material disposed of as directed by the Engineer. All foundations thus excavated shall be backfilled with suitable material and compacted as specified for embankment or as shown on the plans.

152-2.3 Borrow excavation. Borrow areas are not required.

152-2.4 Drainage excavation. Drainage excavation shall consist of excavating drainage ditches including intercepting, inlet, or outlet ditches; or other types as shown on the plans. The work shall be performed in

sequence with the other construction. Ditches shall be constructed prior to starting adjacent excavation operations. All satisfactory material shall be placed in embankment fills; unsuitable material shall be placed in designated waste areas or as directed by the Engineer. All necessary work shall be performed true to final line, elevation, and cross-section. The Contractor shall maintain ditches constructed on the project to the required cross-section and shall keep them free of debris or obstructions until the project is accepted.

152-2.5 Preparation of cut areas or areas where existing pavement has been removed. In those areas on which a subbase or base course is to be placed, the top 12 inches of subgrade shall be compacted to not less than 100% of maximum density for non-cohesive soils, and 95% of maximum density for cohesive soils as determined by ASTM 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 Engineer, that the materials, equipment, and construction processes meet the requirements of this specification. The sequence and manner of rolling necessary to obtain specified density requirements shall be determined. The maximum compacted thickness may be increased to a maximum of 12 inches (300 mm) upon the Contractor's demonstration that approved equipment and operations will uniformly compact the lift to the specified density. The Engineer 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 Engineer. 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 Engineer.

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 Engineer. 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 Engineer 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 D1557. A new Proctor shall be developed for each soil type based on visual classification.

Density tests will be taken by the Engineer for every 1,000 square yards of compacted embankment for each lift which is required to be compacted, or other appropriate frequencies as determined by the Engineer.

If the material has greater than 30% retained on the 3/4-inch (19.0 mm) sieve, follow AASHTO T-180 Annex Correction of maximum dry density and optimum moisture for oversized particles.

Rolling operations shall be continued until the embankment is compacted to not less than 100% of maximum density for non-cohesive soils, and 95% of maximum density for cohesive soils as determined by ASTM D1557. Under all areas to be paved, the embankments shall be compacted to a depth of 12 inches and to a density of not less than 100% of the maximum density 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 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. The Engineer shall perform all density tests. If the specified density is not attained, the area represented by the test or as designated by the Engineer shall be reworked and/or re-compacted and additional random tests made. This procedure shall be followed until the specified density is reached.

Compaction areas shall be kept separate, and no lift shall be covered by another lift until the proper density is obtained.

During construction of the embankment, the Contractor shall route all construction equipment evenly over the entire width of the embankment as each lift is placed. Lift placement shall begin in the deepest portion of the embankment fill. As placement progresses, the lifts shall be constructed approximately parallel to the finished pavement grade line.

When rock, concrete pavement, asphalt pavement, and other embankment material are excavated at approximately the same time as the subgrade, the material shall be incorporated into the outer portion of the embankment and the subgrade material shall be incorporated under the future paved areas. Stones, fragmentary rock, and recycled pavement larger than 4 inches (100 mm) in their greatest dimensions will not be allowed in the top 12 inches (300 mm) of the subgrade. Rockfill shall be brought up in lifts as

specified or as directed by the Engineer 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 Engineer.

When the excavated material consists predominantly of rock fragments of such size that the material cannot be placed in lifts of the prescribed thickness without crushing, pulverizing or further breaking down the pieces, such material may be placed in the embankment as directed in lifts not exceeding 2 feet (60 cm) in thickness. Each lift shall be leveled and smoothed with suitable equipment by distribution of spalls and finer fragments of rock. The lift shall not be constructed above an elevation 4 feet (1.2 m) below the finished subgrade.

There will be no separate measurement of payment for compacted embankment. All costs incidental to placing in lifts, compacting, discing, watering, mixing, sloping, and other operations necessary for construction of embankments will be included in the contract price for excavation, borrow, or other items.

152-2.9 Proof rolling. The purpose of proof rolling the subgrade is to identify any weak areas in the subgrade and not for compaction of the subgrade. Before start of embankment and after compaction is completed, the subgrade area shall be proof rolled with a 20-ton Tandem axle Dual Wheel Dump Truck loaded to the legal limit with tires inflated to 100 psi in the presence of the Engineer. Apply a minimum of 2 coverages, or as specified by the Engineer, under pavement areas. A coverage is defined as the application of one tire print over the designated area. Soft areas of subgrade that deflect more than 1 inch (25 mm) or show permanent deformation greater than 1 inch (25 mm) shall be removed and replaced with suitable material or reworked to conform to the moisture content and compaction requirements in accordance with these specifications. Removal and replacement of soft areas is incidental to this item.

152-2.10 Compaction requirements. The subgrade under areas to be paved shall be compacted to a depth of 12 inches and to a density of not less than 100% 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 and to a density of not less than 95% of the maximum density as determined by ASTM D1557.

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 1,000 square yards of subgrade. All quality assurance testing shall be done by the Engineer.

The in-place field density shall be determined in accordance with 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 Engineer 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-compact, 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 Engineer.

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-compact to grade until the required smoothness and accuracy are obtained and approved by the Engineer. The Contractor shall perform all final smoothness and grade checks in the presence of the Engineer. Any deviation in surface tolerances shall be corrected by the Contractor at the Contractor's expense.

a. Smoothness. The finished surface shall not vary more than +/- ½ inch (12 mm) when tested with a 12-foot (3.7-m) straightedge applied parallel with and at right angles to the centerline. The straightedge shall be moved continuously forward at half the length of the 12-foot (3.7-m) straightedge for the full length of each line on a 50-foot (15-m) grid.

b. Grade. The grade and crown shall be measured on a 50-foot (15-m) grid and shall be within +/-0.05 feet (15 mm) of the specified grade.

On safety areas, turfed areas and other designated areas within the grading limits where no subbase or base is to 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 Engineer, 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 Measurement for payment specified by the cubic yard shall be computed by the average end areas of design cross sections for computation of neat line design quantities. The end area is that bound by the original ground line established by field cross sections and the final theoretical pay line established by cross sections shown on the plans, subject to verification by the Engineer. THE QUANTITY OF UNCLASSIFIED EXCAVATION WILL NOT BE MEASURED FOR PAYMENT.~~

The quantity of muck 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 Embankment. Section not used.

152-3.3 Stockpiled material. Section not used.

BASIS OF PAYMENT

152-4.1 Excavation. Payment for unclassified excavation and muck excavation shall be made at the contract unit price per LUMP SUM AND CUBIC YARD RESPECTIVELY. This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item.

152-4.2 Embankment. Section not used.

152-4.3 Stockpiled material. Section not used.

Payment will be made under:

Item P-152-4.1 Unclassified Excavation – per lump sum

Item P-152-4.1 Muck Excavation – per cubic yard

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO T-180 Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop

ASTM International (ASTM)

ASTM D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/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

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

Part 4 – Base Courses

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 or crushed gravel 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 or gravel 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
Fine Aggregate		
Liquid limit	Less than or equal to 25	ASTM D4318
Plasticity Index	Not more than five (5)	ASTM D4318

¹ The area of each face shall be equal to at least 75% of the smallest mid-sectional area of the piece. When two fractured faces are contiguous, the angle between the planes of fractures shall be at least 30 degrees to count as two fractured faces.

² A flat particle is one having a ratio of width to thickness greater than five (5); an elongated particle is one having a ratio of length to width greater than five (5).

209-2.2 Gradation requirements. The gradation of the aggregate base material shall meet the requirements of the gradation given in the following table when tested per ASTM C117 and ASTM C136.

The gradation shall be well graded from coarse to fine and shall not vary from the lower limit on one sieve to the high limit on an adjacent sieve or vice versa.

Gradation of Aggregate Base

Sieve Size	Design Range Percentage by Weight passing	Contractor's Final Gradation	Job Control Grading Band Tolerances ¹ (Percent)
2 inch (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 (425 µm) ²	10-30		±5
No. 200 (75 µm) ²	0-10		±3

¹ The "Job Control Grading Band Tolerances for Contractor's Final Gradation" in the table shall be applied to "Contractor's Final Gradation" to establish a job control grading band. The full tolerance still applies if application of the tolerances results in a job control grading band outside the design range.

² The fraction of material passing the No 200 (75 µm) sieve shall not exceed two-thirds the fraction passing the No 40 (425 µm) sieve.

209-2.3 Sampling and Testing.

a. Aggregate base materials. The Contractor shall take samples of the aggregate base in accordance with ASTM D75 to verify initial aggregate base requirements and gradation. Material shall meet the requirements in paragraph 209-2.1. This sampling and testing will be the basis for approval of the aggregate base quality requirements.

b. Gradation requirements. The Contractor shall take at least two aggregate base samples per day in the presence of the Engineer 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 Engineer.

209-2.4 Separation Geotextile. Separation geotextile shall be Class 2, 0.02 sec⁻¹ permittivity per ASTM D4491, Apparent opening size per ASTM D4751 with 0.60 mm maximum average roll value.

CONSTRUCTION METHODS

209-3.1 Control strip. The first half-day of construction shall be considered the control strip. The Contractor shall demonstrate, in the presence of the Engineer, 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 Engineer 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 Engineer. 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 Engineer.

209-3.2 Preparing underlying subgrade and/or subbase. The underlying subgrade and/or subbase shall be checked and accepted by the Engineer 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 Engineer 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 Engineer, to a uniform thickness and width. The equipment shall have positive thickness controls to minimize the need for additional manipulation of the material. Dumping from vehicles that require re-handling shall not be permitted. Hauling over the uncompacted base course shall not be permitted.

The aggregate shall meet gradation and moisture requirements prior to compaction. The base course shall be constructed in lifts as established in the control strip, but not less than 4 inches (100 mm) nor more than 12 inches (300 mm) of compacted thickness.

When more than one lift is required to establish the layer thickness shown on the plans, the construction procedure described here shall apply to each lift. No lift shall be covered by subsequent lifts until tests verify that compaction requirements have been met. The Contractor shall rework, re-compact and retest any material placed which does not meet the specifications at the Contractor's expense.

209-3.5 Compaction. Immediately after completion of the spreading operations, compact each layer of the base course, as specified, with approved compaction equipment. The number, type, and weight of rollers shall be sufficient to compact the material to the required density within the same day that the aggregate is placed on the subgrade.

The field density of each compacted lift of material shall be at least 100% of the maximum density of laboratory specimens prepared from samples of the base material delivered to the jobsite. The laboratory specimens shall be compacted and tested in accordance with ASTM D1557. The moisture content of the material during placing operations shall be within ± 2 percentage points of the optimum moisture content as determined by ASTM D1557. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

209-3.6 Weather limitations. Material shall not be placed unless the ambient air temperature is at least 40°F (4°C) and rising. Work on base course shall not be conducted when the subgrade or subbase is wet or frozen or the base material contains frozen material.

209-3.7 Maintenance. The base course shall be maintained in a condition that will meet all specification requirements. When material has been exposed to excessive rain, snow, or freeze-thaw conditions, prior to placement of additional material, the Contractor shall verify that materials still meet all specification requirements. Equipment may be routed over completed sections of base course, provided that no damage results and the equipment is routed over the full width of the completed base course. Any damage resulting to the base course from routing equipment over the base course shall be repaired by the Contractor at the Contractor's expense.

209-3.8 Surface tolerances. After the course has been compacted, the surface shall be tested for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified to a depth of at least 3 inches (75 mm), reshaped and

recompacted to grade until the required smoothness and accuracy are obtained and approved by the Engineer. Any deviation in surface tolerances shall be corrected by the Contractor at the Contractor's expense. The smoothness and accuracy requirements specified here apply only to the top layer when base course is constructed in more than one layer.

a. Smoothness. The finished surface shall not vary more than 3/8-inch (9 mm) when tested with a 12-foot (3.7-m) straightedge applied parallel with and at right angles to the centerline. The straightedge shall be moved continuously forward at half the length of the 12-foot (3.7-m) straightedge for the full length of each line on a 50-foot (15-m) grid.

b. Grade. The grade and crown shall be measured on a 50-foot (15-m) grid and shall be within +0 and -1/2 inch (12 mm) of the specified grade.

209-3.9 Acceptance sampling and testing. Crushed aggregate base course shall be accepted for density and thickness on an area basis. Two tests shall be made for density and thickness for each 1200 square yards. Sampling locations will be determined on a random basis per ASTM D3665.

a. Density. The Engineer shall perform all density tests. Each area shall be accepted for density when the field density is at least 100% of the maximum density of laboratory specimens compacted and tested per ASTM D1557. The in-place field density shall be determined per ASTM D1556. If the specified density is not attained, the area represented by the failed test must be reworked and/or recompacted and two additional random tests made. This procedure shall be followed until the specified density is reached. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

b. Thickness. Depth tests shall be made by test holes at least 3 inches (75 mm) in diameter that extend through the base. The thickness of the base course shall be within +0 and -1/2 inch (12 mm) of the specified thickness as determined by depth tests taken by the Contractor in the presence of the Engineer for each area. Where the thickness is deficient by more than 1/2-inch (12 mm), the Contractor shall correct such areas at no additional cost by scarifying to a depth of at least 3 inches (75 mm), adding new material of proper gradation, and the material shall be blended and recompacted to grade. The Contractor shall replace, at his expense, base material where depth tests have been taken.

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 Engineer as complying with the plans and specifications. Base materials shall not be included in any other excavation quantities.

209-4.2 Separation geotextile shall be measured by the number of square yards of materials placed and accepted by the Engineer as complying with the plans and specifications excluding seam overlaps and edge anchoring.

BASIS OF PAYMENT

209-5.1 Payment shall be made at the contract unit price per cubic yard for crushed aggregate base course. This price shall be full compensation for furnishing all materials, for preparing and placing these materials, and for all labor, equipment tools, and incidentals necessary to complete the item.

209-5.2 Payment shall be made at the contract unit price per square yard for separation geotextile. The price shall be full compensation for furnishing all labor, equipment, material, anchors, and incidentals necessary.

Payment will be made under:

Item P-209-5.1 Crushed Aggregate Base Course – per cubic yard

Item P-209-5.2 Separation geotextile – per square yard

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C29	Standard Test Method for Bulk Density (“Unit Weight”) and Voids in Aggregate
ASTM C88	Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C117	Standard Test Method for Materials Finer than 75- μm (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C131	Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C142	Standard Test Method for Clay Lumps and Friable Particles in Aggregates
ASTM D75	Standard Practice for Sampling Aggregates
ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft ³ (600 kN-m/m ³))
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft ³ (2700 kN-m/m ³))
ASTM D2167	Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D2419	Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate
ASTM D3665	Standard Practice for Random Sampling of Construction Materials
ASTM D4318	Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4491	Standard Test Methods for Water Permeability of Geotextiles by Permittivity
ASTM D4643	Standard Test Method for Determination of Water Content of Soil and Rock by Microwave Oven Heating
ASTM D4751	Standard Test Methods for Determining Apparent Opening Size of a Geotextile

ASTM D4791	Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM D5821	Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate
ASTM D6938	Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM D7928	Standard Test Method for Particle-Size Distribution (Gradation) of Fine-Grained Soils Using the Sedimentation (Hydrometer) Analysis
American Association of State Highway and Transportation Officials (AASHTO) M288	Standard Specification for Geosynthetic Specification for Highway Applications

END OF ITEM P-209

Part 6 – Flexible Pavements

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	1.0 % maximum	ASTM C142
Percentage of Fractured Particles	For pavements designed for aircraft gross weights of 60,000 pounds or more: Minimum 75% by weight of particles with at least two fractured faces and 85% with at least one fractured face ¹	ASTM D5821
	For pavements designed for aircraft gross weights less than 60,000 pounds: 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	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	1.0% maximum	ASTM C142
Sand equivalent	45 minimum	ASTM D2419
Natural Sand	0% to 15% maximum by weight of total aggregate ¹	ASTM D1073

¹ IF NATURAL SAND IS USED, USE THE MINIMUM AMOUNT NECESSARY TO ACHIEVE A WORKABLE MIXTURE, NOT TO EXCEED 15% BY WEIGHT OF TOTAL AGGREGATE.

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) 82-22.

Asphalt Binder PG Plus Test Requirements

Material Test	Requirement	Standard
Elastic Recovery	75% minimum	ASTM D6084 ¹

¹ Follow procedure B on RTFO aged binder.

401-2.4 Anti-stripping agent. Any anti-stripping agent or additive (anti-strip) shall be heat stable and shall not change the asphalt binder grade beyond specifications. Anti-strip shall be an approved material of the 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 Engineer 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 Engineer for review and accepted in writing. The Engineer'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 Engineer for review and accepted in writing before the new material is used. After the initial production JMF has been approved by the Engineer 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 Engineer, will be borne by the Contractor.

The Engineer 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.
- Percentage and properties (asphalt content, asphalt binder properties, and aggregate properties) of reclaimed asphalt mix pavement (RAP) in accordance with paragraph 401-3.4.

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 80 at a saturation of 70-80%	ASTM D4867
Asphalt Pavement Analyzer (APA) ^{2,3}	Less than 10 mm @ 4000 passes	AASHTO T340 at 250 psi hose pressure at 64°C test temperature

¹ Test specimens for TSR shall be compacted at 7 ± 1.0 % air voids. In areas subject to freeze-thaw, use freeze-thaw conditioning in lieu of moisture conditioning per ASTM D4867.

² AASHTO T340 at 100 psi hose pressure at 64°C test temperature may be used in the interim. If this method is used the required Value shall be less than 5 mm @ 8000 passes.

³ Where APA not available, Hamburg Wheel test (AASHTO T-324) 10mm @ 20,000 passes at 50°C MAY BE USED WITH PRIOR APPROVAL FROM THE FAA ADO.

The mineral aggregate shall be of such size that the percentage composition by weight, as determined by laboratory sieves, will conform to the gradation or gradations specified in Table 2 when tested in accordance with ASTM C136 and ASTM C117.

The gradations in Table 2 represent the limits that shall determine the suitability of aggregate for use from the sources of supply; be well graded from coarse to fine and shall not vary from the low limit on one sieve to the high limit on the adjacent sieve, or vice versa.

Table 2. Aggregate – Asphalt Pavements

Sieve Size	Percentage by Weight Passing Sieve
	Gradation 2
1 inch (25.0 mm)	--
3/4 inch (19.0 mm)	100
1/2 inch (12.5 mm)	90-100
3/8 inch (9.5 mm)	72-88
No. 4 (4.75 mm)	53-73
No. 8 (2.36 mm)	38-60
No. 16 (1.18 mm)	26-48
No. 30 (600 µm)	18-38
No. 50 (300 µm)	11-27
No. 100 (150 µm)	6-18
No. 200 (75 µm)	3-6
Minimum Voids in Mineral Aggregate (VMA)¹	15.0
Asphalt percent by total weight of mixture:	
Stone or gravel	5.0-7.5
Slag	6.5-9.5
Recommended Minimum Construction Lift Thickness	2 inch

¹ To achieve minimum VMA during production, the mix design needs to account for material breakdown during production.

The aggregate gradations shown are based on aggregates of uniform specific gravity. The percentages passing the various sieves shall be corrected when aggregates of varying specific gravities are used, as indicated in the Asphalt Institute MS-2 Mix Design Manual, 7th Edition.

401-3.4 Reclaimed asphalt pavement (RAP). RAP shall not be used.

401-3.5 Control Strip. Full production shall not begin until an acceptable control strip has been constructed and accepted in writing by the Engineer.

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 Engineer.

The control strip will consist of at least 250 tons (227 metric 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 Engineer 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 Engineer, 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	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 Engineer, or Engineer'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 Engineer 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 Engineer. 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 Engineer 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 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 Engineer.

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 Engineer 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 Engineer. The asphalt mix shall be placed in consecutive adjacent lanes having a minimum width of 25 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 (30 cm); 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 (3 m) from transverse joints in the previous course. Transverse joints in adjacent lanes shall be offset a minimum of 10 feet (3 m). 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 Engineer 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 Engineer, and if it can be demonstrated in the laboratory, in the presence of the Engineer, 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 Engineer, 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 (3 m) 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 grooving is not required.

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 ravels, aggregate fractures, spalls, or disturbance to the pavement will not be permitted. Contractor shall demonstrate to the Engineer 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 Engineer 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 Engineer shall be permitted unrestricted access to inspect the Contractor's QC facilities and witness QC activities. The Engineer 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 $\frac{1}{4}$ 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 Engineer. 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 Engineer. 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. When placement abuts previously placed material the first measurement shall start with one half the length of the straight edge on the previously placed material.

Deviations on the final surface course in either the transverse or longitudinal direction that will trap water greater than $\frac{1}{4}$ 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 vertically. The documentation will be provided by the Contractor to the Engineer within 24 hours.

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 Engineer, 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 Engineer 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 Engineer 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 Engineer 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 three compacted specimens prepared in accordance with ASTM D6926.

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 Engineer.

(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 Engineer to determine the extent of unbonded areas. Unbonded areas shall be removed by milling and replaced at no additional cost as directed by the Engineer.

(3) Thickness. Thickness of each lift of surface course will be evaluated by the Engineer 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 Engineer to circumscribe the deficient area.

(4) Mat density. One core shall be taken from each subplot. Core locations will be determined by the Engineer 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 Engineer in accordance with ASTM D3665. The bulk specific gravity of each core sample will be determined in accordance with ASTM D2726. The percent compaction (density) of each sample will be determined by dividing the bulk specific gravity of each joint density sample by the average TMD for the lot. The TMD used to determine the joint density at joints formed between lots will be the lower of the average TMD values from the adjacent lots.

401-6.2 Acceptance criteria.

a. General. Acceptance will be based on the implementation of the Contractor Quality Control Program (CQCP) and the following characteristics of the asphalt and completed pavements: air voids, mat density, joint density, grade.

b. Air Voids and Mat density. Acceptance of each lot of plant produced material for mat density and air voids will be based on the percentage of material within specification limits (PWL). If the PWL of the lot equals or exceeds 90%, the lot will be acceptable. Acceptance and payment will be determined in accordance with paragraph 401-8.1.

c. Joint density. Acceptance of each lot of plant produced asphalt for joint density will be based on the PWL. If the PWL of the lot is equal to or exceeds 90%, the lot will be considered acceptable. If the PWL is less than 90%, the Contractor shall evaluate the reason and act accordingly. If the PWL is less than 80%, the Contractor shall cease operations and until the reason for poor compaction has been determined. If the PWL is less than 71%, the pay factor for the lot used to complete the joint will be

reduced by five (5) percentage points. This lot pay factor reduction will be incorporated and evaluated in accordance with paragraph 401-8.1.

d. Grade. The final finished surface of the pavement shall be surveyed to verify that the grade elevations and cross-sections shown on the plans do not deviate more than 1/2 inch vertically.

Cross-sections of the pavement shall be taken at a minimum 50-foot longitudinal spacing, at all longitudinal grade breaks, and at start and end of each lane placed. Minimum cross-section grade points shall include grade at centerline, ±10 feet of centerline, and edge of taxiway pavement.

The survey and documentation shall be stamped and signed by a licensed surveyor. Payment for sublots that do not meet grade for over 25% of the 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 Engineer. A retest will consist of all the sampling and testing procedures contained in paragraphs 401-6.1d and 401-6.2b. Only one resampling per lot will be permitted.

(1) A redefined PWL will be calculated for the resampled lot. The number of tests used to calculate the redefined PWL will include the initial tests made for that lot plus the retests.

(2) The cost for resampling and retesting shall be borne by the Contractor.

b. Payment for resampled lots. The redefined PWL for a resampled lot will be used to calculate the payment for that lot in accordance with Table 6.

c. Outliers. Check for outliers in accordance with ASTM E178, at a significance level of 5%.

METHOD OF MEASUREMENT

401-7.1 Measurement. Asphalt shall be measured by the number of tons of asphalt used in the accepted work. Batch weights or truck scale weights will be used to determine the basis for the tonnage.

BASIS OF PAYMENT

401-8.1 Payment. Payment for a lot of asphalt meeting all acceptance criteria as specified in paragraph 401-6.2 shall be made based on results of tests for mat density and air voids. Payment for acceptable lots shall be adjusted according to paragraph 401-8.1c for mat density and air voids; and paragraph 401-6.2c for joint density, subject to the limitation that:

- a. The total project payment for plant mix asphalt pavement shall not exceed 100 percent of the product of the contract unit price and the total number of tons 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 Engineer may decide to allow the rejected lot to remain. In that case, if the Engineer and Contractor agree in writing that the lot shall not be removed, it shall be paid for at 50% of the contract unit price and the total project payment shall be reduced by the amount withheld for the rejected lot.

- d. **Profilograph Roughness.** Not used.

401-8.1 Payment.

Payment will be made under:

Item P-401-8.1 Asphalt Surface Course - per ton

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C29	Standard Test Method for Bulk Density (“Unit Weight”) and Voids in Aggregate
ASTM C88	Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C117	Standard Test Method for Materials Finer than 75- μm (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C127	Standard Test Method for Density, Relative Density (Specific Gravity) and Absorption of Coarse Aggregate
ASTM C131	Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C142	Standard Test Method for Clay Lumps and Friable Particles in Aggregates
ASTM C566	Standard Test Method for Total Evaporable Moisture Content of Aggregate by Drying
ASTM D75	Standard Practice for Sampling Aggregates
ASTM D242	Standard Specification for Mineral Filler for Bituminous Paving Mixtures
ASTM D946	Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction
ASTM D979	Standard Practice for Sampling Asphalt Paving Mixtures
ASTM D1073	Standard Specification for Fine Aggregate for Asphalt Paving Mixtures
ASTM D1188	Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Coated Samples
ASTM D2172	Standard Test Method for Quantitative Extraction of Bitumen from Asphalt Paving Mixtures
ASTM D1461	Standard Test Method for Moisture or Volatile Distillates in Asphalt Paving Mixtures
ASTM D2041	Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures

ASTM D2419	Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate
ASTM D2489	Standard Practice for Estimating Degree of Particle Coating of Bituminous-Aggregate Mixtures
ASTM D2726	Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures
ASTM D2950	Standard Test Method for Density of Bituminous Concrete in Place by Nuclear Methods
ASTM D3203	Standard Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures
ASTM D3381	Standard Specification for Viscosity-Graded Asphalt Cement for Use in Pavement Construction
ASTM D3665	Standard Practice for Random Sampling of Construction Materials
ASTM D3666	Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials
ASTM D4318	Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4552	Standard Practice for Classifying Hot-Mix Recycling Agents
ASTM D4791	Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM D4867	Standard Test Method for Effect of Moisture on Asphalt Concrete Paving Mixtures
ASTM D5361	Standard Practice for Sampling Compacted Asphalt Mixtures for Laboratory Testing
ASTM D5444	Standard Test Method for Mechanical Size Analysis of Extracted Aggregate
ASTM D5821	Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate
ASTM D6084	Standard Test Method for Elastic Recovery of Bituminous Materials by Ductilometer
ASTM D6307	Standard Test Method for Asphalt Content of Hot Mix Asphalt by Ignition Method
ASTM D6373	Standard Specification for Performance Graded Asphalt Binder
ASTM D6752	Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Automatic Vacuum Sealing Method
ASTM D6925	Standard Test Method for Preparation and Determination of the Relative Density of Hot Mix Asphalt (HMA) Specimens by Means of the SuperPave 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 Inclinator 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 T340	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

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ITEM P-407 ASPHALT OVERLAY FABRIC

DESCRIPTION

407-1.1 This item shall consist of the installation of a non-woven polypropylene asphalt overlay fabric. The asphalt overlay fabric shall be applied in accordance with the manufacturer's guidelines. A technical representative from the manufacturer shall be present at the site during the first day of installation of the product.

MATERIALS

407-2.1 The overlay fabric shall be Amoco Fabrics and Fibers Company "Petromat" or approved equal.

407-2.2 The bituminous materials shall be PG 64-22 and conform to AASHTO M-226, Table 2.

407-2.3 Bituminous Material Contractor's Responsibility. Samples of the bituminous materials that the Contractor proposes to use, together with a statement as to their source and character, must be submitted and approved before use of such material begins. The Contractor shall require the manufacturer or producer of the bituminous materials to furnish material subject to this and all other pertinent requirements of the contract. Only satisfactory materials, so demonstrated by service tests, shall be acceptable.

The Contractor shall furnish vendor's certified test reports for each carload, or equivalent, of bituminous material shipped to the project. The report shall be delivered to the Engineer before permission is granted for use of the material. The furnishing of the vendor's certified test report for the bituminous material shall not be interpreted as basis for final acceptance. All such test reports shall be subject to verification by testing samples of materials received for use on the project.

CONSTRUCTION METHODS

407-3.1 Weather Limitations. The asphalt tack coat shall be applied only when the existing surface is dry, and the pavement and atmosphere temperature is at least 50 degrees F and rising and when the weather is not foggy or rainy.

407-3.2 Surface Preparation. The surface on which the fabric is to be placed shall be free of all dirt, water, and vegetation. Cracks greater than ¼ inch shall be cleaned and filled in accordance with specification Item P-101.

407-3.3 Equipment. The Contractor shall provide equipment for heating and applying the bituminous material.

The distributor shall be designed, equipped, maintained, and operated so that bituminous material at even (300 °F to 325 °F) heat may be applied uniformly on variable widths of surface at the specified rate. The distributor must be capable of applying at least a 13-foot width. The allowable variation from the specified rate shall not exceed 10 percent. Distributor equipment shall include a tachometer, pressure gages, volume-measuring devices or a calibrated tank, and a thermometer for measuring temperatures of tank contents. The distributor shall be self-powered and shall be equipped with a power unit for the pump and full circulation spray bars adjustable laterally and vertically.

407-3.4 Application of Bituminous Material. The bituminous material including vehicle or solvent shall be uniformly applied with a bituminous distributor at the rate of 0.20 to 0.25 gallons per square yard,

depending on the condition of the existing surface. The bituminous material and application rate shall be approved by the Engineer prior to application.

Following the application, the surface shall be allowed to cure without being disturbed for such period of time as may be necessary to permit drying out and setting of the tack coat. This period shall be determined by the Contractor and must be acceptable to the Engineer. The surface shall then be maintained by the Contractor until the fabric course has been placed. Suitable precautions shall be taken by the Contractor to protect the surface against damage during this interval.

407-3.5 Fabric Installation. Installation of the fabric shall be in accordance with the manufacturer's recommendations. The fabric must be installed with a mechanical unit specifically designed for the installation of overlay fabric in a wrinkle free manner. Small wrinkles shall be hand broomed to removal. Large wrinkles (1 inch or greater in length) shall be cut and overlapped in the direction of the paving operation. Transverse joints shall be overlapped 4 to 6 inches in the direction of the paving operation. Longitudinal joints shall be overlapped 2 to 4 inches. Additional tack shall be applied to the joints to assure proper bonding. No traffic except necessary construction traffic shall drive on the paving traffic. Paving fabric shall not be installed in areas when the overlay asphalt tapers to a minimum compacted thickness of less than 1.5 inches. Brooming and/or rubber tire rolling shall be accomplished to maximize paving fabric contact with the pavement surface. Additional hand placed tack may be required at overlaps and repairs as ordered by the Engineer. Turning of the paver and other vehicles shall be done gradually and kept to a minimum to avoid movement of and damage to the fabric. Abrupt starts and stops shall be avoided. Damaged fabric shall be removed and replaced.

407-3.6 Overlay Placement. Asphalt overlay construction shall closely follow fabric placement. All areas in which paving fabric has been placed should be paved during the same day. Excess tack coat that bleeds through the paving fabric shall be removed by broadcasting sand on the paving fabric. Excess sand should be removed before beginning the paving operation. In the event of rainfall on the paving fabric prior to the placement of the asphalt overlay, the paving fabric must be allowed to dry before asphalt concrete is placed. The minimum compacted thickness of the first lift of overlay asphalt shall not be less than 1.5 inches (38 mm) in areas of paving fabric installation.

METHOD OF MEASUREMENT

407-4.1 The quantity of overlay fabric to be paid for shall be the number of square yards of fabric installed, less overlap, in accordance with the specifications and accepted by the Engineer. Separate measurement will not be made for the bituminous material associated with the installation of the fabric.

BASIS OF PAYMENT

407-5.1 Payment for asphalt overlay fabric shall be made at the contract unit price per square yard for fabric installed and accepted by the Engineer. This price shall be full compensation for furnishing all materials, labor, equipment, bituminous material, tools, and incidentals necessary to complete the installation of the overlay fabric.

Payment will be made under:

Item P-407-5.1 Asphalt Overlay Fabric – per square yard

END OF ITEM P-407

Part 9 – Miscellaneous

ITEM M-103 CLOSED RUNWAY OR TAXIWAY MARKERS

DESCRIPTION

103-1.1 Closed runway and taxiway markers shall be installed and maintained at the time and location indicated on the plans, or when ordered by the Engineer. The markers shall remain in place and clearly visible until the runway or taxiway is operational. The Contractor shall make a frequent inspection of the markers and make prompt repairs, as necessary.

MATERIALS

103-2.1 Lighted Portable (Mobile) Closed Runway Markers. Lighted portable (mobile) closed runway markers shall be furnished by the Contractor. Markers shall be in accordance with AC 150/5345-55, “Specification for L-893, Lighted Visual Aid to Indicate Temporary Runway Closure” and shall be operated and maintained by the Contractor.

103-2.2 Closed Taxiway Markers. Closed taxiway markers may be constructed of plywood, lumber, cloth, plastic, or other satisfactory material as approved by the Engineer and secured to the pavement with sandbags or other method approved by the Engineer. The color shall be aviation yellow.

METHOD OF MEASUREMENT

103-3.1 Lighted portable (mobile) closed runway markers shall be measured by the unit. No separate measurement will be made for operation or relocation of the markers.

103-3.2 Closed taxiway markers shall be measured by unit. No separate measurement will be made for relocation of the markers.

BASIS OF PAYMENT

103-4.1 The accepted quantity of lighted portable (mobile) closed runway markers will be paid for at the contract unit price for each. The price shall be full compensation for furnishing the complete unit, labor, and incidentals necessary to acquire, inspect, and maintain each marker for the duration of the project.

103-4.2 The accepted quantity of closed taxiway markers will be paid for at the contract unit price per each. The price shall be full compensation for furnishing all materials, labor, and incidentals necessary to install, secure to pavement, inspect, and maintain each marker for the duration of the project.

Payment will be made under:

Item M-103-4.1 Lighted Portable Closed Runway Markers – per each

Item M-103-4.2 Closed Taxiway Markers – per each

END OF ITEM M-103

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ITEM M-107 AVIATION BARRICADES

DESCRIPTION

107-1.1 Aviation barricades shall be furnished by the Contractor and placed and maintained as shown on the plans or as ordered by the Engineer. The aviation barricades shall be installed when ordered by the Engineer. The aviation barricades shall remain in-place, clearly visible, until ordered removed by the Engineer. Flashing or steady burning red lights shall be placed on the barricades for nighttime use. Aviation barricades shall be placed a maximum of four (4) feet apart.

MATERIALS

107-2.1 Materials shall be as shown on the plans.

METHOD OF MEASUREMENT

107-3.1 Aviation barricades shall be measured per linear foot of the area barricaded including spaces between the barricades. No separate measurement will be made for relocation of the aviation barricades.

BASIS OF PAYMENT

107-4.1 The accepted quantity of aviation barricades will be paid for at the contract unit price per linear foot. The price shall be full compensation for furnishing all materials, labor and incidentals, necessary to install, inspect and maintain the barricades for the duration of the project.

Payment will be made under:

Item M-107-4.1 Aviation Barricades – per linear foot

END OF ITEM M-107

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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 Engineer 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 Engineer.

603-3.2 Equipment. The Contractor shall provide equipment for heating and applying the emulsified asphalt material. The emulsion shall be applied with a manufacturer-approved computer rate-controlled asphalt distributor. The equipment shall be in good working order and contain no contaminants or diluents in the tank. Spray bar tips must be clean, free of burrs, and of a size to maintain an even distribution of the emulsion. Any type of tip or pressure source is suitable that will maintain predetermined flow rates and constant pressure during the application process with application speeds under eight (8) miles per hour (13 km per hour) or seven (700) feet per minute (213 m per minute).

The equipment will be tested under pressure for leaks and to ensure proper set-up before use to verify truck set-up (via a test-shot area), including but not limited to, nozzle tip size appropriate for application, spray-bar height and pressure and pump speed, evidence of triple-overlap spray pattern, lack of leaks, and any other factors relevant to ensure the truck is in good working order before use.

The distributor truck shall be equipped with a minimum 12-foot (3.7-m) spreader spray bar with individual nozzle control with computer-controlled application rates. The distributor truck shall have an easily accessible thermometer that constantly monitors the temperature of the emulsion and have an operable mechanical tank gauge that can be used to cross-check the computer accuracy. If the distributor is not equipped with an operable quick shutoff valve, the prime operations shall be started and stopped on building paper.

The distributor truck shall be equipped to effectively heat and mix the material to the required temperature prior to application as required. Heating and mixing shall be done in accordance with the manufacturer's recommendations. Do not overheat or over mix the material.

The distributor shall be equipped with a hand sprayer.

Asphalt distributors must be calibrated annually in accordance with ASTM D2995. The Contractor must furnish a current calibration certification for the asphalt distributor truck from any State or other agency as approved by the Engineer.

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 Engineer prior to application.

Emulsified Asphalt

Surface Type	Residual Rate, gal/SY	Emulsion Application Bar Rate, gal/SY
New asphalt	0.02-0.05	0.03-0.07
Existing asphalt	0.04-0.07	0.06-0.11
Milled Surface	0.04-0.08	.06-0.12
Concrete	0.03-0.05	0.05-0.08

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 Engineer. 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 Engineer 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:

Item P-603-5.1 Emulsified Asphalt Tack Coat – per gallon

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM D1250	Standard Guide for Use of the Petroleum Measurement Tables
ASTM D2995	Standard Practice for Estimating Application Rate and Residual Application Rate of Bituminous Distributors
ASTM D3628	Standard Practice for Selection and Use of Emulsified Asphalts

END OF ITEM P-603

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Item P-605 Joint Sealants for Pavements

DESCRIPTION

605-1.1 This item shall consist of providing and installing a resilient and adhesive joint sealing material capable of effectively sealing joints in pavement; joints between different types of pavements; and cracks in existing pavement.

MATERIALS

605-2.1 Joint sealants. Joint sealant materials shall meet the requirements of ASTM D5893 and shall be DOWSIL 890SL Silicone Joint Sealant, or approved by the Engineer.

Each lot or batch of sealant shall be delivered to the jobsite in the manufacturer's original sealed container. Each container shall be marked with the manufacturer's name, batch or lot number, the safe heating temperature, and shall be accompanied by the manufacturer's certification stating that the sealant meets the requirements of this specification.

605-2.2 Backer rod. The material furnished shall be a compressible, non-shrinking, non-staining, non-absorbing material that is non-reactive with the joint sealant in accordance with ASTM D5249. The backer-rod material shall be $25\% \pm 5\%$ larger in diameter than the nominal width of the joint.

605-2.3 Bond breaking tapes. Provide a bond breaking tape or separating material that is a flexible, non-shrinkable, non-absorbing, non-staining, and non-reacting adhesive-backed tape. The material shall have a melting point at least 5°F (3°C) greater than the pouring temperature of the sealant being used when tested in accordance with ASTM D789. The bond breaker tape shall be approximately 1/8 inch (3 mm) wider than the nominal width of the joint and shall not bond to the joint sealant.

CONSTRUCTION METHODS

605-3.1 Time of application. Joints shall be sealed as soon after completion of the curing period as feasible and before the pavement is opened to traffic, including construction equipment. ~~The pavement temperature shall be 50°F (10°C) and rising at the time of application of the poured joint sealing material.~~ Do not apply sealant if moisture is observed in the joint. WEATHER LIMITATIONS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

605-3.2 Equipment. Machines, tools, and equipment used in the performance of the work required by this section shall be approved before the work is started and maintained in satisfactory condition at all times. Submit a list of proposed equipment to be used in performance of construction work including descriptive data, 14 days prior to use on the project.

a. Tractor-mounted routing tool. Section not used.

b. Concrete saw. Provide a self-propelled power saw, with water-cooled diamond or abrasive saw blades, for cutting joints to the depths and widths specified.

c. Sandblasting equipment. The Contractor must demonstrate sandblasting equipment including the air compressor, hose, guide and nozzle size, under job conditions, before approval in accordance with paragraph 605-3.3. The Contractor shall demonstrate, in the presence of the Engineer, that the method cleans the joint and does not damage the joint.

d. Waterblasting equipment. The Contractor must demonstrate waterblasting equipment including the pumps, hose, guide and nozzle size, under job conditions, before approval in accordance with paragraph 605-3.3. The Contractor shall demonstrate, in the presence of the Engineer, that the method cleans the joint and does not damage the joint.

e. Hand tools. Hand tools may be used, when approved, for removing defective sealant from a crack and repairing or cleaning the crack faces. Hand tools should be carefully evaluated for potential spalling effects prior to approval for use.

f. Hot-poured sealing equipment. Section not used.

g. Cold-applied, single-component sealing equipment. The equipment for installing ASTM D5893 single component joint sealants shall consist of an extrusion pump, air compressor, following plate, hoses, and nozzle for transferring the sealant from the storage container into the joint opening. The dimension of the nozzle shall be such that the tip of the nozzle will extend into the joint to allow sealing from the bottom of the joint to the top. Maintain the initially approved equipment in good working condition, serviced in accordance with the supplier's instructions, and unaltered in any way without obtaining prior approval. Small hand-held air-powered equipment (i.e., caulking guns) may be used for small applications.

605-3.3 Preparation of joints. Pavement joints for application of material in this specification must be dry, clean of all scale, dirt, dust, curing compound, and other foreign matter. The Contractor shall demonstrate, in the presence of the Engineer, that the method cleans the joint and does not damage the joint.

a. Sawing. All joints shall be sawed in accordance with specifications and plan details. Immediately after sawing the joint, the resulting slurry shall be completely removed from joint and adjacent area by flushing with a jet of water, and by use of other tools as necessary.

b. Sealing. Immediately before sealing, the joints shall be thoroughly cleaned of all remaining laitance, curing compound, filler, protrusions of hardened concrete, old sealant and other foreign material from the sides and upper edges of the joint space to be sealed. Cleaning shall be accomplished by concrete saw, waterblaster, or sandblasting as specified in paragraph 605-3.2. The newly exposed concrete joint faces and the pavement surface extending a minimum of 1/2 inch (12 mm) from the joint edge shall be sandblasted clean. Sandblasting shall be accomplished in a minimum of two passes. One pass per joint face with the nozzle held at an angle directly toward the joint face and not more than 3 inches (75 mm) from it. After final cleaning and immediately prior to sealing, blow out the joints with compressed air and leave them completely free of debris and water. The joint faces shall be surface dry when the seal is applied.

c. Backer Rod. When the joint opening is of a greater depth than indicated for the sealant depth, plug or seal off the lower portion of the joint opening using a backer rod in accordance with paragraph 605-2.2 to prevent the entrance of the sealant below the specified depth. Take care to ensure that the backer rod is placed at the specified depth and is not stretched or twisted during installation.

d. Bond-breaking tape. Where inserts or filler materials contain bitumen, or the depth of the joint opening does not allow for the use of a backup material, insert a bond-separating tape breaker in accordance with paragraph 605-2.3 to prevent incompatibility with the filler materials and three-sided adhesion of the sealant. Securely bond the tape to the bottom of the joint opening so it will not float up into the new sealant.

605-3.4 Installation of sealants. Joints shall be inspected for proper width, depth, alignment, and preparation, and shall be approved by the Engineer before sealing is allowed. Sealants shall be installed in accordance with the following requirements:

Immediately preceding, but not more than 50 feet (15 m) ahead of the joint sealing operations, perform a final cleaning with compressed air. Fill the joints from the bottom up to 1/4 inch \pm 1/16 inch below the top of pavement surface; or bottom of groove for grooved pavement. Remove and discard excess or spilled sealant from the pavement by approved methods. Install the sealant in such a manner as to prevent the formation of voids and entrapped air. In no case shall gravity methods or pouring pots be used to install the sealant material. Traffic shall not be permitted over newly sealed pavement until authorized by the Engineer. When a primer is recommended by the manufacturer, apply it evenly to the joint faces in accordance with the manufacturer's instructions. Check the joints frequently to ensure that the newly installed sealant is cured to a tack-free condition within the time specified.

605-3.5 Inspection. The Contractor shall inspect the joint sealant for proper rate of cure and set, bonding to the joint walls, cohesive separation within the sealant, reversion to liquid, entrapped air and voids. Sealants exhibiting any of these deficiencies at any time prior to the final acceptance of the project shall be removed from the joint, wasted, and replaced as specified at no additional cost to the airport.

605-3.6 Clean-up. Upon completion of the project, remove all unused materials from the site and leave the pavement in a clean condition.

METHOD OF MEASUREMENT

605-4.1 Joint sealing material shall be measured by the linear foot of sealant in place, completed, and accepted.

BASIS OF PAYMENT

605-5.1 Payment for joint sealing material shall be made at the contract unit price per linear foot. The price shall be full compensation for furnishing all materials, for all preparation, delivering, and placing of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item P-605-5.1 Joint Sealing Filler – per linear foot

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM D789	Standard Test Method for Determination of Relative Viscosity of Polyamide (PA)
ASTM D5249	Standard Specification for Backer Material for Use with Cold- and Hot-Applied Joint Sealants in Portland-Cement Concrete and Asphalt Joints
ASTM D5893	Standard Specification for Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements

Advisory Circulars (AC)

AC 150/5340-30	Design and Installation Details for Airport Visual Aids
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END OF ITEM P-605

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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 Engineer 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 Engineer. 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 ½ inch (37.5 mm)	467, or 4 and 67
1 inch (25 mm)	57
¾ inch (19 mm)	67
½ inch (12.5 mm)	7

610-2.2.1 Coarse Aggregate susceptibility to durability (D) cracking. Coarse aggregate may only be accepted from sources that have a 20-year service history for the same gradation to be supplied with no

history of D-Cracking. Aggregates that do not have a 20-year record of service free from major repairs (less than 5% of slabs replaced) in similar conditions without D-cracking shall not be used unless the material currently being produced has a durability factor greater than or equal to 95 per ASTM C666. The Contractor shall submit a current certification and test results to verify the aggregate acceptability. Test results will only be accepted from a State Department of Transportation (DOT) materials laboratory or an accredited laboratory. Certification and test results which are not dated or which are over one (1) year old or which are for different gradations will not be accepted. Crushed granite, calcite cemented sandstone, quartzite, basalt, diabase, rhyolite or trap rock are considered to meet the D-cracking test requirements but must meet all other quality tests specified in Item P-501.

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, II.

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 Engineer.

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 Engineer 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 Engineer 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 Engineer. Retarding shall meet the requirements of ASTM C494, Type A, B, or D and set-accelerating shall meet the requirements of ASTM C494, Type C. Calcium chloride and admixtures containing calcium chloride shall not be used.

610-2.8 Premolded joint material. Premolded joint material for expansion joints shall meet the requirements of ASTM D1751 and ASTM D1752.

610-2.9 Joint filler. The filler for joints shall meet the requirements of Item P-605, unless otherwise specified.

610-2.10 Steel reinforcement. Reinforcing shall BE SHOWN ON THE PLANS AND SHALL CONFORM TO THE FOLLOWING REQUIREMENTS:

Steel Reinforcement

Reinforcing Steel	ASTM A615, ASTM A706, ASTM A775, ASTM A934
Welded Steel Wire Fabric	ASTM A1064, ASTM A884
Welded Deformed Steel Fabric	ASTM A1064
Bar Mats	ASTM A184 or ASTM A704

610-2.11 Materials for curing concrete. Curing materials shall conform to THE FOLLOWING:

Materials for Curing

Waterproof paper	ASTM C171
Clear or white Polyethylene Sheeting	ASTM C171
White-pigmented Liquid Membrane-Forming Compound, Type 2, Class B	ASTM C309

CONSTRUCTION METHODS

610-3.1 General. The Contractor shall furnish all labor, materials, and services necessary for, and incidental to, the completion of all work as shown on the drawings and specified here. All machinery and equipment used by the Contractor on the work, shall be of sufficient size to meet the requirements of the work. All work shall be subject to the inspection and approval of the Engineer.

610-3.2 Concrete Mixture. The concrete shall develop a compressive strength of 4000 psi in 28 days as determined by test cylinders made in accordance with ASTM C31 and tested in accordance with ASTM C39. The concrete shall contain not less than 470 pounds of cementitious material per cubic yard (280 kg per cubic meter). The water cementitious ratio shall not exceed 0.45 by weight. The air content of the concrete shall be 5% +/- 1.2% as determined by ASTM C231 and shall have a slump of not more than 4 inches (100 mm) as determined by ASTM C143.

610-3.3 Mixing. Concrete may be mixed at the construction site, at a central point, or wholly or in part in truck mixers. The concrete shall be mixed and delivered in accordance with the requirements of ASTM C94 or ASTM C685.

The concrete shall be mixed only in quantities required for immediate use. Concrete shall not be mixed while the air temperature is below 40°F (4°C) without the Engineer's approval. If approval is granted for mixing under such conditions, aggregates or water, or both, shall be heated and the concrete shall be placed at a temperature not less than 50°F (10°C) nor more than 100°F (38°C). The Contractor shall be held responsible for any defective work, resulting from freezing or injury in any manner during placing and curing, and shall replace such work at his expense.

Retempering of concrete by adding water or any other material is not permitted.

The rate of delivery of concrete to the job shall be sufficient to allow uninterrupted placement of the concrete.

610-3.4 Forms. Concrete shall not be placed until all the forms and reinforcements have been inspected and approved by the Engineer. 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 Engineer. Concrete shall be placed as soon as practical after mixing, but in no case later than one (1) hour after water has been added to the mix. The method and manner of placing shall avoid segregation and displacement of the reinforcement. Troughs, pipes, and chutes shall be used as an aid in placing concrete when necessary. The concrete shall not be dropped from a height of more than 5 feet (1.5 m). Concrete shall be deposited as nearly as practical in its final position to avoid segregation due to rehandling or flowing. Do not subject concrete to procedures which cause segregation. Concrete shall be placed on clean, damp surfaces, free from running water, or on a properly consolidated soil foundation.

610-3.9 Vibration. Vibration shall follow the guidelines in American Concrete Institute (ACI) Committee 309R, Guide for Consolidation of Concrete.

610-3.10 Joints. Joints shall be constructed as indicated on the plans.

610-3.11 Finishing. All exposed concrete surfaces shall be true, smooth, and free from open or rough areas, depressions, or projections. All concrete horizontal plane surfaces shall be brought flush to the proper elevation with the finished top surface struck-off with a straightedge and floated.

610-3.12 Curing and protection. All concrete shall be properly cured in accordance with the recommendations in American Concrete Institute (ACI) 308R, Guide to External Curing of Concrete. The concrete shall be protected from damage until project acceptance.

610-3.13 Cold weather placing. When concrete is placed at temperatures below 40°F (4°C), follow the cold weather concreting recommendations found in ACI 306R, Cold Weather Concreting.

610-3.14 Hot weather placing. When concrete is placed in hot weather greater than 85°F (30 °C), 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 Engineer 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 Engineer, 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. Concrete shall be considered incidental and no separate payment shall be made.

Payment will be made under:

Not applicable. Incidental to other work items.

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 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-619 PAINT REMOVAL

DESCRIPTION

619-1.1 This item shall consist of furnishing all labor, materials, and equipment required for the removal of all paint from areas designated on the plans or as ordered by the Engineer. Paint removal may be required from bituminous concrete and portland cement concrete pavements. In accordance with AC 150/5340-1, markings may be removed in a larger blocked pattern or area to eliminate the continued visual appearance of the removed markings.

619-1.2 This removal operation will be accomplished with high pressure water or scarification (rotary erasing or grinding). The use of chemicals will not be permitted.

Scarification (rotary erasing or grinding) shall be limited to ungrooved pavements or to removing paint from above the surface.

619-1.3 The Contractor shall furnish all equipment, water, water trucks, and labor for delivery of water to the job site.

EQUIPMENT

619-2.1 Equipment, tools, and machines used in the performance of the removal operation shall be safe and in satisfactory working condition at all times. The Contractor shall provide a certification that the Contractor's equipment has been demonstrated or that said equipment has been used in the performance of a similar contract.

PERFORMANCE

619-3.1 The high-pressure water system, if used, shall have the capability of removing the paint and restoring both portland cement concrete and asphaltic concrete surfaces to a natural surface. The treatment of the surface shall not be damaging to the asphaltic concrete or portland cement concrete surface, joint sealing material, or light fixtures. If it is deemed by the Engineer that damage to the existing pavement is caused by an operational error, such as permitting pressure water to dwell in one location for an extensive time, the Contractor shall repair said damage without compensation.

619-3.2 Paint removal for areas to be remarked shall be defined as the removal of at least 85-90 percent of the existing marking. Compliance will be determined by the Engineer using direct testing within the designated work area.

619-3.3 Paint removal for obsolete markings shall be defined as the removal of at least 95-100 percent of the existing marking. Compliance will be determined by the Engineer using direct testing within the designated work area.

619-3.4 The removal level is defined such that the pavement is clearly exposed to the degree specified. The degree shall be verified by the grid method. A grid of transparent material inscribed with a grid of 100 one-inch squares shall be used as a tool for quantitative measure of the removal level. For a removal level of 85-90 percent, no more than 15 squares should contain paint deposits. For 95-100 percent removal, 5 squares or less should contain paint deposits.

619-3.5 The method used shall not materially damage the structural integrity of the pavement. Any damage caused by the Contractor's operations shall be corrected at the Contractor's expense and in a manner approved by the Engineer.

Excessive damage shall be defined as the removal of more than 1/8-inch of portland cement concrete pavement or asphaltic pavement with exposed aggregate which can be loosened by light brushing or abrasion. Grooved surfaces shall maintain their functionality, i.e., water shall be able to run off the surface without puddling.

The Contractor shall take precautions to protect the public from any damage due to his operations. Accumulation of sand, water, dust, or other residue resulting from the removal operation shall be removed as the work progresses. Prior to any painting operations, the surface shall be free of any dirt, removal residue, other contaminants that would prevent the bond of the new coating to the pavement. Quality control measures shall include a simple "pull test" with adhesive material; evidence of excessive debris on the adhesive indicates that additional cleaning shall be required.

619-3.6 Prior to the start of work, pavement markings shall be removed from a designated test section, not less than 50 square yards in size. The method and equipment used for the test section shall be the same as that intended for the remainder of the work. The test section shall be inspected and approved by the Engineer prior to beginning any further paint removal. If more than one degree of paint removal is required for the project, a test section for each type shall be designated, conducted, and approved.

619-3.7 The Contractor shall use rebar, metal strips, or other approved methods to protect existing joint seal material during paint removal operations.

619-3.8 Scarring resulting from the paint removal shall be sealed with a surface treatment in accordance with Item P-608 if ordered by the Engineer.

METHOD OF MEASUREMENT

619-4.1 The removal of paint shall be paid for by the number of square feet of existing paint removed from existing pavements for each level in accordance with the specifications and accepted by the Engineer.

BASIS OF PAYMENT

619-5.1 Payment shall be at the contract unit price per square foot for each level of paint removal. This price shall be full compensation for all materials, equipment, labor and incidentals necessary to complete the item.

Payment will be made under:

Item P-619-5.1 Paint Removal (85-90% Level) – per square foot

Item P-619-5.1 Paint Removal (95-100% Level) – per square foot

END OF ITEM P-619

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 Engineer. 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 Engineer prior to the initial application of markings. The reports can be used for material acceptance or the Engineer may perform verification testing. The reports shall not be interpreted as a basis for payment. The Contractor shall notify the Engineer 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 Engineer.

620-2.2 Marking materials.

Table 1. Marking Materials

Paint¹				Glass Beads²	
Type	Color	Fed Std. 595 Number	Application Rate Max.	Type	Application Rate Min.
Waterborne Type III	Yellow (Initial)	33538	180 ft ² /gal	--	--
Waterborne Type III	Yellow (Final)	33538	90 ft ² /gal	III	8 lb/ gal
Waterborne Type III	Black (Final)	37038	90 ft ² gal	--	--
Waterborne Type III	Red (Initial)	31136	180 ft ² /gal	--	--
Waterborne Type III	Red (Final)	31136	90 ft ² / gal	IV	3 lb/gal
Waterborne Type III	White (Initial)	37925	180 ft ² /gal	--	--
Waterborne Type III	White (Final)	37925	90 ft ² /gal	III	8 lb/gal

¹ See paragraph 620-2.2a.

² See paragraph 620-2.2b.

a. Paint. Paint shall be waterborne in accordance with the requirements of this paragraph. Paint colors shall comply with Federal Standard No. 595.

Waterborne. Paint shall meet the requirements of Federal Specification TT-P-1952F, Type III. The non-volatile portion of the vehicle for all paint types shall be composed of a 100% acrylic polymer as determined by infrared spectral analysis.

The acrylic resin used for Type III shall be 100% cross linking acrylic as evidenced by infrared peaks at wavelengths 1568, 1624, and 1672 cm-1 with intensities equal to those produced by an acrylic resin known to be 100% cross linking.

b. Reflective media. Glass beads for white and yellow paint shall meet the requirements for Federal Specification TT-B-1325D Type III.

Glass beads for red and pink paint shall meet the requirements for Type IV, Gradation A.

Glass beads shall be treated with all compatible coupling agents recommended by the manufacturers of the paint and reflective media to ensure adhesion and embedment.

Glass beads shall not be used in black and green paint.

Type III glass beads shall not be used in red and pink paint.

CONSTRUCTION METHODS

620-3.1 Weather limitations. Painting shall only be performed when the surface is dry, and the ambient temperature and the pavement surface temperature meet the manufacturer's recommendations in accordance with paragraph 620-2.1. Painting operations shall be discontinued when the ambient or surface temperatures does not meet the manufacturer's recommendations. Markings shall not be applied when the wind speed exceeds 10 mph unless windscreens are used to shroud the material guns. Markings shall not be applied when weather conditions are forecasts to not be within the manufacturers' recommendations for application and dry time.

620-3.2 Equipment. Equipment shall include the apparatus necessary to properly clean the existing surface, a mechanical marking machine, a bead dispensing machine, and such auxiliary hand-painting equipment as may be necessary to satisfactorily complete the job.

The mechanical marker shall be an atomizing spray-type or airless type marking machine with automatic glass bead dispensers suitable for application of traffic paint. It shall produce an even and uniform film thickness and appearance of both paint and glass beads at the required coverage and shall apply markings of uniform cross-sections and clear-cut edges without running or spattering and without over spray. The marking equipment for both paint and beads shall be calibrated daily.

620-3.3 Preparation of surfaces. Immediately before application of the paint, the surface shall be dry and free from dirt, grease, oil, laitance, or other 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 Engineer. 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 Engineer 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 Engineer 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 Engineer. 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 manufacturer’s application and surface preparation requirements must be submitted to the Engineer 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 Engineer.

The edges of the markings shall not vary from a straight line more than 1/2 inch (12 mm) in 50 feet (15 m), and marking dimensions and spacing shall be within the following tolerances:

Marking Dimensions and Spacing Tolerance

Dimension and Spacing	Tolerance
36 inch (910 mm) or less	±1/2 inch (12 mm)
greater than 36 inch to 6 feet (910 mm to 1.85 m)	±1 inch (25 mm)
greater than 6 feet to 60 feet (1.85 m to 18.3 m)	±2 inch (50 mm)
greater than 60 feet (18.3 m)	±3 inch (76 mm)

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 BEAD SHALL NOT BE HAND THROWN. 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. Preformed thermoplastic 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 Engineer. 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 readings 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	Red
Initial Type I	300	175	35
Initial Type III	600	300	35
Initial Thermoplastic	225	100	35
All materials, remark when less than ¹	100	75	10

¹ Prior to remarking determine if removal of contaminants on markings will restore retro-reflectance.

620-3.9 Protection and cleanup. After application of the markings, all markings shall be protected from damage until dry. All surfaces shall be protected from excess moisture and/or rain and from disfiguration by spatter, splashes, spillage, or drippings. The Contractor shall remove from the work area all debris, waste, loose reflective media, and by-products generated by the surface preparation and application operations to the satisfaction of the Engineer. 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 surface preparation shall be measured by the number of square feet for each type of surface preparation specified in paragraph 620-3.3.~~

620-4.1b The quantity of markings shall be paid for shall be measured by the number of square feet of painting.

620-4.1c The quantity of reflective media shall be paid for by lump sum.

620-4.1d Temporary markings not required.

620-4.2 THE QUANTITY OF SURFACE PAINTED SIGNS TO BE PAID FOR SHALL BE THE NUMBER OF EACH PERFORMED IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS AND ACCEPTED BY THE ENGINEER.

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 Engineer in accordance with these specifications.

~~**620-5.1a** Payment for surface preparation shall be made at the contract price for the number of square feet for each type of surface preparation specified in paragraph 620-3.3.~~

620-5.1b Payment for markings shall be made at the contract price for the number of square feet of painting.

620-5.1c Payment for reflective media shall be made at the contract price by lump sum.

620-5.1d Temporary markings are not required.

620-5.2 PAYMENT SHALL BE MADE AT THE CONTRACT UNIT PRICE PER EACH FOR SURFACE PAINTED SIGN. THIS PRICE SHALL BE FULL COMPENSATION FOR FURNISHING ALL MATERIALS AND FOR ALL LABOR, EQUIPMENT, TOOLS, AND INCIDENTALS NECESSARY TO COMPLETE THE ITEM.

Payment will be made under:

Item P-620-5.1b Marking (Type) – per square foot

Item P-620-5.1c Reflective Media – per lump sum price

Item P-620-5.2 Surface Painted Holding Marking (Regardless of Color/Type, with Beads) – per each

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM D476	Standard Classification for Dry Pigmentary Titanium Dioxide Products
ASTM D968	Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive
ASTM D1652	Standard Test Method for Epoxy Content of Epoxy Resins
ASTM D2074	Standard Test Method for Total, Primary, Secondary, and Tertiary Amine Values of Fatty Amines by Alternative Indicator Method
ASTM D2240	Standard Test Method for Rubber Property - Durometer Hardness
ASTM D7585	Standard Practice for Evaluating Retroreflective Pavement Markings Using Portable Hand-Operated Instruments
ASTM E303	Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester
ASTM E1710	Standard Test Method for Measurement of Retroreflective Pavement Marking Materials with CEN-Prescribed Geometry Using a Portable Retroreflectometer
ASTM E2302	Standard Test Method for Measurement of the Luminance Coefficient Under Diffuse Illumination of Pavement Marking Materials Using a Portable Reflectometer
ASTM G154	Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials

Code of Federal Regulations (CFR)

40 CFR Part 60, Appendix A-7, Method 24: Determination of volatile matter content, water content, density, volume solids, and weight solids of surface coatings

29 CFR Part 1910.1200: Hazard Communication

Federal Specifications (FED SPEC)

FED SPEC TT-B-1325D	Beads (Glass Spheres) Retro-Reflective
FED SPEC TT-P-1952F	Paint, Traffic and Airfield Marking, Waterborne
FED STD 595	Colors used in Government Procurement

Commercial Item Description

A-A-2886B Paint, Traffic, Solvent Based

Advisory Circulars (AC)

AC 150/5340-1 Standards for Airport Markings

AC 150/5320-12

Measurement, Construction, and Maintenance of Skid Resistant Airport
Pavement Surfaces

END OF ITEM P-620

Part 11 – Drainage

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 R73	Standard Practice for Evaluation of Precast Concrete Drainage Productions
ASTM C76	Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM C506	Standard Specification for Reinforced Concrete Arch Culvert, Storm Drain, and Sewer Pipe
ASTM C507	Standard Specification for Reinforced Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe
ASTM C655	Standard Specification for Reinforced Concrete D-Load Culvert, Storm Drain, and Sewer Pipe
ASTM C1433	Standard Specification for Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers
ASTM C1479	Standard Practice for Installation of Precast Concrete Sewer, Storm Drain, and Culvert Pipe Using Standard Installations
ASTM C1577	Standard Specification for Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers Designed According to AASHTO LRFD
ASTM C1786	Standard Specification for Segmental Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers Designed According to AASHTO LRFD
ASTM C1840	Standard Practice for Inspection and Acceptance of Installed Reinforced Concrete Culvert, Storm Drain, and Storm Sewer Pipe

701-2.3 Concrete for Pipe Cradles. 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. Rubber gaskets for zinc-coated steel pipe and precoated galvanized pipe

shall conform to the requirements of ASTM D1056, for the “RE” closed cell grades. Rubber gaskets for steel reinforced thermoplastic ribbed pipe shall conform to the requirements of ASTM F477.

701-2.5 Joint mortar. Not used.

701-2.6 Joint fillers. Not used.

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.

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 (300 mm) on each side. The trench walls shall be approximately vertical.

The Contractor shall comply with all current federal, state and local rules and regulations governing the safety of men and materials during the excavation, installation and backfilling operations. Specifically, the Contractor shall observe that all requirements of the Occupational Safety and Health Administration (OSHA) relating to excavations, trenching and shoring are strictly adhered to. The width of the trench shall be sufficient to permit satisfactorily jointing of the pipe and thorough compaction of the bedding material under the pipe and backfill material around the pipe, but it shall not be greater than the widths shown on the plans trench detail.

Where rock, hardpan, or other unyielding material is encountered, the Contractor shall remove it from below the foundation grade for a depth of at least 8 inch (200 mm) or 1/2 inch (12 mm) for each foot of fill over the top of the pipe (whichever is greater) but for no more than three-quarters of the nominal diameter of the pipe. The excavation below grade should be filled with granular material to form a uniform foundation.

Where a firm foundation is not encountered at the grade established, due to soft, spongy, or other unstable soil, the unstable soil shall be removed and replaced with approved granular material for the full trench width. The Engineer 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. Section not used.

c. Other pipe materials. Section not used.

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.

Elliptical and elliptically reinforced concrete pipes shall be placed with the manufacturer's reference lines designating the top of the pipe within five degrees of a vertical plane through the longitudinal axis of the pipe.

701-3.4 Joining pipe. Joints shall be made with 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.

b. Metal pipe. Section not used.

c. PVC, Polyethylene, or Polypropylene pipe. Section 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. Section not used.

c. Metal Pipe. Section not used.

701-3.5-2 Placement of Embedment Material.

The embedment material shall be compacted in layers not exceeding 6 inches (150 mm) on each side of the pipe and shall be brought up one foot (30 cm) above the top of the pipe or to natural ground level, whichever is greater. Thoroughly compact the embedment material under the haunches of the pipe without displacing the pipe. Material shall be brought up evenly on each side of the pipe for the full length of the pipe.

When the top of the pipe is above the top of the trench, the embedment material shall be compacted in layers not exceeding 6 inches (150 mm) and shall be brought up evenly on each side of the pipe to one foot (30 cm) above the top of the pipe. All embedment material shall be compacted to a density required under Item P-152.

Concrete cradles and flowable fills, such as controlled low strength material (CLSM) or controlled density fill (CDF), may be used for embedment provided adequate flotation resistance can be achieved by restraints, weighing, or placement technique.

It shall be the Contractor's responsibility to protect installed pipes and culverts from damage due to construction equipment operations. The Contractor shall be responsible for installation of any extra strutting or backfill required to protect pipes from the construction equipment.

701-3.6 Overfill. Pipes shall be inspected before any overfill is in place. Any pipes found to be out of alignment, unduly settled, or damaged shall be removed and relaid or replaced at the Contractor's expense. Evaluation of any damage to RCP shall be evaluated based on AASHTO R73.

Overfill material shall be 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 Engineer no sooner than 30 days after completion of installation and final backfill. Clean or flush all lines prior to inspection.

Use a camera with lighting suitable to allow a clear picture of the entire periphery of the pipe interior. Center the camera in the pipe both vertically and horizontally and be able to pan and tilt to a 90 degree angle with the axis of the pipe rotating 360 degrees. Use equipment to move the camera through the pipe that will not obstruct the camera's view or interfere with proper documentation of the pipe's condition. The video image shall be clear, focused, and relatively free from roll, static, or other image distortion qualities that would prevent the reviewer from evaluating the condition of the pipe.

For pipe sizes larger than 48 inches, a walk-through visual inspection shall be performed.

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.

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 class, type, and size of pipe shall be measured separately. All fittings shall be included in the footage as typical pipe sections in the pipe being measured.

BASIS OF PAYMENT

701-5.0 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.

701-5.1 Payment will be made at the contract unit price per linear foot for each class, size, and type of pipe.

Payment will be made under:

Item 701-5.1 [Size] [Type], [Class] - per linear foot

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO M167 Standard Specification for Corrugated Steel Structural Plate, Zinc-Coated, for Field-Bolted Pipe, Pipe-Arches, and Arches

AASHTO M190	Standard Specification for Bituminous-Coated Corrugated Metal Culvert Pipe and Pipe Arches
AASHTO M196	Standard Specification for Corrugated Aluminum Pipe for Sewers and Drains
AASHTO M219	Standard Specification for Corrugated Aluminum Alloy Structural Plate for Field-Bolted Pipe, Pipe-Arches, and Arches
AASHTO M243	Standard Specification for Field Applied Coating of Corrugated Metal Structural Plate for Pipe, Pipe-Arches, and Arches
AASHTO M252	Standard Specification for Corrugated Polyethylene Drainage Pipe
AASHTO M294	Standard Specification for Corrugated Polyethylene Pipe, 300- to 1500-mm (12- to 60-in.) Diameter
AASHTO M304	Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Wall Drain Pipe and Fittings Based on Controlled Inside Diameter
AASHTO MP20	Standard Specification for Steel Reinforced Polyethylene (PE) Ribbed Pipe, 300- to 900-mm (12- to 36-in.) Diameter
ASTM International (ASTM)	
ASTM A760	Standard Specification for Corrugated Steel Pipe, Metallic Coated for Sewers and Drains
ASTM A761	Standard Specification for Corrugated Steel Structural Plate, Zinc Coated, for Field-Bolted Pipe, Pipe-Arches, and Arches
ASTM A762	Standard Specification for Corrugated Steel Pipe, Polymer Precoated for Sewers and Drains
ASTM A849	Standard Specification for Post-Applied Coatings, Pavings, and Linings for Corrugated Steel Sewer and Drainage Pipe
ASTM B745	Standard Specification for Corrugated Aluminum Pipe for Sewers and Drains
ASTM C14	Standard Specification for Nonreinforced Concrete Sewer, Storm Drain, and Culvert Pipe
ASTM C76	Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM C94	Standard Specification for Ready Mixed Concrete
ASTM C144	Standard Specification for Aggregate for Masonry Mortar
ASTM C150	Standard Specification for Portland Cement
ASTM C443	Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
ASTM C506	Standard Specification for Reinforced Concrete Arch Culvert, Storm Drain, and Sewer Pipe
ASTM C507	Standard Specification for Reinforced Concrete Elliptical Culvert, Storm Drain and Sewer Pipe
ASTM C655	Standard Specification for Reinforced Concrete D-Load Culvert, Storm Drain and Sewer Pipe
ASTM C990	Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
ASTM C1433	Standard Specification for Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers

ASTM D1056	Standard Specification for Flexible Cellular Materials Sponge or Expanded Rubber
ASTM D3034	Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings
ASTM D3212	Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
ASTM D3262	Standard Specification for "Fiberglass" (Glass-Fiber Reinforced Thermosetting Resin) Sewer Pipe
ASTM D3282	Standard Practice for Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes
ASTM D4161	Standard Specification for "Fiberglass" (Glass-Fiber Reinforced Thermosetting Resin) Pipe Joints Using Flexible Elastomeric Seals
ASTM D6690	Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements
ASTM F477	Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
ASTM F667	Standard Specification for 3 through 24 in. Corrugated Polyethylene Pipe and Fittings
ASTM F714	Standard Specification for Polyethylene (PE) Plastic Pipe (DR PR) Based on Outside Diameter
ASTM F794	Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe & Fittings Based on Controlled Inside Diameter
ASTM F894	Standard Specification for Polyethylene (PE) Large Diameter Profile Wall Sewer and Drain Pipe
ASTM F949	Standard Specification for Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings
ASTM F2435	Standard Specification for Steel Reinforced Polyethylene (PE) Corrugated Pipe
ASTM F2562	Specification for Steel Reinforced Thermoplastic Ribbed Pipe and Fittings for Non-Pressure Drainage and Sewerage
ASTM F2736	Standard Specification for 6 to 30 in. (152 to 762 mm) Polypropylene (PP) Corrugated Single Wall Pipe and Double Wall Pipe
ASTM F2764	Standard Specification for 30 to 60 in. (750 to 1500 mm) Polypropylene (PP) Triple Wall Pipe and Fittings for Non-Pressure Sanitary Sewer Applications
ASTM F2881	Standard Specification for 12 to 60 in. (300 to 1500 mm) Polypropylene (PP) Dual Wall Pipe and Fittings for Non-Pressure Storm Sewer Applications
National Fire Protection Association (NFPA)	
NFPA 415	Standard on Airport Terminal Buildings, Fueling Ramp Drainage, and Loading Walkways

END OF ITEM D-701

Item D-705 Pipe Underdrains for Airports

DESCRIPTION

705-1.1 This item shall consist of the construction of pipe drains in accordance with these specifications and in reasonably close conformity with the lines and grades shown on the plans.

MATERIALS

705-2.1 General. Materials shall meet the requirements shown on the plans and specified below.

705-2.2 Pipe. The pipe shall be of the type called for on the plans or in the proposal and shall be in accordance with the following appropriate requirements.

AASHTO M196	Standard Specification for Corrugated Aluminum Pipe for Sewers and Drains
AASHTO M252	Standard Specification for Corrugated Polyethylene Drainage Pipe
AASHTO M294	Standard Specification for Corrugated Polyethylene Pipe, 300- to 1500-mm (12- to 60-in.) Diameter
AASHTO M304	Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Wall Drain Pipe and Fittings Based on Controlled Inside Diameter
AASHTO MP20	Standard Specification for Steel Reinforced Polyethylene (PE) Ribbed Pipe, 300- to 900-mm (12- to 36-in.) Diameter
ASTM A760	Standard Specification for Corrugated Steel Pipe, Metallic-Coated for Sewers and Drains
ASTM A762	Standard Specification for Corrugated Steel Pipe, Polymer Precoated for Sewers and Drains
ASTM C444	Standard Specification for Perforated Concrete Pipe
ASTM C654	Standard Specification for Porous Concrete Pipe
ASTM D3262	Standard Specification for "Fiberglass" (Glass-Fiber Reinforced Thermosetting Resin) Sewer Pipe
ASTM D4161	Standard Specification for "Fiberglass" (Glass-Fiber Reinforced Thermosetting Resin) Pipe Joints Using Flexible Elastomeric Seals
ASTM F758	Standard Specification for Smooth-Wall Poly (Vinyl Chloride) (PVC) Plastic Underdrain Systems for Highway, Airport, and Similar Drainage
ASTM F794	Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe & Fittings Based on Controlled Inside Diameter
ASTM F949	Standard Specification for Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings
ASTM F2562	Specification for Steel Reinforced Thermoplastic Ribbed Pipe and Fittings for Non-Pressure Drainage and Sewerage

705-2.3 Joint mortar. Pipe joint mortar shall consist of one part by volume of Portland cement and two parts sand. The Portland cement shall conform to the requirements of ASTM C150, Type I. The sand shall conform to the requirements of ASTM C144.

705-2.4 Elastomeric seals. Elastomeric seals shall conform to the requirements of ASTM F477.

705-2.5 Porous backfill. Porous backfill shall be free of clay, humus, or other objectionable matter, and shall conform to the gradation in Table 1 when tested in accordance with ASTM C136.

Table 1. Gradation of Porous Backfill

Sieve Designation (square openings)	Percentage by Weight Passing Sieves
	Porous Material No. 2
1-1/2 inch (37.5 mm)	100
1 inch (25.0 mm)	90 – 100
3/8 inch (9.5 mm)	25 – 60
No. 4 (4.75 mm)	5 – 40
No. 8 (2.36 mm)	0 – 20

705-2.6 Granular material. Granular material used for backfilling shall conform to the requirements of ASTM D2321 for Class IA, IB, or II materials.

705-2.7 Filter fabric. The filter fabric shall conform to the requirements of AASHTO M288 Class 2 or equivalent.

Table 2. Fabric Properties

Fabric Property	Test Method	Test Requirement
Grab Tensile Strength, lbs	ASTM D4632	125 min
Grab Tensile Elongation %	ASTM D4632	50 min
Burst Strength, psi	ASTM D3785	125 min
Trapezoid Tear Strength, lbs	ASTM D4533	55 min
Puncture Strength, lbs	ASTM D4833	40 min
Abrasion, lbs	ASTM D4886	15 max loss
Equivalent Opening Size	ASTM D4751	70 - 100
Permittivity sec ⁻¹	ASTM D4491	0.80
Accelerated Weathering (UV Stability) (Strength Retained - %)	ASTM D4355 *(500 hrs exposure)	70

705-2.8 Controlled low-strength material (CLSM). Controlled low-strength material shall conform to the requirements of Item P-153. All joints shall have elastomeric seals.

CONSTRUCTION METHODS

705-3.1 Equipment. All equipment required for the construction of pipe underdrains shall be on the project, in good working condition, and approved by the Engineer before construction is permitted to start.

705-3.2 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 shall not be less than the external diameter of the pipe plus 6 inches (150 mm) on each side of the pipe. The trench walls shall be approximately vertical.

Where rock, hardpan, or other unyielding material is encountered, it shall be removed below the foundation grade for a depth of at least 4 inches (100 mm). The excavation below grade shall be backfilled with selected fine compressible material, such as silty clay or loam, and lightly compacted in layers not over 6 inches (150 mm) in uncompacted depth to form a uniform but yielding foundation.

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 Engineer shall determine the depth of removal necessary. The granular material shall be compacted to provide adequate support for the pipe.

Excavated material not required or acceptable for backfill shall be disposed of by the Contractor as directed by the Engineer. The excavation shall not be carried below the required depth; if this occurs, the trench shall be backfilled at the Contractor's expense with material approved by the Engineer and compacted to the density of the surrounding material.

The pipe bedding shall be constructed uniformly over the full length of the pipe barrel, as required on the plans. The maximum aggregate size shall be 1 inch when the bedding thickness is less than 6 inches, and 1-1/2 inch when the bedding thickness is greater than 6 inches. Bedding shall be loosely placed, uncompacted material under the middle third of the pipe prior to placement of the pipe.

The Contractor shall do trench bracing, sheathing, or shoring necessary to perform and protect the excavation as required for safety and conformance to federal, state and local laws. Unless otherwise provided, the bracing, sheathing, or shoring shall be removed by the Contractor after the backfill has reached at least 12 inches (300 mm) over the top of the pipe. The sheathing or shoring shall be pulled as the granular backfill is placed and compacted to avoid any unfilled spaces between the trench wall and the backfill material. The cost of bracing, sheathing, or shoring, and the removal of same, shall be included in the unit price bid per foot (meter) for the pipe.

705-3.3 Laying and installing pipe.

a. Concrete pipe. The laying of the pipe in the finished trench shall be started at the lowest point and proceed upgrade. When bell and spigot pipe is used, the bells shall be laid upgrade. If tongue and groove pipe is used, the groove end shall be laid upgrade. Holes in perforated pipe shall be placed down, unless otherwise shown on the plans. The pipe shall be firmly and accurately set to line and grade so that the invert will be smooth and uniform. Pipe shall not be laid on frozen ground.

Pipe which is not true in alignment, or which shows any settlement after laying, shall be taken up and re-laid by the Contractor at no additional expense. Making adjustments in grade by exerting force on the barrel of the pipe with excavating equipment, by lifting and dropping the pipe, or by lifting the pipe and packing bedding material under it shall be prohibited. If the installed pipe section is not to grade, the pipe section shall be completely removed, the grade corrected, and the pipe rejoined.

b. Metal pipe. The metal pipe shall be laid with the separate sections joined firmly together with bands, with outside laps of circumferential joints pointing upgrade, and with longitudinal laps on the sides. Any metal in the pipe or bands that is not protected thoroughly by galvanizing shall be coated with a suitable asphaltum paint.

During installation, the asphalt-protected pipe shall be handled without damaging the asphalt coating. Any breaks in the bitumen or treatment of the pipe shall be refilled with the type and kind of bitumen used in coating the pipe originally.

c. PVC, fiberglass, or polyethylene pipe. PVC or polyethylene pipe shall be installed in accordance with the requirements of ASTM D2321. Perforations shall meet the requirements of AASHTO M252 or AASHTO M294 Class 2, unless otherwise indicated on the plans. The pipe shall be laid accurately to line

and grade. Fiberglass per ASTM D3839 Standard Guide for Underground Installation of "Fiberglass" (Glass-Fiber Reinforced Thermosetting-Resin) Pipe.

d. All types of pipe. The upgrade end of pipelines, not terminating in a structure, shall be plugged or capped as approved by the Engineer.

Unless otherwise shown on the plans, a 4-inch (100 mm) bed of granular backfill material shall be spread in the bottom of the trench throughout the entire length under all perforated pipe underdrains.

Pipe outlets for the underdrains shall be constructed when required or shown on the plans. The pipe shall be laid with tight-fitting joints. Porous backfill is not required around or over pipe outlets for underdrains. All connections to other drainage pipes or structures shall be made as required and in a satisfactory manner. If connections are not made to other pipes or structures, the outlets shall be protected and constructed as shown on the plans.

e. Filter fabric. The filter fabric shall be installed in accordance with the manufacturer's recommendations, or in accordance with the AASHTO M288 Appendix, unless otherwise shown on the plans.

705-3.4 Mortar. The mortar shall be of the desired consistency for caulking and filling the joints of the pipe and for making connections to other pipes or to structures. Mortar that is not used within 45 minutes after water has been added shall be discarded. Retempering of mortar shall not be permitted.

705-3.5 Joints in concrete pipe. When open or partly open joints are required or specified, they shall be constructed as indicated on the plans. The pipe shall be laid with the ends fitted together as designed. If bell and spigot pipe is used, mortar shall be placed along the inside bottom quarter of the bell to center the following section of pipe.

The open or partly open joints shall be surrounded with granular material meeting requirements of porous backfill No. 2 in Table 1 or as indicated on the plans. This backfill shall be placed so its thickness will be not less than 3 inches (75 mm) nor more than 6 inches (150 mm), unless otherwise shown on the plans.

When the original material excavated from the trench is impervious, commercial concrete sand or granular material meeting requirements of porous backfill No. 1 shall surround porous backfill No. 2 (Table 1), as shown on the plans or as directed by the Engineer.

When the original material excavated from the trench is pervious and suitable, it may be used as backfill in lieu of porous backfill No. 1, when indicated on the plans or as directed by the Engineer.

705-3.6 Embedment and Backfill

a. Earth. All trenches and excavations shall be backfilled soon after the pipes are installed, unless additional protection of the pipe is directed. The embedment material shall be select material from excavation or borrow and shall be approved by the Engineer. The select material shall be placed on each side of the pipe out to a distance of the nominal pipe diameter and one foot (30 cm) over the top of the pipe and shall be readily compacted. It shall not contain stones 3 inches (75 mm) or larger in size, frozen lumps, chunks of highly plastic clay, or any other material that is objectionable to the Engineer. The material shall be moistened or dried, as required to aid compaction. Placement of the embedment material shall not cause displacement of the pipe. Thorough compaction under the haunches and along the sides to the top of the pipe shall be obtained.

The embedment material shall be placed in loose layers not exceeding 6 inches (150 mm) in depth under and around the pipe. Backfill material over the pipe shall be placed in lifts not exceeding 8 inches (200 mm). Successive layers shall be added and thoroughly compacted by hand and pneumatic tampers, approved by the Engineer, until the trench is completely filled and brought to the planned elevation. Embedment and backfilling shall be done to avoid damaging top or side of the pipe.

In embankments and other unpaved areas, the backfill shall be compacted per Item P-152 to the density required for embankments in unpaved areas. Under paved areas, the subgrade and any backfill shall be compacted per Item P-152 to the density required for embankments for paved areas.

b. Granular backfill. When granular backfill is required, placement in the trench and about the pipe shall be as shown on the plans. The granular backfill shall not contain an excessive amount of foreign matter, nor shall soil from the sides of the trench or from the soil excavated from the trench be allowed to filter into the granular backfill. When required by the Engineer, a template shall be used to properly place and separate the two sizes of backfill. The backfill shall be placed in loose layers not exceeding 6 inches (150 mm) in depth. The granular backfill shall be compacted by hand and pneumatic tampers to the requirements as given for embankment. Backfilling shall be done to avoid damaging top or side pressure on the pipe. The granular backfill shall extend to the elevation of the trench or as shown on the plans.

When perforated pipe is specified, granular backfill material shall be placed along the full length of the pipe. The position of the granular material shall be as shown on the plans. If the original material excavated from the trench is pervious and suitable, it shall be used in lieu of porous backfill No. 1.

If porous backfill is placed in paved or adjacent to paved areas before grading or subgrade operations is completed, the backfill material shall be placed immediately after laying the pipe. The depth of the granular backfill shall be not less than 12 inches (300 mm), measured from the top of the underdrain. During subsequent construction operations, a minimum depth of 12 inches (300 mm) of backfill shall be maintained over the underdrains. When the underdrains are to be completed, any unsuitable material shall be removed exposing the porous backfill. Porous backfill containing objectionable material shall be removed and replaced with suitable material. The cost of removing and replacing any unsuitable material shall be at the Contractor's expense.

If a granular subbase blanket course is used which extends several feet beyond the edge of paving to the outside edge of the underdrain trench, the granular backfill material over the underdrains shall be placed in the trench up to an elevation of 2 inches (50 mm) above the bottom surface of the granular subbase blanket course. Immediately prior to the placing of the granular subbase blanket course, the Contractor shall blade this excess trench backfill from the top of the trench onto the adjacent subgrade where it can be incorporated into the granular subbase blanket course. Any unsuitable material that remains over the underdrain trench shall be removed and replaced. The subbase material shall be placed to provide clean contact between the subbase material and the underdrain granular backfill material for the full width of the underdrain trench.

c. Controlled low-strength material (CLSM). Controlled low-strength material shall conform to the requirements of Item P-153.

705-3.7 Flexible Pipe Ring Deflection. Section not used.

705-3.8 Connections. When the plans call for connections to existing or proposed pipe or structures, these connections shall be watertight and made to obtain a smooth uniform flow line throughout the drainage system.

705-3.9 Cleaning and restoration of site. After the backfill is completed, the Contractor shall dispose of all surplus material, soil, and rubbish from the site. Surplus soil may be deposited in embankments, shoulders, or as directed by the Engineer. Except for paved areas of the airport, the Contractor shall restore all disturbed areas to their original condition.

METHOD OF MEASUREMENT

705-4.1 Pipe underdrains. The length of pipe shall be the number of linear feet of pipe underdrains in place, completed, and approved; measured along the centerline of the pipe from end or inside face of structure to the end or inside face of structure, whichever is applicable. The several classes, types, and sizes shall be measured separately. All fittings, porous backfill, and filter fabric shall be included in the footage as typical pipe sections in the pipeline being measured.

705-4.2 Porous backfill. Section not used.

705-4.3 Filter fabric. Section not used.

BASIS OF PAYMENT

705-5.1 Pipe underdrains. Payment will be made at the contract unit price per linear foot for pipe underdrains complete, including porous backfill and filter fabric, of the type, class, and size designated.

705-5.2 Porous backfill. Section not used.

705-5.3 Filter fabric. Section not used.

These prices shall be full compensation for furnishing all materials and for all preparation, excavation, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item D-705-5.1 (size) (type) underdrain or edge drain pipe (type) - per linear foot complete, including porous backfill and filter fabric

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 A760	Standard Specification for Corrugated Steel Pipe, Metallic Coated for Sewers and Drains
ASTM A762	Standard Specification for Corrugated Steel Pipe, Polymer Precoated for Sewers and Drains
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C144	Standard Specification for Aggregate for Masonry Mortar
ASTM C150	Standard Specification for Portland Cement
ASTM C444	Standard Specification for Perforated Concrete Pipe
ASTM C654	Standard Specification for Porous Concrete Pipe
ASTM D2321	Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications
ASTM D3262	Standard Specification for "Fiberglass" (Glass-Fiber Reinforced Thermosetting Resin) Sewer Pipe

ASTM D4161	Standard Specification for "Fiberglass" (Glass-Fiber Reinforced Thermosetting Resin) Pipe Joints Using Flexible Elastomeric Seals
ASTM F477	Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
ASTM F758	Standard Specification for Smooth Wall Poly (Vinyl Chloride) (PVC) Plastic Underdrain Systems for Highway, Airport, and Similar Drainage
ASTM F794	Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe & Fittings Based on Controlled Inside Diameter
ASTM F949	Standard Specification for Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings
ASTM F2562	Specification for Steel Reinforced Thermoplastic Ribbed Pipe and Fittings for Non-Pressure Drainage and Sewerage
American Association of State Highway and Transportation Officials (AASHTO)	
AASHTO M190	Standard Specification for Bituminous - Coated Corrugated Metal Culvert Pipe and Pipe Arches
AASHTO M196	Standard Specification for Corrugated Aluminum Pipe for Sewers and Drains
AASHTO M252	Standard Specification for Corrugated Polyethylene Drainage Pipe
AASHTO M288	Standard Specification for Geotextile Specification for Highway Applications
AASHTO M294	Standard Specification for Corrugated Polyethylene Pipe, 300- to 1500- mm (12- to 60-in.) Diameter
AASHTO M304	Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Wall Drain Pipe and Fittings Based on Controlled Inside Diameter
AASHTO MP20	Standard Specification for Steel-Reinforced Polyethylene (PE) Ribbed Pipe, 300- to 900-mm (12- to 36-in.) diameter
AASHTO Standard Specifications for Highway Bridges	

END OF ITEM D-705

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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 Engineer.

MATERIALS

751-2.1 Brick. The brick shall conform to the requirements of ASTM C32, Grade MS.

751-2.2 Mortar. Mortar shall consist of one part Portland cement and two parts sand. The cement shall conform to the requirements of ASTM C150, Type I. The sand shall conform to the requirements of ASTM C144.

751-2.3 Concrete. Plain and reinforced concrete used in structures, connections of pipes with structures, and the support of structures or frames shall conform to the requirements of Item P-610.

751-2.4 Precast concrete pipe manhole rings. Precast concrete pipe manhole rings shall conform to the requirements of ASTM C478. Unless otherwise specified, the risers and offset cone sections shall have an inside diameter of not less than 36 inches (90 cm) nor more than 48 inches (120 cm). There shall be a gasket between individual sections and sections cemented together with mortar on the inside of the manhole. Gaskets shall conform to the requirements of ASTM C443.

751-2.5 Corrugated metal. 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: Malleable iron castings
- c. ASTM A27: Steel castings
- d. ASTM A283, Grade D: Structural steel for grates and frames
- e. ASTM A536, Grade 65-45-12: Ductile iron castings
- f. ASTM A897: Austempered ductile iron castings

All castings or structural steel units shall conform to the dimensions shown on the plans and shall be designed to support the loadings, aircraft gear configuration and/or direct loading, specified.

Each frame and cover or grate unit shall be provided with fastening members to prevent it from being dislodged by traffic but which will allow easy removal for access to the structure.

All castings shall be thoroughly cleaned. After fabrication, structural steel units shall be galvanized to meet the requirements of ASTM A123.

751-2.7 Steps. The steps or ladder bars shall be gray or malleable cast iron or galvanized steel. The steps shall be the size, length, and shape shown on the plans and those steps that are not galvanized shall be given a coat of asphalt paint, when directed.

751-2.8 Precast 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 Engineer. 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 Engineer 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 Engineer. 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 Engineer. No concrete or reinforcing steel shall be placed until the Engineer has approved the depth of the excavation and the character of the foundation material.

751-3.2 Brick structures.

a. **Foundations.** A prepared foundation shall be placed for all brick structures after the foundation excavation is completed and accepted. Unless otherwise specified, the base shall consist of reinforced concrete mixed, prepared, and placed in accordance with the requirements of Item P-610.

b. **Laying brick.** Laying brick. All brick shall be clean and thoroughly wet before laying so that they will not absorb any appreciable amount of additional water at the time they are laid. All brick shall be laid in freshly made mortar. Mortar not used within 45 minutes after water has been added shall be discarded. Retempering of mortar shall not be permitted. An ample layer of mortar shall be spread on the beds and a shallow furrow shall be made in it that can be readily closed by the laying of the brick. All bed and head joints shall be filled solid with mortar. End joints of stretchers and side or cross joints of headers shall be fully buttered with mortar and a shoved joint made to squeeze out mortar at the top of the joint. Any bricks that may be loosened after the mortar has taken its set, shall be removed, cleaned, and re-laid with fresh mortar. No broken or chipped brick shall be used in the face, and no spalls or bats shall be used except where necessary to shape around irregular openings or edges; in which case, full bricks shall be placed at ends or corners where possible, and the bats shall be used in the interior of the course. In making closures, no piece of brick shorter than the width of a whole brick shall be used; and wherever practicable, whole brick shall be used and laid as headers.

c. **Joints.** All joints shall be filled with mortar at every course. Exterior faces shall be laid up in advance of backing. Exterior faces shall be plastered or parged with a coat of mortar not less than 3/8 inch (9 mm) thick before the backing is laid up. Prior to parging, all joints on the back of face courses shall be cut flush. Unless otherwise noted, joints shall be not less than 1/4 inch (6 mm) nor more than 1/2 inch (12 mm) wide and the selected joint width shall be maintained uniform throughout the work.

d. Pointing. Face joints shall be neatly struck, using the weather-struck joint. All joints shall be finished properly as the laying of the brick progresses. When nails or line pins are used, the holes shall be immediately plugged with mortar and pointed when the nail or pin is removed.

e. Cleaning. Upon completion of the work all exterior surfaces shall be thoroughly cleaned by scrubbing and washing with water. If necessary to produce satisfactory results, cleaning shall be done with a 5% solution of muriatic acid which shall then be rinsed off with liberal quantities of water.

f. Curing and cold weather protection. The brick masonry shall be protected and kept moist for at least 48 hours after laying the brick. Brick masonry work or pointing shall not be done when there is frost on the brick or when the air temperature is below 50°F (10°C) unless the Contractor has, on the project ready to use, suitable covering and artificial heating devices necessary to keep the atmosphere surrounding the masonry at a temperature of not less than 60°F (16°C) for the duration of the curing period.

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 Engineer 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 Engineer 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 Engineer, 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 Engineer. 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 Engineer. 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 Engineer.

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 Engineer.

b. Backfill shall not be placed against any structure until approved by the Engineer. 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 Engineer. 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 Manholes, catch basins, inlets, and inspection holes shall be measured by the unit.

751-4.2 Adjust Drainage Structure and Replace Drop Inlet Top shall be measured per each.

BASIS OF PAYMENT

751-5.1 The accepted quantities of manholes, catch basins, inlets, and inspection holes will be paid for at the contract unit price per each in place when completed. Prices 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:

Item D-751-5.1 Adjust Drainage Structure - per each

Item D-751-5.1 Install Stormwater Management Structure - per each

Item D-751-5.1 Replace Drop Inlet Top - per each

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM A27	Standard Specification for Steel Castings, Carbon, for General Application
ASTM A47	Standard Specification for Ferritic Malleable Iron Castings
ASTM A48	Standard Specification for Gray Iron Castings
ASTM A123	Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A283	Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates
ASTM A536	Standard Specification for Ductile Iron Castings
ASTM A897	Standard Specification for Austempered Ductile Iron Castings
ASTM C32	Standard Specification for Sewer and Manhole Brick (Made from Clay or Shale)
ASTM C144	Standard Specification for Aggregate for Masonry Mortar
ASTM C150	Standard Specification for Portland Cement
ASTM C443	Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
ASTM C478	Standard Specification for Precast Reinforced Concrete Manhole Sections
ASTM C913	Standard Specification for Precast Concrete Water and Wastewater Structures

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO M36	AASHTO M36: Standard Specification for Corrugated Steel Pipe, Metallic-Coated, for Sewers and Drains
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Item D-752 Concrete Culverts, Headwalls, and Miscellaneous Drainage Structures

DESCRIPTION

752-1.1 This item shall consist of reinforced concrete culverts, headwalls, and miscellaneous drainage structures constructed 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 Engineer.

MATERIALS

752-2.1 Concrete. Concrete shall meet the requirements of Item P-610.

CONSTRUCTION METHODS

752-3.1 Unclassified excavation.

a. Trenches and foundation pits for structures or structure footings shall be excavated to the lines and grades and elevations shown on the plans. The excavation shall be of sufficient size to permit the placing of the full width and length of the structure or structure footings shown. The elevations of the bottoms of footings, as shown on the plans, shall be considered as approximate only; and the Engineer may approve, in writing, changes in dimensions or elevations of footings necessary to secure 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 Engineer. All seams or crevices shall be cleaned out and grouted. All loose and disintegrated rock and thin strata shall be removed. When 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 steel is placed.

c. The Contractor shall do all bracing, sheathing, or shoring necessary to perform 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 excavation.~~

d. All bracing, sheathing, or shoring shall be removed by the Contractor after the completion of the structure. Removal shall not disturb or damage the finished concrete. ~~The cost of removal shall be included in the unit price bid for excavation.~~

e. After each excavation is completed, the Contractor shall notify the Engineer. No concrete or reinforcing steel shall be placed until the Engineer has approved the depth of the excavation and the character of the foundation material.

752-3.2 Backfilling.

a. After a structure has been completed, backfilling with approved material shall be accomplished by applying the fill in horizontal layers not to exceed 8 inches (200 mm) in loose depth, and compacted. The field density of the compacted material shall be at least 90% of the maximum density for cohesive soils and 95% of the maximum density for non-cohesive soils. The maximum density shall be determined in accordance with ASTM D698. The field density shall be determined in accordance with ASTM D1556.

b. No backfilling shall be placed against any structure until approved by the Engineer. For concrete, 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 or the placement methods.

c. Fill placed around concrete culverts shall be deposited on each side at the same time and to approximately the same elevation. All slopes bounding or within the areas to be backfilled shall be stepped or serrated to prevent wedge action against the structure.

d. Backfill will not be measured for direct payment. Performance of this work shall be considered as a subsidiary obligation of the Contractor. ~~covered under the contract unit price for "unclassified excavation for structures."~~

752-3.3 Weep holes. Weep holes shall be constructed as shown on the plans.

752-3.4 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 embankment, shoulders, or as approved by the Engineer. 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

752-4.1 Section not used.

752-4.2 Section not used.

752-4.3 Section not used.

752-4.4 END WALLS SHALL BE MEASURED BY THE UNIT, COMPLETE. NO SEPARATE MEASUREMENT WILL BE MADE FOR EXCAVATION, BACKFILL, CONCRETE, REINFORCING STEEL, OR OTHER MATERIALS NECESSARY TO INSTALL THE STRUCTURE.

BASIS OF PAYMENT

752-5.1 Section not used.

752-5.2 Section not used.

752-5.3 Section not used.

752-5.4 PAYMENT WILL BE MADE AT THE CONTRACT UNIT PRICE PER EACH FOR END WALLS.

These prices shall be full compensation for furnishing all materials and for all preparation, excavation, and placing the materials, and for all labor, equipment, tools, and incidentals necessary to complete the structure.

Payment will be made under:

Item D-752-5.4 Underdrain Endwall – per each

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

- | | |
|------------|---|
| ASTM D698 | Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lb/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 |

END OF ITEM D-752

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Item D-754 Concrete Gutters, Ditches, and Flumes

DESCRIPTION

754-1.1 This item shall consist of Portland cement concrete gutters, ditches, and flumes constructed in accordance with these specifications at the specified locations in accordance with the dimensions, lines, and grades as shown on the plans.

EQUIPMENT AND MATERIALS

754-2.1 Concrete. Plain and reinforced concrete shall meet the requirements of Item P-610.

754-2.2 Joints. Joint filler materials and premolded joint material shall conform to Item P-605.

CONSTRUCTION METHODS

754-3.1 Preparing subgrade. Excavation shall be made to the required width and depth, and the subgrade upon which the item is to be built shall be compacted to a firm uniform grade. All soft and unsuitable material shall be removed and replaced with suitable approved material. When required, a layer of approved granular material, compacted to the thickness indicated on the plans, shall be placed to form a subbase. The underlying course shall be checked and accepted by the Engineer before placing and spreading operations are started.

754-3.2 Placing. The forms and the mixing, placing, finishing, and curing of concrete shall conform to the requirements of Item P-610 and the following requirements.

The concrete shall be tamped until it is consolidated and mortar covers the top surface. The surface of the concrete shall be floated smooth and the edges rounded to the radii shown on the plans. Before the concrete is given the final finishing, the surface shall be tested with a 12-foot (3.7-m) straightedge, and any irregularities of more than 1/4 inch (6 mm) in 12-foot (3.7-m) shall be eliminated.

The concrete shall be placed with dummy-grooved joints not to exceed 25 feet (7.5 m) apart and no section shall be less than 4 feet (1.2 m) long.

Expansion joints of the type called for in the plans shall be constructed to replace dummy groove joints at a spacing of approximately 100 feet (30 m). When the gutter is placed next to concrete pavement, expansion joints in the gutter shall be located opposite expansion joints in the pavement. When a gutter abuts a pavement or other structure, an expansion joint shall be placed between the gutter and the other structure.

Forms shall not be removed within 24 hours after the concrete has been placed. Minor defects shall be repaired with mortar containing one (1) part cement and two (2) parts fine aggregate.

Depositing, compacting, and finishing the item shall be conducted to build a satisfactory structure. If any section of concrete is found to be porous, or is otherwise defective, it shall be removed and replaced by the Contractor without additional compensation.

754-3.3 Backfilling. After the concrete has set sufficiently, the spaces adjacent to the structure shall be refilled to the required elevation with material specified on the plans and compacted by mechanical equipment to at least 90% of the maximum density as determined by ASTM D698. The in-place density shall be determined in accordance with ASTM D1556.

754-3.4 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 ordered by the Engineer. 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.

Performance of the work described in this section shall be considered as a subsidiary obligation of the Contractor, covered under the contract unit price for the structure.

METHOD OF MEASUREMENT

754-4.1 Concrete shall be measured by the square yard in accordance with the dimensions shown on the plans or ordered by the Engineer. No deductions shall be made for the volume occupied by reinforcing steel, anchors, conduits, weep holes, or piling.

~~**754-4.2** Reinforcing steel shall be measured by the pound, based on the theoretical number of pounds (kg) complete in place as shown on the plans or placed as ordered by the Engineer.~~

BASIS OF PAYMENT

754-5.1 The accepted quantities of structural concrete will be paid for at the contract unit price per square yard complete in place.

~~**754-5.2** The accepted quantities of reinforcing steel will be paid for at the contract price per pound complete in place. No allowance shall be made for clips, wire, or other material used for fastening reinforcement in place.~~

Payment will be made under:

Item D-754-5.1 Concrete Ditch – per square yard

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lb/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

END OF ITEM D-754

Part 12 – Turfing

Item T-901 Seeding

DESCRIPTION

901-1.1 This item shall consist of soil preparation, seeding, liming, and fertilizing the areas shown on the plans or as directed by the Engineer 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 Engineer duplicate signed copies of a statement by the vendor certifying that each lot of seed has been tested by a recognized laboratory for seed testing within six (6) months of date of delivery. This statement shall include: name and address of laboratory, date of test, lot number for each kind of seed, and the results of tests as to name, percentages of purity and of germination, and percentage of weed content for each kind of seed furnished, and, in case of a mixture, the proportions of each kind of seed. Wet, moldy, or otherwise damaged seed will be rejected.

Seeds shall be applied as follows:

Seed Properties and Rate of Application

Seed	Minimum Seed Purity (Percent)	Minimum Germination (Percent)	Rate of Application lb/acre (or lb/1,000 S.F.)
As identified on the plans.			

Seeding shall be performed during the period between March 15 to May 1 and August 15 to October 1 inclusive, unless otherwise approved by the Engineer.

901-2.2 Lime. Not required.

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 a commercial fertilizer AS INDICATED IN THE PLANS and shall be spread at the rate AS SHOWN ON THE PLANS.

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 Engineer before being placed.

CONSTRUCTION METHODS

901-3.1 Advance preparation and cleanup. After grading of areas has been completed and before applying fertilizer and ground limestone, areas to be seeded shall be raked or otherwise cleared of stones larger than 2 inches (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 (125 mm) as a result of grading operations and, if immediately prior to seeding, the top 3 inches (75 mm) of soil is loose, friable, reasonably free from large clods, rocks, large roots, or other undesirable matter, and if shaped to the required grade.

When the area to be seeded is sparsely sodded, weedy, barren and unworked, or packed and hard, any grass and weeds shall first be cut or otherwise satisfactorily disposed of, and the soil then scarified or otherwise loosened to a depth not less than 5 inches (125 mm). Clods shall be broken and the top 3 inches (75 mm) of soil shall be worked into a satisfactory seedbed by discing, or by use of cultipackers, rollers, drags, harrows, or other appropriate means.

901-3.2 Dry application method. Section not used.

901-3.3 Wet application method.

a. General. The Contractor may elect to apply seed and fertilizer (and lime, if required) by spraying them on the previously prepared seedbed in the form of an aqueous mixture and by using the methods and equipment described herein. The rates of application shall be as specified in the special provisions.

b. Spraying equipment. The spraying equipment shall have a container or water tank equipped with a liquid level gauge calibrated to read in increments not larger than 50 gallons (190 liters) over the entire range of the tank capacity, mounted so as to be visible to the nozzle operator. The container or tank shall also be equipped with a mechanical power-driven agitator capable of keeping all the solids in the mixture in complete suspension at all times until used.

The unit shall also be equipped with a pressure pump capable of delivering 100 gallons (380 liters) per minute at a pressure of 100 lb / sq inches (690 kPa). The pump shall be mounted in a line that will recirculate the mixture through the tank whenever it is not being sprayed from the nozzle. All pump passages and pipe lines shall be capable of providing clearance for 5/8 inch (16 mm) solids. The power unit for the pump and agitator shall have controls mounted so as to be accessible to the nozzle operator. There shall be an indicating pressure gauge connected and mounted immediately at the back of the nozzle.

The nozzle pipe shall be mounted on an elevated supporting stand in such a manner that it can be rotated through 360 degrees horizontally and inclined vertically from at least 20 degrees below to at least

60 degrees above the horizontal. There shall be a quick-acting, three-way control valve connecting the recirculating line to the nozzle pipe and mounted so that the nozzle operator can control and regulate the amount of flow of mixture delivered to the nozzle. At least three different types of nozzles shall be supplied so that mixtures may be properly sprayed over distance varying from 20 to 100 feet (6 to 30 m). One shall be a close-range ribbon nozzle, one a medium-range ribbon nozzle, and one a long-range jet nozzle. For case of removal and cleaning, all nozzles shall be connected to the nozzle pipe by means of quick-release couplings.

In order to reach areas inaccessible to the regular equipment, an extension hose at least 50 feet (15 m) in length shall be provided to which the nozzles may be connected.

c. Mixtures. Lime, if required, shall be applied separately, in the quantity specified, prior to the fertilizing and seeding operations. Not more than 220 pounds (100 kg) of lime shall be added to and mixed with each 100 gallons (380 liters) of water. Seed and fertilizer shall be mixed together in the relative proportions specified, but not more than a total of 220 pounds (100 kg) of these combined solids shall be added to and mixed with each 100 gallons (380 liters) of water.

All water used shall be obtained from fresh water sources and shall be free from injurious chemicals and other toxic substances harmful to plant life. The Contractor shall identify to the Engineer all sources of water at least two (2) weeks prior to use. The Engineer 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 Engineer 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 Engineer, 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 Engineer. 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 Engineer. A grass stand shall be considered adequate when bare spots are one square foot (0.01 sq m) or less, randomly dispersed, and do not exceed 3% of the area seeded.

METHOD OF MEASUREMENT

901-4.1 The quantity of seeding to be paid for shall be the number of units acre measured on the ground surface, completed and accepted.

BASIS OF PAYMENT

901-5.1 Payment shall be made at the contract unit price per acre or fraction thereof, which price and payment shall be full compensation for furnishing and placing all material and for all labor, equipment, tools, and incidentals necessary to complete the work prescribed in this item.

Payment will be made under:

Item 901-5.1 Seeding - per acre

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C602 Standard Specification for Agricultural Liming Materials

Federal Specifications (FED SPEC)

FED SPEC JJJ-S-181, Federal Specification, Seeds, Agricultural

Advisory Circulars (AC)

AC 150/5200-33 Hazardous Wildlife Attractants on or Near Airports

FAA/United States Department of Agriculture

Wildlife Hazard Management at Airports, A Manual for Airport Personnel

END OF ITEM T-901

Item T-904 Sodding

DESCRIPTION

904-1.1 This item shall consist of furnishing, hauling, and placing approved live sod on prepared areas in accordance with this specification at the locations shown on the plans or as directed by the Engineer.

MATERIALS

904-2.1 Sod. Sod furnished by the Contractor shall have a good cover of living or growing grass. This shall be interpreted to include grass that is seasonally dormant during the cold or dry seasons and capable of renewing growth after the dormant period. All sod shall be obtained from areas where the soil is reasonably fertile and contains a high percentage of loamy topsoil. Sod shall be cut or stripped from living, thickly matted turf relatively free of weeds or other undesirable foreign plants, large stones, roots, or other materials that might be detrimental to the development of the sod or to future maintenance. At least 70% of the plants in the cut sod shall be composed of the species stated in the special provisions, and any vegetation more than 6 inches (150 mm) in height shall be mowed to a height of 3 inches (75 mm) or less before sod is lifted. Sod, including the soil containing the roots and the plant growth showing above, shall be cut uniformly to a thickness not less than that stated in the special provisions.

904-2.2 Lime. Not required.

904-2.3 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 10-20-10 commercial fertilizer and shall be spread at the rate as recommended by the Contractor's soil fertility tests.

904-2.4 Water. The water shall be sufficiently free from oil, acid, alkali, salt, or other harmful materials that would inhibit the growth of grass.

904-2.5 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 Engineer before being placed.

CONSTRUCTION METHODS

904-3.1 General. Areas to be solid, strip, or spot sodded shall be shown on the plans. Areas requiring special ground surface preparation such as tilling and those areas in a satisfactory condition that are to remain undisturbed shall also be shown on the plans.

Suitable equipment necessary for proper preparation of the ground surface and for the handling and placing of all required materials shall be on hand, in good condition, and shall be approved by the Engineer before the various operations are started. The Contractor shall demonstrate to the Engineer before starting the various operations that the application of required materials will be made at the specified rates.

904-3.2 Preparing the ground surface. After grading of areas has been completed and before applying fertilizer and limestone, areas to be sodded shall be raked or otherwise cleared of stones larger than 2 inches (50 mm) in any diameter, sticks, stumps, and other debris which might interfere with sodding, growth of grasses, or subsequent maintenance of grass-covered areas. If any damage by erosion or other causes occurs after grading of areas and before beginning the application of fertilizer and ground limestone, the Contractor shall repair such damage. This may include filling gullies, smoothing irregularities, and repairing other incidental damage.

904-3.3 Applying fertilizer and ground limestone. Following ground surface preparation, fertilizer shall be uniformly spread at a rate which will provide not less than the minimum quantity of each fertilizer ingredient, as stated in the special provisions. If use of ground limestone is required, it shall then be spread at a rate that will provide not less than the minimum quantity stated in the special provisions. These materials shall be incorporated into the soil to a depth of not less than 2 inches (50 mm) by discing, raking, or other suitable methods. Any stones larger than 2 inches (50 mm) in any diameter, large clods, roots, and other litter brought to the surface by this operation shall be removed.

904-3.4 Obtaining and delivering sod. After inspection and approval of the source of sod by the Engineer, the sod shall be cut with approved sod cutters to such a thickness that after it has been transported and placed on the prepared bed, but before it has been compacted, it shall have a uniform thickness of not less than 2 inches (50 mm). Sod sections or strips shall be cut in uniform widths, not less than 10 inches (250 mm), and in lengths of not less than 18 inches (0.5 m), but of such length as may be readily lifted without breaking, tearing, or loss of soil. Where strips are required, the sod must be rolled without damage with the grass folded inside. The Contractor may be required to mow high grass before cutting sod.

The sod shall be transplanted within 24 hours from the time it is stripped, unless circumstances beyond the Contractor's control make storing necessary. In such cases, sod shall be stacked, kept moist, and protected from exposure to the air and sun and shall be kept from freezing. Sod shall be cut and moved only when the soil moisture conditions are such that favorable results can be expected. Where the soil is too dry, approval to cut sod may be granted only after it has been watered sufficiently to moisten the soil to the depth the sod is to be cut.

904-3.5 Laying sod. Sodding shall be performed only during the seasons when satisfactory results can be expected. Frozen sod shall not be used and sod shall not be placed upon frozen soil. Sod may be transplanted during periods of drought with the approval of the Engineer, provided the sod bed is watered to moisten the soil to a depth of at least 4 inches (100 mm) immediately prior to laying the sod.

The sod shall be moist and shall be placed on a moist earth bed. Pitch forks shall not be used to handle sod, and dumping from vehicles shall not be permitted. The sod shall be carefully placed by hand, edge to edge and with staggered joints, in rows at right angles to the slopes, commencing at the base of the area to be sodded and working upward. The sod shall immediately be pressed firmly into contact with the sod bed by tamping or rolling with approved equipment to provide a true and even surface, and ensure

knitting without displacement of the sod or deformation of the surfaces of sodded areas. Where the sod may be displaced during sodding operations, the workmen, when replacing it, shall work from ladders or treaded planks to prevent further displacement. Screened soil of good quality shall be used to fill all cracks between sods. The quantity of the fill soil shall not cause smothering of the grass. Where the grades are such that the flow of water will be from paved surfaces across sodded areas, the surface of the soil in the sod after compaction shall be set approximately one inch (25 mm) below the pavement edge. Where the flow will be over the sodded areas and onto the paved surfaces around manholes and inlets, the surface of the soil in the sod after compaction shall be placed flush with pavement edges.

On slopes steeper than one (1) vertical to 2-1/2 horizontal and in v-shaped or flat-bottom ditches or gutters, the sod shall be pegged with wooden pegs not less than 12 inches (300 mm) in length and have a cross-sectional area of not less than 3/4 sq inch (18 sq mm). The pegs shall be driven flush with the surface of the sod.

904-3.6 Watering. Adequate water and watering equipment must be on hand before sodding begins, and sod shall be kept moist until it has become established and its continued growth assured. In all cases, watering shall be done in a manner that will avoid erosion from the application of excessive quantities and will avoid damage to the finished surface.

904-3.7 Establishing turf. The Contractor shall provide general care for the sodded areas as soon as the sod has been laid and shall continue until final inspection and acceptance of the work. All sodded areas shall be protected against traffic or other use by warning signs or barricades approved by the Engineer. The Contractor shall mow the sodded areas with approved mowing equipment, depending upon climatic and growth conditions and the needs for mowing specific areas. Weeds or other undesirable vegetation shall be mowed and the clippings raked and removed from the area.

904-3.8 Repairing. When the surface has become gullied or otherwise damaged during the period covered by this contract, the affected areas shall be repaired to re-establish the grade and the condition of the soil, as directed by the Engineer, and shall then be sodded as specified in paragraph 904-3.5.

METHOD OF MEASUREMENT

904-4.1 This item shall be measured on the basis of the area in square yards of the surface covered with sod and accepted.

BASIS OF PAYMENT

904-5.1 This item will be paid for on the basis of the contract unit price per square yard for sodding, which price shall be full compensation for all labor, equipment, material, staking, and incidentals necessary to satisfactorily complete the items as specified.

Payment will be made under:

Item T-904-5.1 Sodding – per square yard

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C602 Standard Specification for Agricultural Liming Materials

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-904

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 Engineer.

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 20% 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 Engineer 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 Engineer 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 Engineer, 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 Engineer. 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 Engineer. The topsoil shall be spread on areas already tilled and smooth-graded or stockpiled in areas approved by the Engineer. 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 Engineer. The Contractor shall notify the Engineer 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 4-6 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 Engineer. 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 the site shall be measured by the number of cubic yards of topsoil measured in its original position and stripped or excavated. Topsoil stockpiled by others and removed for topsoil by the Contractor shall be measured by the number of cubic yards of topsoil measured in the stockpile. Topsoil shall be measured by volume in cubic yards computed by the method of end areas. Topsoil shall be incidental to the project and shall not be measured.~~

905-4.2 Section not used.

BASIS OF PAYMENT

905-5.1 ~~Payment will be made at the contract unit price per cubic yard for topsoil (obtained on the site). 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.~~ No separate payment will be made for top soil. Top soil shall be incidental to the project.

905-5.2 Section not used.

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 T-908 Mulching

DESCRIPTION

908-1.1 This item shall consist of furnishing, hauling, placing, and securing mulch on surfaces indicated on the plans or designated by the Engineer.

MATERIALS

908-2.1 Mulch material. Acceptable mulch shall be the materials listed below or any approved locally available material that is similar to those specified. Mulch shall be free from noxious weeds, mold, and other deleterious materials. Mulch materials, which contain matured seed of species that would volunteer and be detrimental to the proposed overseeding, or to surrounding farm land, will not be acceptable. Straw or other mulch material which is fresh and/or excessively brittle, or which is in such an advanced stage of decomposition as to smother or retard the planted grass, will not be acceptable.

a. Hay. Not used.

b. Straw. Not used.

c. Hay mulch containing seed. Not used.

d. Manufactured mulch. Cellulose-fiber or wood-pulp mulch shall be products commercially available for use in spray applications.

e. Asphalt binder. Not used.

908-2.2 Inspection. The Engineer shall be notified of sources and quantities of mulch materials available, and the Contractor shall furnish him with representative samples of the materials to be used 30 days before delivery to the project. These samples may be used as standards with the approval of the Engineer and any materials brought on the site that do not meet these standards shall be rejected.

CONSTRUCTION METHODS

908-3.1 Mulching. Before spreading mulch, all large clods, stumps, stones, brush, roots, and other foreign material shall be removed from the area to be mulched. Mulch shall be applied immediately after seeding. The spreading of the mulch may be by hand methods, blower, or other mechanical methods, provided a uniform covering is obtained.

Mulch material shall be furnished, hauled, and evenly applied on the area shown on the plans or designated by the Engineer. ~~Straw or hay shall be spread over the surface to a uniform thickness at the rate of 2 to 3 tons per acre (1800—2700 kg per acre) to provide a loose depth of not less than 1 1/2 inches (38 cm) nor more than 3 inches (75 mm).~~ Other organic material shall be spread at the rate directed by the Engineer. ~~Mulch may be blown on the slopes and the use of cutters in the equipment for this purpose will be permitted to the extent that at least 95% of the mulch in place on the slope shall be 6 inches (150 mm) or more in length. When mulches applied by the blowing method are cut, the loose depth in place shall be not less than one inch (25 mm) nor more than 2 inches (50 mm).~~

908-3.2 Securing mulch. The mulch shall be held in place by light discing, a very thin covering of topsoil, ~~pins, stakes, wire mesh, asphalt binder,~~ or other adhesive material approved by the Engineer. ~~Where mulches have been secured by either of the asphalt binder methods, it will not be permissible to walk on the slopes after the binder has been applied. When an application of asphalt binder material is~~

~~used to secure the mulch, the Contractor must take every precaution to guard against damaging or disfiguring structures or property on or adjacent to the areas worked and will be held responsible for any such damage resulting from the operation.~~

~~If the “peg and string” method is used, the mulch shall be secured by the use of stakes or wire pins driven into the ground on 5 foot (1.5 m) centers or less. Binder twine shall be strung between adjacent stakes in straight lines and crisscrossed diagonally over the mulch, after which the stakes shall be firmly driven nearly flush to the ground to draw the twine down tight onto the mulch.~~

908-3.3 Care and repair.

a. The Contractor shall care for the mulched areas until final acceptance of the project. Care shall consist of providing protection against traffic or other use by placing warning signs, as approved by the Engineer, and erecting any barricades that may be shown on the plans before or immediately after mulching has been completed on the designated areas.

b. The Contractor shall be required to repair or replace any mulch that is defective or becomes damaged until the project is finally accepted. When, in the judgment of the Engineer, such defects or damages are the result of poor workmanship or failure to meet the requirements of the specifications, the cost of the necessary repairs or replacement shall be borne by the Contractor.

~~**c.** If the “asphalt spray” method is used, all mulched surfaces shall be sprayed with asphalt binder material so that the surface has a uniform appearance. The binder shall be uniformly applied to the mulch at the rate of approximately 8 gallons (32 liters) per 1,000 square feet (100 sq m), or as directed by the Engineer, with a minimum of 6 gallons (24 liters) and a maximum of 10 gallons (40 liters) per 1,000 square feet (100 sq m) depending on the type of mulch and the effectiveness of the binder securing it. Asphalt binder material may be sprayed on the mulched slope areas from either the top or the bottom of the slope. An approved spray nozzle shall be used. The nozzle shall be operated at a distance of not less than 4 feet (1.2 m) from the surface of the mulch and uniform distribution of the asphalt material shall be required. A pump or an air compressor of adequate capacity shall be used to ensure uniform distribution of the asphalt material.~~

~~**d.** If the “asphalt mix” method is used, the mulch shall be applied by blowing, and the asphalt binder material shall be sprayed into the mulch as it leaves the blower. The binder shall be uniformly applied to the mulch at the rate of approximately 8 gallons (32 liters) per 1,000 square feet (100 sq m) or as directed by the Engineer, with a minimum of 6 gallons (24 liters) and a maximum of 10 gallons (40 liters) per 1,000 square feet (100 sq m) depending on the type of mulch and the effectiveness of the binder securing it.~~

METHOD OF MEASUREMENT

908-4.1 Mulching shall be measured in acres on the basis of the actual surface area acceptably mulched.

BASIS OF PAYMENT

908-5.1 Payment will be made at the contract unit price per acre for mulching. The price shall be full compensation for furnishing all materials and for placing and anchoring the materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item T-908-5.1 Mulching – per acre

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 D977 Standard Specification for Emulsified Asphalt

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

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Part 13 – Lighting Installation

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 Engineer. 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 Engineer.
- 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 Engineer) 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 Engineer 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 Engineer, to determine compliance with the plans and specifications. The Contractor's submittals shall be electronically submitted in pdf format. The Engineer reserves the right to reject any and all equipment, materials, or procedures that do not meet the system design and the standards and codes, specified in this document.
- f. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for at least twelve (12) months from the date of final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's

discretion, with no additional cost to the Owner. The Contractor shall maintain a minimum insulation resistance in accordance with paragraph 108-3.10e with isolation transformers connected in new circuits and new segments of existing circuits through the end of the contract warranty period when tested in accordance with AC 150/5340-26, *Maintenance Airport Visual Aid Facilities*, paragraph 5.1.3.1, Insulation Resistance Test.

108-2.2 Cable. Underground cable for airfield lighting facilities (runway and taxiway lights and signs) shall conform to the requirements of AC 150/5345-7, Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits latest edition. Conductors for use on 6.6 ampere primary airfield lighting series circuits shall be single conductor, seven strand, #8 American wire gauge (AWG), L-824 Type C, 5,000 volts, non-shielded, with cross-linked polyethylene insulation. Conductors for use on 20 ampere primary airfield lighting series circuits shall be single conductor, seven strand, #6 AWG, L-824 Type C, 5,000 volts, non-shielded, with cross-linked polyethylene insulation. L-824 conductors for use on the L-830 secondary of airfield lighting series circuits shall be sized in accordance with the manufacturer's recommendations. All other conductors shall comply with FAA and National Electric Code (NEC) requirements. Conductor sizes noted above shall not apply to leads furnished by manufacturers on airfield lighting transformers and fixtures.

Wire for electrical circuits up to 600 volts shall comply with Specification L-824 and/or Commercial Item Description A-A-59544A and shall be type 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. 6 AWG bare solid copper wire for counterpoise and/or No. 6 AWG 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 solid stainless steel, copper, copper-clad steel, or sectional copper-clad steel. The ground rods shall be of the length and diameter specified on the plans, but in no case be less than 8 feet long and 5/8 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 Engineer proof of the qualifications of each proposed cable splicer for the airport cable type and voltage level to be worked on. Cable splicing/terminating personnel shall have a minimum of three (3) years continuous experience in terminating/splicing medium voltage cable.

108-2.6 Concrete. Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures.

108-2.7 Flowable backfill. Flowable material used to backfill trenches for power cable trenches shall conform to the requirements of Item P-153, Controlled Low Strength Material.

108-2.8 Cable identification tags. Cable identification tags shall be made from a non-corrosive material with the circuit identification stamped or etched onto the tag. The tags shall be of the type as detailed on the plans.

108-2.9 Tape. Electrical tapes shall be Scotch™ Electrical Tapes – Scotch™ 88 (1-1/2 inch (38 mm) wide) and Scotch™ 130C® linerless rubber splicing tape (2-inch (50 mm) wide) – as manufactured by the Minnesota Mining and Manufacturing Company (3M™), or an approved equivalent.

108-2.10 Electrical coating. Electrical coating shall be Scotchkote™ as manufactured by 3M™, or an approved equivalent.

108-2.11 Existing circuits. Whenever the scope of work requires connection to an existing circuit, the existing circuit's insulation resistance shall be tested, in the presence of the Engineer. 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 Engineer. When the work affecting the circuit is complete, the circuit's insulation resistance shall be checked again, in the presence of the Engineer. The Contractor shall record the results on forms acceptable to the Engineer. 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 Engineer 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 Engineer.

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 Engineer 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 Engineer prior to any cable installation. If required by the Engineer, pulling tension values for cable pulls shall be monitored by a dynamometer in the presence of the Engineer. Cable pull tensions shall be recorded by the Contractor and reviewed by the Engineer. 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 Engineer, 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 Engineer, 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 Engineer. 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 sodding, topsoiling, fertilizing, liming, seeding, sprigging, and mulching as shown on the plans. The Contractor shall be held responsible for maintaining all disturbed surfaces and replacements until final acceptance. When trenching is through paved areas, restoration shall be equal to existing conditions. If the cable is to be installed in locations or areas where other compaction requirements are specified (under pavements, embankments, etc.) the backfill compaction shall be to a minimum of 100 percent of ASTM D1557. 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 Engineer. 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 Engineer. 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 Engineer.

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 Engineer 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. Counterpoise size is as shown on the plans. The isolation method is an alternate method for use only with edge lights installed in turf and stabilized soils and raceways installed parallel to and adjacent to the edge of the pavement. NFPA 780 uses 15 feet to define “adjacent to.”

The counterpoise conductor shall be installed halfway between the pavement edge and the light base, mounting stake, raceway, or cable being protected.

The counterpoise conductor shall be installed 8 inches (203 mm) minimum below grade. The counterpoise is not connected to the light base or mounting stake. An additional grounding electrode is required at each light base or mounting stake. The grounding electrode is bonded to the light base or mounting stake with a 6 AWG solid copper conductor.

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 Isolation Method of lightning protection.

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 Engineer. Only personnel experienced in and regularly engaged in this type of work shall make these connections.

Contractor shall demonstrate to the satisfaction of the Engineer, 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 Engineer. The Contractor shall demonstrate the electrical characteristics to the satisfaction of the Engineer. 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 Engineer for approval. Earth resistance testing results shall be recorded on an approved form and testing shall be performed in the presence of the Engineer. 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 Engineer 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 Engineer 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 50 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 Engineer prior to performing the testing.

Two copies of tabulated results of all cable tests performed shall be supplied by the Contractor to the Engineer. 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 Trenching shall be measured by the linear feet of trench, including the excavation, backfill, and restoration, completed, measured as excavated, and accepted as satisfactory. When specified, separate measurement shall be made for trenches of various specified widths.

108-4.2 Cable or counterpoise wire installed in trench, duct bank or conduit shall be measured by the number of linear feet installed and grounding connectors, and trench marking tape ready for operation, and accepted as satisfactory. Separate measurement shall be made for each cable or counterpoise wire installed in trench, duct bank or conduit. The measurement for this item shall not include additional quantities required for slack. Cable 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 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 Engineer. This price shall be full compensation for furnishing all materials and for all preparation and installation of these materials, and for all labor, equipment, tools, and incidentals, including ground rods and ground connectors and trench marking tape, necessary to complete this item.

Payment will be made under:

Item L-108-5.2 No. 8 AWG, 5 kV, L-824, Type C Cable, Installed in Trench, Duct Bank or Conduit – per liner foot

Item L-108-5.3 No. 6 AWG, Solid, Bare Copper Counterpoise Wire, Installed in Trench, Including Connections/Terminations – per linear foot

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

AC 150/5340-26	Maintenance of Airport Visual Aid Facilities
AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-26	Specification for L-823 Plug and Receptacle, Cable Connectors
AC 150/5345-53	Airport Lighting Equipment Certification Program

Commercial Item Description

A-A-59544A	Cable and Wire, Electrical (Power, Fixed Installation)
A-A-55809	Insulation Tape, Electrical, Pressure-Sensitive Adhesive, Plastic

ASTM International (ASTM)

ASTM B3	Standard Specification for Soft or Annealed Copper Wire
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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

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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 Engineer.

b. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications and acceptable to the Engineer. Materials supplied and/or installed that do not comply with these specifications shall be removed, when directed by the Engineer 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 Engineer 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 Engineer, to determine compliance with the plans and specifications. The Contractor's submittals shall be neatly bound in a properly sized 3-ring binder, tabbed by specification section. The RPR reserves the right to reject any and all equipment, materials or procedures that do not meet the system design and the standards and codes specified in this document.

e. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

110-2.2 Steel conduit. Rigid galvanized steel (RGS) conduit and fittings shall be hot dipped galvanized inside and out and conform to the requirements of Underwriters Laboratories Standards 6, 514B, and 1242. All RGS conduits or RGS elbows installed below grade, in concrete, permanently wet locations or other similar environments shall be painted with a 10-mil thick coat of asphaltum sealer or shall have a factory-bonded polyvinyl chloride (PVC) cover. Any exposed galvanizing or steel shall be coated with 10 mils of asphaltum sealer. When using PVC coated RGS conduit, care shall be exercised not to damage the factory PVC coating. Damaged PVC coating shall be repaired per the manufacturer's written instructions. In lieu of PVC coated RGS, corrosion wrap tape shall be permitted to be used where RGS is in contact with direct earth.”

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. Split conduit shall be pre-manufactured for the intended purpose and shall be made of steel or plastic.

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 Engineer approved third party certification program. Precast concrete structures shall conform to ASTM C478.

110-2.8 Flowable backfill. Flowable material used to back fill conduit and duct bank trenches shall conform to the requirements of Item P-153, Controlled Low Strength Material.

110-2.9 Detectable warning tape. Plastic, detectable, American Public Works Association (APWA) red (electrical power lines, cables, conduit and lighting cable), orange (telephone/fiber optic cabling) with continuous legend magnetic tape shall be polyethylene film with a metallized foil core and shall be 3-6 inches (75-150 mm) wide. Detectable tape is incidental to the respective bid item.

CONSTRUCTION METHODS

110-3.1 General. The Contractor shall install underground duct banks and conduits at the approximate locations indicated on the plans. The Engineer 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 Engineer 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 Engineer. 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 Engineer, 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 Engineer.

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 Engineer 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 Engineer 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 Engineer, 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 Engineer 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 Engineer 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 Engineer.

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. Flowable backfill may alternatively be used.

Unless otherwise shown on plans, conduits shall be installed so that the tops of all conduits within the Airport's secured area where trespassing is prohibited are at least 18 inches (0.5 m) below the finished grade. Conduits outside the Airport's secured area shall be installed so that the tops of the conduits are at least 24 inches (60 cm) below the finished grade per National Electric Code (NEC), Table 300.5.

When two or more individual conduits intended to carry conductors of equivalent voltage insulation rating are installed in the same trench without concrete encasement, they shall be spaced not less than 3 inches (75 mm) apart (measured from outside wall to outside wall) in a horizontal direction and not less than 6 inches (150 mm) apart in a vertical direction. Where two or more individual conduits intended to carry conductors of differing voltage insulation rating are installed in the same trench without concrete encasement, they shall be placed not less than 3 inches (75 mm) apart (measured from outside wall to outside wall) in a horizontal direction and 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 Engineer 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 Engineer, 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 Engineer. 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 Engineer. 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.

Flowable backfill may alternatively be used.

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 Engineer.

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.

Flowable backfill may alternatively be used.

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 Engineer.

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, seeding, and mulching 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. Removable cable shall become the property of the Contractor

METHOD OF MEASUREMENT

110-4.1 Underground conduits and duct banks shall be measured by the linear feet of conduits and duct banks installed, including encasement, locator tape, trenching and backfill with designated material, and restoration, and for drain lines, the termination at the drainage structure, all measured in place, completed, and accepted. Separate measurement shall be made for the various types and sizes.

BASIS OF PAYMENT

110-5.1 Payment will be made at the contract unit price per linear foot for each type and size of conduit and duct bank completed and accepted, including trench and backfill with the designated material, and, for drain lines, the termination at the drainage structure. This price shall be full compensation for removal and disposal of existing duct banks and conduits as shown on the plans, furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item per the provisions and intent of the plans and specifications.

Payment will be made under:

Item L-110-5.1 Non-Encased Electrical Conduit, (number)(size) – per linear foot

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circular (AC)

- AC 150/5340-30 Design and Installation Details for Airport Visual Aids
- AC 150/5345-53 Airport Lighting Equipment Certification Program

ASTM International (ASTM)

- ASTM A615 Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

National Fire Protection Association (NFPA)

- NFPA-70 National Electrical Code (NEC)

Underwriters Laboratories (UL)

- UL Standard 6 Electrical Rigid Metal Conduit - Steel
- UL Standard 514B Conduit, Tubing, and Cable Fittings
- UL Standard 514C Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
- UL Standard 1242 Electrical Intermediate Metal Conduit Steel
- UL Standard 651 Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings
- UL Standard 651A Type EB and A Rigid PVC Conduit and HDPE Conduit

END OF ITEM L-110

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 Engineer.

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 Engineer. Materials supplied and/or installed that do not comply with these specifications shall be removed, when directed by the Engineer 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 Engineer 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 Engineer, to determine compliance with the plans and specifications. The Contractor's submittals shall be submitted in electronic PDF format, tabbed by specification section. The Engineer reserves the right to reject any or all equipment, materials or procedures, which, in the Engineer'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. ALL LED LIGHT FIXTURES SHALL BE WARRANTIED BY THE MANUFACTURER FOR A MINIMUM OF FOUR (4) YEARS AFTER DATE OF INSTALLATION INCLUSIVE OF ALL ELECTRONICS. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

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
SEE PLANS								

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
SEE PLANS					

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. The circuit selector cabinet shall meet the requirements of AC 150/5345-5, Type L-847, one circuit control as indicated, Class A, indoor, Rating 1, for 6.6 amperes.

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 A 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 Engineer, 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 Reflective markers will be measured by the number installed as completed units in place, ready for operation, and accepted by the Engineer. Runway and taxiway lights will be measured by the number of each type installed as completed units in place, ready for operation, and accepted by the Engineer. Guidance signs will be measured by the number of each type and size installed as completed units, in place, ready for operation, and accepted by the Engineer. ~~Runway End Identifier Lights shall be measured by each system installed as a completed unit in place, ready for operation, and accepted by the Engineer.~~

~~Precision Approach Path Indicator shall be measured by each system installed as a completed unit, in place, ready for operation, and accepted by the Engineer. Abbreviated Precision Approach Path Indicator shall be measured by each system installed as a completed unit, in place, ready for operation, and accepted by the Engineer.~~

BASIS OF PAYMENT

125-5.1 Payment will be made at the Contract unit price for each complete runway or taxiway light, guidance sign, reflective marker, runway end identification light, precision approach path indicator, or abbreviated precision approach path indicator installed by the Contractor and accepted by the Engineer. 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:

Item L-125-5.1 Relocated L-858(L) Airfield Guidance Sign (size) on New Foundation – per each

Item L-125-5.1 L-858(L) Airfield Guidance Sign (size) on New Foundation - per each

Item L-125-5.2 L-861T(L) Base Mounted MITL (LED) – per each

Item L-125-5.3 L-861T(L) Base Mounted MITL (LED) Base Only – per each

Item L-125-5.4 Relocated L-861T(L) Base Mounted MITL (LED) – per each

Item L-125-5.3 Adjust L-861T(L) Base Mounted MITL (LED) – per each

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

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
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END OF ITEM L-125

State Roadway Specifications

Item R-414 VA Riprap

DESCRIPTION

414-1.1 This item shall consist of placing the specified type of riprap in accordance with the plans and these specifications and the VDOT Road and Bridge Specifications, current edition, Section 414.

MATERIALS

414-2.1 All stone for riprap shall be sound, durable, and free from seams, cracks, and other structural defects. Stones shall weigh between 25 and 75 pounds each. Approximately ten percent may weigh 25 pounds or less and ten percent may weigh 75 to 100 pounds.

414-2.2 Geotextile bedding shall meet the requirements of VDOT Road and Bridge Specifications, current edition, Section 245.

CONSTRUCTION METHODS

414-3.1 Riprap shall be placed as described VDOT Road and Bridge Specifications, current edition, Section 414. Unless shown on the plans, depth of riprap shall be 18 inches. Type B treatment shall be installed when prescribed on the plans.

METHOD OF MEASUREMENT

414-4.1 Riprap shall be measured in square yards of surface area complete in-place in accordance with the plans for each type specified. Excavation and geotextile bedding fabric necessary to complete this item shall not be measured separately but the cost thereof should be included in the unit cost of erosion control treatment.

BASIS OF PAYMENT

414-5.1 Riprap shall be paid at the contract unit price per square yard for the type(s) specified, which payment shall be full compensation for furnishing and placing the riprap and geotextile bedding, all labor, tools, equipment, and incidentals necessary to complete the item.

Payment will be made under:

Item R-414-5.1 Riprap, Class AI – per square yard

END OF ITEM R-414 VA

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Item R-606 VA Soil Retention Covers

DESCRIPTION

606-1.1 This work shall consist of furnishing and placing protective coverings for soil retention, including seed, fertilizer, lime, topsoil, and water, in accordance with these specifications and in reasonably close conformity to the dimensions, line, and grades shown on the plans or as established by the Engineer.

MATERIALS

606-2.1 Materials shall conform to VDOT, Road and Bridge Specifications, current edition, Section 244.02(K).

CONSTRUCTION METHODS

606-3.1 The equipment and construction methods for the installation of the soil retention coverings shall conform to VDOT, Road and Bridge Specifications, current edition, Section 606.

METHOD OF MEASUREMENT

606-4.1 Protective coverings and soil stabilization mats will be measured in square yards of area covered, complete-in-place, in accordance with nominal plan dimensions, and will be paid for at the contract unit price per square yard. Overlaps, overwidths, and cut slots will not be measured for separate payment.

BASIS OF PAYMENT

606-5.1 The accepted quantities of soil retention coverings will be paid for at the contract unit price per square yard, which price shall be full compensation for furnishing, installing, and stapling soil retention coverings; smoothing and shaping ditch channels and waterways; preparing seed beds; and furnishing and applying topsoil, lime, seed, fertilizer, and water, and for all labor, tools, equipment, and incidentals necessary to complete the item.

Payment will be made under:

Item R-606-5.1 Soil Stabilization Mat (Standard) (Type) – per square yard

END OF ITEM R-606 VA

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Appendix A - Sample Submittal Form

SAMPLE SUBMITTAL FORM

Project Title: Rehabilitate Taxiway B from Taxiway B1 to B4

Delta Project #: 23078 - ROA

Submittal #:

Submittal Description:

Bid/Pay Item #:

Drawing Sheet #:

Date:

CONTRACTOR CERTIFICATIONS:

This shop drawing has been reviewed by [Name of Contractor] and approved with respect to the means, methods, techniques, sequences, procedures of construction, safety precautions and programs incidental thereto. [Name of Contractor] also warrants that this shop drawing complies with the contract documents and comprises no variations thereto, unless noted below.

[Name of Contractor] certifies that this shop drawing complies with Buy American requirements as established under 49 USC Section 50101. Steel products must be 100% U.S. domestic product Manufactured Products. Preference shall be given to products that are 100% manufactured and assembled in the U.S. Manufactured products not meeting the 100% U.S. domestic preference may only be used on the project if the FAA has officially granted a permissible waiver to Buy American Preferences.

PROPOSED VARIATIONS OR SUBSTITUTIONS

Signature: _____

Date: _____

Printed Name: _____

Company Name: _____

Appendix B - Construction Safety and Phasing Plan

CONSTRUCTION SAFETY & PHASING PLAN

Taxiway B Rehabilitation from Taxiway B1 to B4

Roanoke-Blacksburg Regional Airport

Roanoke, Virginia

AIP Project No. 3-51-0045-071-2024 (Design)

Delta Project No. 23078

January 2025

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INTRODUCTION

Aviation safety is a primary consideration at airports, especially during construction. In accordance with FAA Advisory Circular (AC) 150/5370-2G, "Operational Safety on Airports During Construction," a Construction Safety and Phasing Plan (CSPP) must be developed on each on-airfield construction project funded by the Airport Improvement Program (AIP), Passenger Facility Charge (PFC) program or for any project located on an airport certificated under Part 139.

The CSPP sets forth benchmarks and requirements for the project and is the airport operator's guideline for developing the highest levels of safety, security, and efficiency at the airport during project construction. The CSPP is to be used by all personnel involved in the project, including construction personnel, inspection personnel, and airport staff. This document has been developed for this construction project in order to minimize interruptions to airport operations, control construction costs, and maximize the performance and safety of construction activity.

The Contractor shall be required to submit a Safety Plan Compliance Document (SPCD) to the airport operator describing how the Contractor will comply with the requirements set forth in this CSPP. The SPCD must be submitted to and approved by the airport operator prior to issuance of the Notice to Proceed. The SPCD includes a certification statement by the Contractor that indicates it understands the operational safety requirements of the CSPP and asserts it will not deviate from the approved CSPP and SPCD unless written approval is granted by the airport operator.

In the event the Contractor's activities are found in non-compliance with the provisions of the CSPP or the SPCD, the Contractor shall immediately cease those operations in violation. In addition, the Contractor will conduct a safety meeting, with the airport operator's representative present, and review those provisions in the CSPP/SPCD which were violated. The Contractor will not be allowed to resume construction operations until conclusion of the safety meeting and implementation of corrective actions.

PROJECT SCOPE

This CSPP has been prepared for an upcoming airfield project at the Roanoke-Blacksburg Regional Airport in Roanoke, Virginia. The project includes the pavement rehabilitation of Taxiway B from east of Taxiway B4 Taxiway Object Free Area (TOFA) to Taxiway B1 including connector Taxiways B1, B2, and B3 outside of the Runway Safety Area to avoid Runway 6-24 closures. The existing taxiway geometrics do not meet current FAA AC 150/5300-13B standards for taxiway pavement and shoulder pavement fillet geometry and shoulder width. The taxiway shoulders need to be reconfigured during rehabilitation in order to be in compliance with the current design standards, which will result the following work:

- Relocation of taxiway edge lights
- Widening of taxiway and taxiway paved shoulders
- Grading grass shoulder off the edge of pavement
- Revising taxiway edge markings
- Mill and overlay asphalt pavement
- Reconstruct portions of taxiway shoulder pavement to full-strength pavement to meet updated geometric standards
- Stormwater management modifications

The Roanoke-Blacksburg Regional Airport is an Airport Reference Code (ARC) C-IV facility with regularly scheduled passenger service. The airport has two runways, 6-24 which is 6,800 long by 150 feet wide and Runway 16-34 which is 5,810 feet long by 150 feet wide. Operations are supported through a contract air traffic control tower that is open 24 hours a day, 7 days a week.

1. COORDINATION

Coordination of safety issues will occur throughout all stages of the project. Key conferences and meetings include:

1.1. Design Coordination

Design coordination will be completed with the affected agencies and organizations to discuss operational safety. Participants will include the airline station managers, tenants, funding agencies, FAA ATCT, ARFF personnel, FAA District Office, State Aviation personnel, the Engineer, and airport operator staff. Input will be solicited on key safety issues to be considered, methods to ensure safety

during construction, required protocols, advance notices, and other requirements that need to be incorporated in the contract bid documents.

1.2. Prebid Meeting

A prebid meeting with potential bidders and construction contractors will take place. The meeting will be held approximately 10 days prior to the bid opening date. During the meeting, safety will be discussed, with an emphasis on the unique aspects of construction on an active airfield. FAA Advisory Circular 150/5370-2G will be reviewed, as will the requirements for the Contractor-prepared SPCD. It will be made clear in both the contract documents as well as the pre-bid meeting that the SPCD is the responsibility of the Contractor.

1.3. Preconstruction Meeting

A preconstruction meeting will be held once a construction contract has been awarded, but prior to the start of construction. Invitees will include airline station managers, users, tenants, prime contractor, subcontractors, funding agencies, ATCT, ARFF personnel, FAA District Office, State Aviation personnel, the Engineer, Resident Project Representative, and the airport operator staff. The FAA Airports District Office should ensure that all appropriate FAA offices and Federal agencies that may have an interest in the project are notified.

The airport operator, or authorized agent will prepare an agenda prior to the preconstruction meeting.

This will include, but not be limited to:

- a. project scope and phasing requirements;
- b. relationship between airport operator, airport operator's authorized agent, and the Contractor;
- c. relationship between the airport operator and the FAA;
- d. identification of Contractor's superintendent and discussion of authority and responsibilities;
- e. designation of airport operator representative responsible for notifying the Flight Service Station of any circumstances requiring a NOTAM;
- f. scheduling of work and phasing requirements;
- g. notice to proceed date;

- h. safety during construction, including responsibility for marking and lighting of closed and hazardous areas, all in accordance with FAA AC 150/5370-2G *Operational Safety on Airports During Construction*;
- i. security requirements;
- j. communications and documentation protocols, including contact information for all key personnel.

Emphasis will be placed on compliance with the established CSPP and approved SPCD.

1.4. Contractor Progress Meetings

Regular progress meetings will be held throughout the construction phase, with operational safety as a standing agenda item. Current compliance issues and upcoming critical work will be reviewed. Meeting participants will include the Engineer, the Resident Project Representative, the Contractor, and the airport operator. Daily meetings between the Resident Project Representative and key Contractor personnel will also occur to address daily work schedules and associated operational concerns. When necessary, appropriate FAA/State personnel, airport staff, or affected tenants will attend progress meetings.

1.5. Scope or Schedule Changes

Coordination between the Engineer, Contractor, FAA, and the airport operator will occur in the event of any scope or schedule changes. It will be determined if revisions to either the CSPP or the SPCD are required as a result of any scope or schedule changes. Revisions to these documents will be routed through the appropriate approval channels prior to beginning construction in areas of impact.

1.6. FAA ATCT Coordination

FAA ATCT must be kept informed of pending changes in airfield access and airfield naming conventions throughout the project, and their concurrence must be received prior to making any of these changes.

2. PHASING (CONSTRUCTION SEQUENCING)

This discussion reviews the construction phasing and work areas defined for the project. The phasing generally provides the desired sequencing for the project. The defined work areas address work limitations. These limitations are primarily associated with operational safety, focusing on maintaining adequate separation between the Contractor's activities and aircraft operations and limiting the time that Contractor

activities impact airport operations. Refer to the phasing plans in Attachment A for work areas. General elements of this sequencing and phasing are described in the following subsections.

2.1. Construction Staging Areas

Refer to the phasing plans in Attachment A for staging area locations and general safety and security notes concerning use of the staging areas. Construction staging areas and Contractor employee parking areas are to remain outside of all object free areas and all safety areas for all active airfield surfaces.

2.2. Construction Access and Haul Routes

Refer to phasing plans in Attachment A for access and haul route locations and general safety and security notes concerning use of access and haul routes. Applicable control along haul routes for both safety and security must be maintained at all times.

2.3. Firefighting Access Routes

Emergency firefighting access in and around the site will be maintained by the Contractor, as required, for the duration of this project. Construction contractors must prominently mark open trenches and excavations within the construction site, with approval from the airport operator, and light them with red lights during hours of restricted visibility or darkness.

2.4. Required Hazard Marking and Lighting

Refer to the phasing plans in Attachment A for required hazard marking and lighting. Reference Sections 15, 16, and 17 of this CSPP for additional information.

2.5. Work Area Phasing.

Work areas have been defined to limit the Contractor's activities and minimize impact to airport operations, including minimizing closures to Runway 6-24 and minimizing impacts to the air cargo operations. The work for this project will be split up into six work areas. Work area phasing will be completed as follows:

Work Area A

Work Area A will include the work on Taxiway B between Taxiway B4 and approximately halfway across the cargo apron. During this phase, Taxiway B4 will remain open, as the work inside the work area is outside of the object free area for Taxiway B4. Aircraft that are landing on Runway 6 and cannot exit at or before Taxiway B4 will be required to turn around utilizing Taxiways B2 and B3 and back-taxi on the

runway and exit at Taxiway B4. Aircraft taking off on Runway 24 from the Terminal and GA Area will need to back-taxi on the runway utilizing Taxiway B4 and can use Taxiways B3 and B1 to turn around. Runway back-taxiing will stretch from Taxiway B4 to Taxiway B3.

Work Area B

Work Area B will include the remaining section of Taxiway B that is adjacent to the cargo apron and work on Taxiway B3. Milestone time for Work Area B is 27 calendar days. In order to allow partial access to the cargo apron for cargo operations, the work hours will be split between taxiway shoulder work and taxiway pavement work. Taxiway shoulder work will allow the work area to be cleaned and safe to re-open cargo aprons during night hours, from 20:30 to 6:30 nightly. Taxiway pavement work will fully close Taxiway B in this area, resulting in a 24-hour closure for a maximum of 10 days. While the section of Taxiway B in Work Area B is closed, UPS cargo will temporarily relocate the parking positions of their aircraft to the west side of the cargo apron to maintain continuous access. It was discussed with UPS operations that they would be able to maintain operations in the relocated position for a duration of 2 weeks. Exact work area limits can be referenced in the phasing plan located in Appendix A.. Back-taxi on the runway is still required for aircraft taking off on Runway 24 and for aircraft landing on Runway 6 and missing Taxiway B4. Runway back-taxi will stretch from Taxiway B4 to Taxiway B2. Aircraft will utilize Taxiways B1 and B2 to turn around before departing on Runway 24.

Work Area C

Work Area C includes the work for the hold apron and connectors B1 and B2, and outside of the object free area for Taxiway B3. This phase has impacts to Runway 24 takeoff, and for aircraft landing on Runway 6 and missing Taxiway B3. In both scenarios the aircraft will need to turn around on the runway and back taxi to exit on Taxiway B3.

There will be a work period where the taxiway lead-in centerline marking will be placed onto the Runway, and will require a temporary closure of Runway 6-24. This closure will only be required for the duration of the marking placement and will not be impacted for the entire duration of Work Area C. Exact work area limits can be referenced in the phasing plan attached in Appendix A.

Work Area D

Work Area D includes the work required to remove and remark the taxiway lead-in centerline from Taxiway B1 to the Runway 24 end. Work Area D shall be completed concurrently within Work Area C.

Runway 6-24 will be closed during the entire duration of Work Area C, which is for 1 calendar day between the hours of 1:00 AM to 5:00 AM. Exact work area limits can be referenced in the phasing plan attached in Appendix A.

Work Area E

Work Area E includes the work required to mill, pave, and remark the contractor staging area, located on the far south end of the cargo apron adjacent to the Piedmont hangar apron and airfield lighting vault. Work Area E shall be the final area of work for the project. Exact work area limits can be referenced in the phasing plan attached in Appendix A.

Work Area F

Work Area F includes the work required to install stormwater basin modifications at the existing basin off of Airport Road to the north of the airfield. Work Area F can be completed concurrently with Work Areas A, B, and/or C and has no impact on airfield operations. Exact work area limits can be referenced in the phasing plan attached in Appendix A.

3. AREAS AND OPERATIONS AFFECTED BY CONSTRUCTION ACTIVITY

Runways and taxiways shall remain in use to the maximum extent possible without compromising safety. Meetings with the Engineer, Contractor, FAA ATCT (if applicable), and the airport operator will occur before construction begins on each phase. Items discussed during these meetings are described below:

3.1. Identification of Affected Areas

The affected areas for each construction phase are identified in the phasing plans in Attachment A.

3.1.1. Closing or partial closing of runways, taxiways, and aprons. See Attachment A.

3.1.2. Closing of firefighting access routes. Access into, through, and/or around the project work area by emergency vehicles may be affected during construction. Refer to the phasing plans (Attachment A) for requirements.

3.1.3. Approach/departure surfaces affected by heights of objects. Contractor equipment used in the project and/or staging area may impact approach/departure surfaces. Equipment locations shall not violate runway Part 77 surfaces except under special waiver conditions. FAA Form 7460-1, *Notice of Proposed Construction or Alteration*, must be submitted by the airport operator to the FAA ADO, and approved prior to construction. Refer to the phasing plans (Attachment A) for requirements.

3.1.4. Construction areas. Construction areas, including actual construction, storage/stockpiles, employee parking, staging areas, and haul routes are located near active airfield surfaces. Refer to the phasing plans (Attachment A) for requirements.

3.2. Mitigation of Effects

Establishment of specific procedures is necessary to maintain the safety and efficiency of airport operations. All coordination pertaining to airport operations during construction shall be with the airport operator's designated representative. Specific contacts will be discussed in detail at the preconstruction meeting.

3.2.1. Temporary and permanent changes to runway and/or taxi operations. Affected runway and taxiways will be barricaded as indicated on the phasing plans (Attachment A).

3.2.2. Detours for ARFF and other airport vehicles. The project work site shall remain open to all firefighting and rescue vehicles in emergency situations. The Contractor is required to maintain access into the project work area for firefighting and rescue vehicles.

3.2.3. Maintenance of essential utilities. Special attention will be given by the Contractor to preventing unscheduled interruption of utility services and facilities. Where required by construction, the Contractor will follow prescribed procedures to locate all utilities (aboveground and underground) prior to working around them. All utility outages will be coordinated in advance in accordance with the procedures included in the plans and specifications. When a utility is damaged, it shall immediately be repaired by the Contractor in accordance with the procedures in the plans and specifications.

3.2.4. Temporary changes to air traffic control procedures. Temporary back-taxiing routes will be necessary for aircraft operations during multiple work area phases. Refer to section 2.5 Work Area Phasing.

4. NAVIGATION AIDS (NAVAIDS) PROTECTION

Before beginning any construction activity, parking of equipment, or storing construction materials near a NAVAID, coordination with the appropriate FAA ATO to evaluate the effects of construction activity on the facility must take place. Necessary clearance distances will be coordinated at daily and weekly progress meetings (refer to Section 1, “Coordination”). NAVAIDS impacted by this project shall be identified through the NOTAM process described in Section 9, “Notification of Construction Activities.” Underground utilities serving the NAVAIDS shall be protected as described in Section 11, “Underground Utilities.” No NAVAIDS are anticipated to be impacted during this project.

5. CONTRACTOR ACCESS

5.1. Location of Stockpiled Construction Materials

Stockpiled materials and equipment storage are not permitted within the safety area, obstacle free zone, or object free area of any active runway or taxiway. Stockpiled materials shall be stored at a location approved by the airport operator and constrained in a manner to prevent movement resulting either from prop wash, jet blast, or wind. Stockpile heights shall not exceed 15 feet and shall not penetrate protected airspace (refer to the plans for information on protected airspace). Stockpiled materials and equipment adjacent to these areas shall be prominently marked and lighted during hours of restricted visibility or darkness. Further reference is directed to Section 6, “Wildlife Management,” Section 7, “Foreign Object Debris Management,” and Section 17, “Protection of Runway and Taxiway Safety Areas.”

5.2. Vehicle and Pedestrian Operations

Vehicle and pedestrian access routes for airport construction projects must be controlled to prevent inadvertent or unauthorized entry of persons, vehicles, or animals into the AOA.

5.2.1. Construction site parking. Vehicle parking areas for Contractor employees shall be as shown on the plans or as designated by the airport operator.

5.2.2. Construction equipment parking. Equipment not in use shall be parked in the construction staging area shown on the plans.

5.2.3. Access and haul roads. Access routes used by contractors shall be clearly marked to prevent inadvertent entry to open aircraft operational areas. If the access routes share or cross any routes

designated for use by ARFF, right of way shall be maintained at all times unless alternate routes have been established. The Contractor shall only use the access and haul roads designated by the airport operator. The airport operator will provide access to the Contractor only after the Contractor has received training from the airport operator. These haul routes are shown in the construction plans.

5.2.4. Marking and lighting of vehicles. Equipment and vehicles shall be marked with 3-foot by 3-foot orange and white checker flags (day only) or yellow flashing dome type lights (day or night). Additionally, all Contractor vehicles operating in the AOA shall be clearly labeled with the Contractor's name visible from 200 feet.

5.2.5. Description of proper vehicle operations. Vehicle operations shall be in accordance with Advisory Circular 150/5210-20 "Ground Vehicle Operations on Airports."

5.2.5.1. Normal conditions: Project haul routes and phasing have been established to prevent the crossing of any open airfield pavements. At no time will vehicles or personnel enter portions of the secure AOA outside the contract area unless approved by the airport operator and accompanied by an airport operator escort. Any vehicle operators must successfully complete airport driver training, as administered by the airport operator, prior to operating a vehicle on the airfield.

5.2.5.2. Lost communications or emergency conditions: In the event that radio communications are lost, the driver shall follow the procedures taught in airport driver training. This include pulling the vehicle onto the shoulder out of the way of any possible aircraft. The vehicle shall then be turned to face the tower and flash the headlights to alert the tower. The tower shall give further instruction to the vehicle using a light gun. The driver must have knowledge of these signaling procedures.

5.2.6. Required escorts. All untrained drivers shall be escorted at all times when on the AOA side of the security fence. Escorted vehicles shall be marked and lighted in accordance with this Section 5.

5.2.7. Training requirements. The airport operator will provide access to the Contractor only after the Contractor has received safety and security training from the Owner. All Contractor personnel that will receive AOA badges shall be required to complete safety and security training and receive driver training prior to issuance of badges. Training sessions are approximately three hours in duration. Personnel and/or suppliers requiring only occasional access to the site shall be exempt from security training requirements, provided they are under the direct supervision and escort of a contractor employee with an AOA badge.

5.2.8. Situational awareness. Vehicle drivers must confirm by personal observation that no aircraft is approaching their position (either in the air or on the ground) when given clearance to cross a runway, taxiway, or any other area open to airport operations. In addition, it is the responsibility of the escort vehicle driver to verify the movement/position of all escorted vehicles at any given time.

5.2.9. Two-way radio communication procedures

5.2.9.1. If prior approval and training has been obtained from the airport operator, and the proper equipment has been installed in AOA vehicles, the Contractor may be allowed to operate vehicles in active aircraft areas. Prior to entering any active safety area, the Contractor shall obtain clearance from the ATCT (Ground Control xxx.xx MHz). Two-way radio communications shall be required at all times the Contractor is working in a runway or taxiway safety area, or on any paved surface that is open to aircraft traffic. The Contractor is responsible for providing radio equipment that is capable of maintaining clear communications with ATCT from all parts of the safety areas that the Contractor has permission to be in. No equipment or personnel shall enter an open runway or taxiway safety area unless properly coordinated with the ATCT. The use of trained flagmen and two-way radios shall be required in these areas. The Contractor shall have a two-way radio at the jobsite at all times work is in progress. Reference is directed to Section 5.

5.2.9.2. No construction activity is anticipated during the hours when the ATCT is closed.

5.2.9.3. The Contractor shall have an adequate number of two-way radios on-site at all times and shall be responsible for providing the radios. The Contractor shall also check with the airport operator to ensure that all the frequencies are the intended frequencies to be used between the Contractor and the ATCT.

5.2.9.4. The Contractor shall be trained in proper radio usage including “read back” requirements. Proper phraseology including the Phonetic Alphabet will also be part of the training. The Contractor shall understand light gun signals in the event that there is a radio failure. Safety Placards from the “Ground Vehicle Guide to Airport Signs and Markings” will be given to the Contractor.

5.2.10. Maintenance of the secured area of the airport

5.2.10.1. Care shall be taken to maintain security during construction when access points are created in the security fencing to permit the passage of construction vehicles or personnel. Temporary gates shall be equipped so that they can be securely closed and locked to prevent access by animals and unauthorized persons. Procedures shall be established to ensure that only authorized persons and vehicles have access to the AOA and that vehicles are allowed through the gate one at a time, i.e. no “piggybacking” behind another person or vehicle. The Contractor is responsible for ensuring that all employees of the Contractor and Subcontractors use only the authorized access point to the AOA and verifying that the access point is secure immediately after use. Gates that fail shall be reported immediately to the airport operator and shall be guarded by the Contractor until the airport operator mobilizes to secure the opening.

5.2.10.2. The Contractor shall maintain separation between the airside and non-secure side of the airport at all times. The perimeter fence shall be maintained on a continuous basis with any temporary opening being continuously guarded by the Contractor’s designated employee. The airport is subject to FAA security requirements and rigid adherence is mandatory. Any fines for unauthorized personnel entering through the Contractor’s entrance points will be deducted from monies due the Contractor. Reference is directed to Section 5. Temporary openings and construction gates shall be secured and locked at the completion of work each day.

5.2.10.3. The Contractor shall delineate limits of construction prior to beginning work each day. The Contractor’s personnel shall not be beyond the limits of construction without authorization from the Owner. Violators are subject to removal from the jobsite and loss of AOA working privileges.

5.2.10.4. The Contractor shall submit a Security Plan at the Preconstruction Conference outlining the methods that the Contractor intends to apply in order to maintain airport security and of monitoring gate openings within and along the security fence.

5.2.10.5. The Airport reserves the right to require all personnel working inside the AOA to obtain a valid AOA badge or be under the direct supervision (within approximately 100 feet) of a person with an AOA badge. Personnel and/or suppliers requiring only occasional access to the site shall be exempt from security training requirements but shall be escorted by a badged employee at all times.

6. WILDLIFE MANAGEMENT

6.1. Trash

Food scraps shall be collected from construction personnel activity. Trash shall be disposed of weekly, or more frequently if necessary, to discourage wildlife encroachment.

6.2. Standing Water

Areas of standing water shall be kept to a minimum so as not to attract wildlife.

6.3. Tall Grass and Seeds

Only the grasses specified on the plans and in the specifications may be used for either temporary or permanent seeding. Incompatible plants could be an unwanted bird attractant.

6.4. Poorly Maintained Fencing and Gates

Reference is directed to Section 5 “Contractor Access” in regard to the importance of maintaining security on the airport so as to discourage access by wildlife.

6.5. Disruption of Existing Wildlife Habitat / Wildlife Sightings

Contractor personnel shall immediately notify the airport operator of significant wildlife sightings.

7. FOREIGN OBJECT DEBRIS (FOD) MANAGEMENT

Waste and loose materials, commonly referred to as FOD, are capable of causing damage to aircraft landing gears, propellers, and jet engines. Materials capable of creating FOD shall be continuously removed during

the project and must not be left or placed near active aircraft movement areas. The following measures will be utilized to control and monitor FOD:

- Worksite housekeeping
- Ground vehicle tire inspections
- Runway and taxiway sweeps

Inspection requirements are outlined in Section 10.

8. HAZARDOUS MATERIALS (HAZMAT) MANAGEMENT

The Contractor shall be prepared to immediately contain and clean-up spills resulting from fuel or hydraulic fluid leaks. Provisions for HAZMAT management shall be addressed in the Contractor's Storm Water Pollution Prevention Plan (SWPPP). The HAZMAT management procedures shall include, but not be limited to the following:

- Fuel deliveries
- Spill recovery procedures
- Material Safety Data Sheets (MSDS) availability

9. NOTIFICATION OF CONSTRUCTION ACTIVITIES

This section outlines procedures for maintaining communication in the event that airport users and the FAA must be notified immediately of any conditions adversely affecting the operational safety of the airport.

9.1. Contact List

The Contractor shall provide a list of responsible representatives/points of contact for all involved parties, and procedures for contacting each of them, including after hours. The Contractor must have someone available to take emergency calls from the airport operator throughout the entire construction time period. The Contractor's list shall also include the airport point of contact, ATCT (if applicable), and the Engineer to ensure that Contractor personnel have the contacts that they need in the event of a safety related event.

Airport points of contact are as follows:

- Emergency Telephone Number (Police/Fire/Rescue): 911
- Airport Security Office: (540) 797-3093 (24-hour contact)
- Airport Operations: (540) 362-1999 Ext. 277
- ATCT: (540) 265-2280

9.2. NOTAMs

The airport operator shall be responsible for the issuance of all NOTAMs. Only the airport operator may initiate or cancel NOTAMs on airport conditions and is the only entity that can open or close a runway. The airport operator shall coordinate the issuance, maintenance, and cancellation of NOTAMs regarding airport conditions resulting from construction activities with tenants and the Air Traffic Control Tower and provide information on closed or hazardous conditions on airport movement areas to the FAA Flight Service Station (FSS) for issuance of NOTAMs.

9.3. Emergency notification procedures

In the event of an emergency, the Contractor shall call 911. Additional notification procedures will be reviewed at the preconstruction meeting, and periodically at construction progress meetings, and distributed to all appropriate parties.

9.4. Coordination with ARFF

Coordination with ARFF personnel regarding maintenance of access routes, impacts to fire protection water sources, impacts to fire alarm systems, and use of hazardous materials during construction will be addressed at the preconstruction meeting as well as construction progress meetings.

9.5. Notification to the FAA

9.5.1. Part 77. Any proposed construction or alteration of objects that affect navigable airspace, as defined in FAR Part 77, shall be coordinated with the FAA by submitting FAA Form 7460-1, "Notice of Proposed Construction or Alteration" to the appropriate FAA Airports Regional or District Office. This includes construction equipment and proposed parking areas for this equipment (i.e. cranes, graders, and other equipment) on the airport.

10. INSPECTION REQUIREMENTS

10.1. Daily Inspections

Inspections shall be conducted by the Contractor at least daily to ensure compliance with the CSPP. A sample checklist is provided in Attachment B. In addition, daily inspections will be conducted by the airport operator or their Representative to ensure compliance with the CSPP and the SPCD.

10.2. Final Inspections

A Final Inspection will be conducted by the airport operator, Engineer, FAA, and State upon substantial completion of the project.

11. UNDERGROUND UTILITIES

Special attention shall be given to preventing unscheduled interruption of utility services and facilities. The Contractor shall locate, or arrange for the location of underground utilities, cables, wires, pipelines, and other underground facilities located in excavation areas shall be located. This shall include coordination with public utilities, "One Call" or "Miss Utility" services. FAA ATO/Technical Operations shall be contacted for location and marking of FAA NAVAID cables. Full coordination between the airport operator's representatives and construction personnel will take place to ensure that these items are protected at all times during construction. If the Contractor damages any active utility during construction, immediate action shall be taken by the Contractor to repair the utility. Refer to Section 9 "Notification of Construction Activities" for contact information.

12. PENALTIES

12.1. Failure on the part of the Contractor to adhere to the requirements of this CSPP, and the plans and specifications, may have consequences that jeopardize the health and safety of persons on or near the construction site. Penalties for such actions are established by the airport operator and may include fines, suspension of construction, and/or removal from the job site. The airport operator reserves the right to deduct fines from money due to the Contractor.

12.2. Unauthorized personnel entering through the Contractor's access point is a violation of this CSPP and may result in a fine. The airport operator reserves the right to deduct fines from money due to the Contractor.

12.3. Contractor personnel found to be beyond the limits of construction without authorization from the Owner are subject to removal from the jobsite and loss of security badge and/or secured area working privileges.

13. SPECIAL CONDITIONS

Special conditions that require safety mitigation action include the following:

- Low-visibility operations
- Snow removal
- Aircraft in distress
- Aircraft accident
- Security breach
- Vehicle/pedestrian deviation (VPD)

During these events the Contractor will be required to suspend operations, clear active construction zones, or other measures as directed by the airport operator. Notification procedures in Section 9 shall be followed. See also Sections 5, "Contractor Access," and 14, "Runway and Taxiway Visual Aids."

14. RUNWAY AND TAXIWAY VISUAL AIDS

14.1. General

Those areas where aircraft will be operating shall be clearly marked to separate them from construction areas. Airport markings, lighting, signs, and visual NAVAIDs shall be clearly visible to pilots and not misleading, confusing, or deceptive. This shall be verified throughout the construction of the project. All facilities shall be secured in place to prevent movement by prop wash, jet blast, wing vortices, or other wind currents. The facilities shall be constructed of materials that would minimize damage to an aircraft in the event of inadvertent contact.

14.2. Markings

Temporary markings are required. Refer to the phasing plans (Attachment A) for details on temporary marking for the project.

14.2.1. Temporarily Closed Runways. Temporarily closed runways shall be designated by the placement of an X at each end of the runway directly on or as near as practicable to the runway designation numbers.

14.2.2. Temporarily Closed or New Taxiways. For temporarily closed taxiways or new taxiways prior to opening, an X shall be placed at the entrance to each taxiway as indicated in the phasing plans.

14.3. Lighting and Signage.

Temporary lighting is required. Refer to the phasing plans (Attachment A) for details on temporary lighting for the project.

14.3.1. Temporarily Closed Runways. Temporarily closed runways shall have their lights de-energized or covered, in accordance with the phasing plans.

14.3.2. Temporarily Closed Taxiways. Temporary closed taxiways shall have their lights de-energized or covered. Directional sign panels associated with temporary closed pavements shall be removed and replaced with a blank panel or covered.

15. MARKING AND SIGNS FOR ACCESS ROUTES

Pavement markings and signs for construction personnel shall conform to AC 150/5340-18 on the runway and taxiway. Elsewhere, access route marking and signs shall conform to the Federal Highway Administration Manual on Uniform Traffic Control Devices (MUTCD) and/or State highway specifications. Signs adjacent to areas used by aircraft shall comply with the frangibility requirements on AC 150/5220-23, "Frangible Connections." The height of temporary signage shall be restricted so as not to penetrate any avigational surfaces (avigational surfaces are described in the phasing plans in Attachment A). Temporary markings and signage are indicated in the phasing plans.

16. HAZARD MARKING, LIGHTING, AND SIGNAGE

16.1. Purpose

The purpose for delineating work areas is to prevent pilots and other airport personnel who do not belong in the construction area from entering. Work areas will be delineated with closed markers, aviation barricades, and bucket barricades. The first item of work in any work area will be the installation of the necessary closed markers and barricades to isolate the areas of proposed construction. All runway and taxiway closures will be fully coordinated with the airport operator to ensure that the proper NOTAMs are issued.

16.2. Barricades

Barricades are acceptable methods used to identify and define the limits of construction and hazardous areas on airports. The types of barricades allowed are detailed on the phasing plans (Attachment A).

16.3. Lights

Lights shall be red, either steady burning or flashing, and meet the luminance requirements of the State Highway Department. Lights shall be mounted on barricades and spaced at no more than ten (10) feet apart. Lights shall be operated between sunset and sunrise and during periods of low visibility whenever the airport is open for operations.

16.4. Signs

The barricades shall be supplemented with signs (for example “No Entry,” “No Vehicles”) as necessary. Signs shall conform to the Federal Highway Administration Manual on Uniform Traffic Control Devices (MUTCD) and/or State highway specifications.

16.5. Air Operations Area – General

Barricades are not permitted in any active safety area. Within a runway or taxiway object free area, and on aprons, the following shall be used to separate all construction/maintenance areas from the movement area:

- Orange traffic cones
- Flashing or steady burning red lights
- Collapsible barricades with diagonal, alternating orange & white stripes
- Signs

Barricades shall be supplemented with alternating orange and white flags at least 20 by 20 inches (50 x 50 centimeters) square and securely fastened to eliminate FOD. All barricades adjacent to an open

runway or taxiway / taxilane safety area or apron shall be as low as possible to the ground, and no more than 18 inches high, exclusive of supplementary lights and flags. Barricades shall be of low mass; easily collapsible upon contact with aircraft or any of its components; and weighted or sturdily attached to the surface to prevent displacement from prop wash, jet blast, wing vortex, or other surface wind currents. Barricades affixed to the surface shall be frangible at grade level or as low as possible, but not to exceed 3 inches above the ground. The types of barricades allowed are detailed on the phasing plans (Attachment A).

16.6. Air Operations Area – Runway / Taxiway Intersections

Highly reflective barricades with lights shall be used to close taxiways leading to closed runways. The types of barricades allowed are detailed on the phasing plans (Attachment A).

16.7. Air Operations Area – Other

For areas outside runway and taxiway object free areas and safety areas and aprons, barricades intended for construction vehicles and personnel may consist of different shapes and may be constructed from various materials, including railroad ties, sawhorses, jersey barriers, or barrels. The Contractor shall coordinate these barricades, and their locations with the airport operator's representative.

16.8. Maintenance

The construction specifications include a provision requiring the Contractor to have personnel on call 24 hours a day for emergency maintenance of airport hazard lighting and barricades.

Refer to the phasing plans in Attachment A for graphical depictions of hazard marking, lighting, and signage.

17. PROTECTION OF RUNWAY AND TAXIWAY SAFETY AREAS

17.1. Runway Safety Area. Construction activities within the existing RSA are subject to the following conditions:

17.1.1. No activity is permitted while the runway is open for aircraft operations. Reference is directed to Section 5 for information on Contractor access to runway safety areas.

17.1.2. Excavations

17.1.2.1. Stockpiling of materials, open trenches, or excavations are not permitted within the RSA while the runway is open. Stockpiled materials shall be removed prior to opening the runway. Trenches shall be either backfilled or covered prior to opening the runway. If the runway must be reopened before excavations are backfilled, the excavations shall be covered appropriately. Covering for open trenches shall be designed to allow the safe operation of the heaviest aircraft operating on the runway across the trench without damage to the aircraft.

17.1.2.2. Open trenches and excavations at the construction site shall be prominently marked by the Contractor with red or orange flags, as approved by the Owner, and lighted with red lights during hours of restricted visibility or darkness. Refer to Section 16 for additional information on hazard marking and lighting.

17.1.3. Erosion Control

Soil erosion shall be controlled to maintain RSA standards, that is, the RSA must be cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations, and be capable, under dry conditions, of supporting snow removal equipment, aircraft rescue and firefighting equipment, and the occasional passage of aircraft without causing structural damage to the equipment or aircraft.

17.1.4. For this project, the following distances (in accordance with FAA Advisory Circular 150/5300-13), must be protected along the runway edges:

Runway	Aircraft Approach Category A, B, C, or D	Airplane Design Group I, II, III, or IV	RSA Width in Feet Divided by 2
6	C	IV	250
24	C	IV	250
16	C	IV	250
34	C	IV	250

17.1.5. For this project, the following distances (in accordance with FAA Advisory Circular 150/5300-13), must be protected before the runway threshold:

Runway End Number	Airplane Design Group I, II, III, or IV	Aircraft Approach Category A, B, C, or D	Minimum Safety Area Prior to the Threshold	Minimum Distance to Threshold Based on Required Approach Slope	
6	IV	C	600	1,000 ft	34:1
24	IV	C	600	1,000 ft	34:1
16	IV	C	600	1,000 ft	34:1
34	IV	C	600	1,000 ft	34:1

17.2. Runway Object Free Area (ROFA)

Construction, including excavations, may be permitted in the ROFA only if performed in accordance with the requirements in the phasing plans (Attachment A). Equipment must be removed from the ROFA when not in use, and material shall not be stockpiled in the ROFA if not necessary. Stockpiling material in the OFA shall not occur until a 7460-1 form and justification is provided to the appropriate FAA Airports Regional or District Office and approved. ROFA dimensions shall be as identified in the following table, which is in accordance with FAA Advisory Circular 150/5300-13.

Runway	ROFA Distance from Centerline (ft)	ROFA Width (ft)	ROFA Length from End of Runway (ft)
6	400	800	1000
24	400	800	1000
16	400	800	1000
34	400	800	1000

17.3. Taxiway Safety Area (TSA)

17.3.1. No construction is permitted within the taxiway safety area while the taxiway is open for aircraft operations.

17.3.2. Excavations

17.3.2.1. Stockpiling of materials, open trenches, or excavations are not permitted within the TSA while the taxiway is open. Stockpiled materials shall be removed prior to opening the taxiway. Trenches shall be either backfilled or covered prior to opening the taxiway. If the taxiway must be reopened before excavations are backfilled, the excavations shall be covered appropriately. Covering for open trenches shall be designed to allow the safe operation of the heaviest aircraft operating on the taxiway across the trench without damage to the aircraft.

17.3.2.2. Open trenches and excavations at the construction site shall be prominently marked by the Contractor with red or orange flags, as approved by the Owner, and lighted with red lights during hours of restricted visibility or darkness. Refer to Section 16 for additional information on hazard marking and lighting.

17.3.3. Erosion Control

Soil erosion shall be controlled to maintain TSA standards, that is, the TSA must be cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations, and capable, under dry conditions, of supporting snow removal equipment, aircraft rescue and firefighting equipment, and the occasional passage of aircraft without causing structural damage to the equipment or aircraft.

17.3.4. For this project, the following distances (in accordance with FAA Advisory Circular 150/5300-13) must be protected along the taxiway edges:

Taxiway	Aircraft Approach Category A, B, C, or D	Airplane Design Group I, II, III, or IV	TSA Width in Feet Divided by 2
All taxiways	C	IV	85.5

17.4. Taxiway Object Free Area (TOFA)

No work is permitted inside the TOFA without the taxiway being closed. For this project, the following distances (in accordance with FAA Advisory Circular 150/5300-13) must be protected along the taxiway:

Taxiway	Aircraft Approach Category A, B, C, or D	Airplane Design Group I, II, III, or IV	TOFA Width in Feet Divided by 2
All taxiways	C	IV	121.5

17.5. Obstacle Free Zone (OFZ)

Typically, no personnel, equipment, or material shall be permitted inside the OFZ while the runway is open for aircraft operations. If access is required, the express permission of the airport operator shall be obtained. Any request for such permission shall be submitted in writing by the Contractor, along with justification in order for the owner to coordinate the request with FAA. The Runway OFZ is the airspace above the runway whose elevation at any point is the same as the elevation of the nearest point on the runway centerline. For this project, the OFZ dimensions (in accordance with FAA Advisory Circular 150/5300-13) are as follows:

Runway	OFZ Distance from Centerline (ft)	OFZ Width (ft)	OFZ Length from End of Runway (ft)
6	200	400	200
24	200	400	200
16	200	400	200
34	200	400	200

17.6. Runway Approach/ Departure Areas and Clearways

All personnel, equipment, and material shall remain outside the protected approaches and surfaces as shown on the phasing plans in Attachment A. Objects that do not penetrate these surfaces may still be obstructions to air navigation and may affect standard instrument approach procedures. Prior to placing such objects, a 7460-1 form and justification must be provided to the appropriate FAA Airports Regional or District Office and approved. Particular attention is called to the placement of cranes, excavators, and other tall equipment.

18. OTHER LIMITATIONS ON CONSTRUCTION

18.1. Prohibitions.

The following are prohibited:

18.1.1. No use of tall equipment (cranes, concrete pumps, etc.) unless a 7460-1 determination letter is issued for such equipment.

18.1.2. No uses of open flame welding or torches unless fire safety precautions are provided, and the airport operator has approved their use.

18.1.3. No use of electrical blasting caps on or within 1,000 feet (300 meters) of the airport property.

18.1.4. No use of flare pots within the AOA.

18.2. Restrictions.

The following are restricted:

18.2.1. Activities during special condition events as outlined in Section 13.

18.2.2. Areas that cannot be worked on simultaneously as outlined in the phasing plans. Also refer to Section 2, "Phasing."

18.2.3. Day or night construction restrictions as outlined in the phasing plans. Also refer to Section 2, "Phasing."

18.2.4. Work area restrictions as outlined in the phasing plans. Also refer to Section 2, "Phasing."

ATTACHMENT A – PHASING PLANS



(Bid Set - see Work Area Milestone Plan Sheets)

ATTACHMENT B – SAMPLE CHECKLISTS



APPENDIX C. SAFETY AND PHASING PLAN CHECKLIST

This appendix is keyed to Chapter 2. In the electronic version of this AC, clicking on the paragraph designation in the Reference column will access the applicable paragraph. There may be instances where the CSPP requires provisions that are not covered by the list in this appendix.

This checklist is intended as an aid, not a required submittal.

Table C-1. CSPP Checklist

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
General Considerations					
Requirements for predesign, prebid, and preconstruction conferences to introduce the subject of airport operational safety during construction are specified.	<u>2.5</u>				
Operational safety is a standing agenda item for construction progress meetings.	<u>2.5</u>				
Scheduling of the construction phases is properly addressed.	<u>2.6</u>				
Any formal agreements are established.	<u>2.5.3</u>				
Areas and Operations Affected by Construction Activity					
Drawings showing affected areas are included.	<u>2.7.1</u>				
Closed or partially closed runways, taxiways, and aprons are depicted on drawings.	<u>2.7.1.1</u>				
Access routes used by ARFF vehicles affected by the project are addressed.	<u>2.7.1.2</u>				
Access routes used by airport and airline support vehicles affected by the project are addressed.	<u>2.7.1.3</u>				
Underground utilities, including water supplies for firefighting and drainage.	<u>2.7.1.4</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
Approach/departure surfaces affected by heights of temporary objects are addressed.	<u>2.7.1.5</u>				
Construction areas, storage areas, and access routes near runways, taxiways, aprons, or helipads are properly depicted on drawings.	<u>2.7.1</u>				
Temporary changes to taxi operations are addressed.	<u>2.7.2.1</u>				
Detours for ARFF and other airport vehicles are identified.	<u>2.7.2.2</u>				
Maintenance of essential utilities and underground infrastructure is addressed.	<u>2.7.2.3</u>				
Temporary changes to air traffic control procedures are addressed.	<u>2.7.2.4</u>				
NAVAIDs					
Critical areas for NAVAIDs are depicted on drawings.	<u>2.8</u>				
Effects of construction activity on the performance of NAVAIDs, including unanticipated power outages, are addressed.	<u>2.8</u>				
Protection of NAVAID facilities is addressed.	<u>2.8</u>				
The required distance and direction from each NAVAID to any construction activity is depicted on drawings.	<u>2.8</u>				
Procedures for coordination with FAA ATO/Technical Operations, including identification of points of contact, are included.	<u>2.8, 2.13.1, 2.13.5.3.1, 2.18.1</u>				
Contractor Access					
The CSPP addresses areas to which contractor will have access and how	<u>2.9</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
the areas will be accessed.					
The application of 49 CFR Part 1542 Airport Security, where appropriate, is addressed.	<u>2.9</u>				
The location of stockpiled construction materials is depicted on drawings.	<u>2.9.1</u>				
The requirement for stockpiles in the ROFA to be approved by FAA is included.	<u>2.9.1</u>				
Requirements for proper stockpiling of materials are included.	<u>2.9.1</u>				
Construction site parking is addressed.	<u>2.9.2.1</u>				
Construction equipment parking is addressed.	<u>2.9.2.2</u>				
Access and haul roads are addressed.	<u>2.9.2.3</u>				
A requirement for marking and lighting of vehicles to comply with <i>AC 150/5210-5, Painting, Marking and Lighting of Vehicles Used on an Airport</i> , is included.	<u>2.9.2.4</u>				
Proper vehicle operations, including requirements for escorts, are described.	<u>2.9.2.5, 2.9.2.6</u>				
Training requirements for vehicle drivers are addressed.	<u>2.9.2.7</u>				
Two-way radio communications procedures are described.	<u>2.9.2.9</u>				
Maintenance of the secured area of the airport is addressed.	<u>2.9.2.10</u>				
Wildlife Management					
The airport operator's wildlife management procedures are addressed.	<u>2.10</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
Foreign Object Debris Management					
The airport operator's FOD management procedures are addressed.	<u>2.11</u>				
Hazardous Materials Management					
The airport operator's hazardous materials management procedures are addressed.	<u>2.12</u>				
Notification of Construction Activities					
Procedures for the immediate notification of airport user and local FAA of any conditions adversely affecting the operational safety of the airport are detailed.	<u>2.13</u>				
Maintenance of a list by the airport operator of the responsible representatives/points of contact for all involved parties and procedures for contacting them 24 hours a day, seven days a week is specified.	<u>2.13.1</u>				
A list of local ATO/Technical Operations personnel is included.	<u>2.13.1</u>				
A list of ATCT managers on duty is included.	<u>2.13.1</u>				
A list of authorized representatives to the OCC is included.	<u>2.13.2</u>				
Procedures for coordinating, issuing, maintaining and cancelling by the airport operator of NOTAMS about airport conditions resulting from construction are included.	<u>2.8, 2.13.2, 2.18.3.3.9</u>				
Provision of information on closed or hazardous conditions on airport movement areas by the airport operator to the OCC is specified.	<u>2.13.2</u>				
Emergency notification procedures for medical, fire fighting, and police	<u>2.13.3</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
response are addressed.					
Coordination with ARFF personnel for non-emergency issues is addressed.	<u>2.13.4</u>				
Notification to the FAA under 14 CFR parts 77 and 157 is addressed.	<u>2.13.5</u>				
Reimbursable agreements for flight checks and/or design and construction for FAA owned NAVAIDs are addressed.	<u>2.13.5.3.2</u>				
Inspection Requirements					
Daily and interim inspections by both the airport operator and contractor are specified.	<u>2.14.1, 2.14.2</u>				
Final inspections at certificated airports are specified when required.	<u>2.14.3</u>				
Underground Utilities					
Procedures for protecting existing underground facilities in excavation areas are described.	<u>2.15</u>				
Penalties					
Penalty provisions for noncompliance with airport rules and regulations and the safety plans are detailed.	<u>2.16</u>				
Special Conditions					
Any special conditions that affect the operation of the airport or require the activation of any special procedures are addressed.	<u>2.17</u>				
Runway and Taxiway Visual Aids - Marking, Lighting, Signs, and Visual NAVAIDs					
The proper securing of temporary airport markings, lighting, signs, and visual NAVAIDs is addressed.	<u>2.18.1</u>				
Frangibility of airport markings, lighting, signs, and visual NAVAIDs is specified.	<u>2.18.1, 2.18.3, 2.18.4.2, 2.20.2.4</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
The requirement for markings to be in compliance with <u>AC 150/5340-1</u> , <i>Standards for Airport Markings</i> , is specified.	<u>2.18.2</u>				
Detailed specifications for materials and methods for temporary markings are provided.	<u>2.18.2</u>				
The requirement for lighting to conform to <u>AC 150/5340-30</u> , <i>Design and Installation Details for Airport Visual Aids</i> ; <u>AC 150/5345-50</u> , <i>Specification for Portable Runway and Taxiway Lights</i> ; and <u>AC 150/5345-53</u> , <i>Airport Lighting Certification Program</i> , is specified.	<u>2.18.3</u>				
The use of a lighted X is specified where appropriate.	<u>2.18.2.1.2</u> , <u>2.18.3.2</u>				
The requirement for signs to conform to <u>AC 150/5345-44</u> , <i>Specification for Runway and Taxiway Signs</i> ; <u>AC 150/5340-18</u> , <i>Standards for Airport Sign Systems</i> ; and <u>AC 150/5345-53</u> , <i>Airport Lighting Certification Program</i> , is specified.	<u>2.18.4</u>				
Marking and Signs For Access Routes					
The CSPP specifies that pavement markings and signs intended for construction personnel should conform to <u>AC 150/5340-18</u> and, to the extent practicable, with the MUTCD and/or State highway specifications.	<u>2.18.4.2</u>				
Hazard Marking and Lighting					
Prominent, comprehensible warning indicators for any area affected by construction that is normally accessible to aircraft, personnel, or vehicles are specified.	<u>2.20.1</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
Hazard marking and lighting are specified to identify open manholes, small areas under repair, stockpiled material, and waste areas.	<u>2.20.1</u>				
The CSPP considers less obvious construction-related hazards.	<u>2.20.1</u>				
Equipment that poses the least danger to aircraft but is sturdy enough to remain in place when subjected to typical winds, prop wash and jet blast is specified.	<u>2.20.2.1</u>				
The spacing of barricades is specified such that a breach is physically prevented barring a deliberate act.	<u>2.20.2.1</u>				
Red lights meeting the luminance requirements of the State Highway Department are specified.	<u>2.20.2.2</u>				
Barricades, temporary markers, and other objects placed and left in areas adjacent to any open runway, taxiway, taxi lane, or apron are specified to be as low as possible to the ground, and no more than 18 inch high.	<u>2.20.2.3</u>				
Barricades are specified to indicate construction locations in which no part of an aircraft may enter.	<u>2.20.2.3</u>				
Highly reflective barriers with lights are specified to barricade taxiways leading to closed runways.	<u>2.20.2.5</u>				
Markings for temporary closures are specified.	<u>2.20.2.5</u>				
The provision of a contractor's representative on call 24 hours a day for emergency maintenance of airport hazard lighting and barricades is specified.	<u>2.20.2.7</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
Work Zone Lighting for Nighttime Construction					
If work is to be conducted at night, the CSPP identifies construction lighting units and their general locations and aiming in relationship to the ATCT and active runways and taxiways.	<u>2.21</u>				
Protection of Runway and Taxiway Safety Areas					
The CSPP clearly states that no construction may occur within a safety area while the associated runway or taxiway is open for aircraft operations.	<u>2.22.1.1</u> , <u>2.22.3.1</u>				
The CSPP specifies that the airport operator coordinates the adjustment of RSA or TSA dimensions with the ATCT and the appropriate FAA Airports Regional or District Office and issues a local NOTAM.	<u>2.22.1.2</u> , <u>2.22.3.2</u>				
Procedures for ensuring adequate distance for protection from blasting operations, if required by operational considerations, are detailed.	<u>2.22.3.3</u>				
The CSPP specifies that open trenches or excavations are not permitted within a safety area while the associated runway or taxiway is open, subject to approved exceptions.	<u>2.22.1.4</u>				
Appropriate covering of excavations in the RSA or TSA that cannot be backfilled before the associated runway or taxiway is open is detailed.	<u>2.22.1.4</u>				
The CSPP includes provisions for prominent marking of open trenches and excavations at the construction site.	<u>2.22.1.4</u>				
Grading and soil erosion control to maintain RSA/TSA standards are	<u>2.22.3.5</u>				

Coordination	Reference	Addressed?			Remarks
		Yes	No	NA	
addressed.					
The CSPP specifies that equipment is to be removed from the ROFA when not in use.	<u>2.22.2</u>				
The CSPP clearly states that no construction may occur within a taxiway safety area while the taxiway is open for aircraft operations.	<u>2.22.3</u>				
Appropriate details are specified for any construction work to be accomplished in a taxiway object free area.	<u>2.22.4</u>				
Measures to ensure that personnel, material, and/or equipment do not penetrate the OFZ or threshold siting surfaces while the runway is open for aircraft operations are included.	<u>2.22.4.3.6</u>				
Provisions for protection of runway approach/departure areas and clearways are included.	<u>2.22.6</u>				
Other Limitations on Construction					
The CSPP prohibits the use of open flame welding or torches unless adequate fire safety precautions are provided and the airport operator has approved their use.	<u>2.23.1.2</u>				
The CSPP prohibits the use of electrical blasting caps on or within 1,000 ft (300 m) of the airport property.	<u>2.23.1.3</u>				

APPENDIX D. CONSTRUCTION PROJECT DAILY SAFETY INSPECTION CHECKLIST

The situations identified below are potentially hazardous conditions that may occur during airport construction projects. Safety area encroachments, unauthorized and improper ground vehicle operations, and unmarked or uncovered holes and trenches near aircraft operating surfaces pose the most prevalent threats to airport operational safety during airport construction projects. The list below is one tool that the airport operator or contractor may use to aid in identifying and correcting potentially hazardous conditions. It should be customized as appropriate for each project including information such as the date, time and name of the person conducting the inspection.

Table D-1. Potentially Hazardous Conditions

Item	Action Required (Describe)	No Action Required (Check)
Excavation adjacent to runways, taxiways, and aprons improperly backfilled.		
Mounds of earth, construction materials, temporary structures, and other obstacles near any open runway, taxiway, or taxi lane; in the related Object Free area and aircraft approach or departure areas/zones; or obstructing any sign or marking.		
Runway resurfacing projects resulting in lips exceeding 3 inch (7.6 cm) from pavement edges and ends.		
Heavy equipment (stationary or mobile) operating or idle near AOA, in runway approaches and departures areas, or in OFZ.		
Equipment or material near NAVAIDs that may degrade or impair radiated signals and/or the monitoring of navigation and visual aids. Unauthorized or improper vehicle operations in localizer or glide slope critical areas, resulting in electronic interference and/or facility shutdown.		
Tall and especially relatively low visibility units (that is, equipment with slim profiles) — cranes, drills, and similar objects — located in critical areas, such as OFZ and		

Item	Action Required (Describe)	No Action Required (Check)
approach zones.		
Improperly positioned or malfunctioning lights or unlighted airport hazards, such as holes or excavations, on any apron, open taxiway, or open taxi lane or in a related safety, approach, or departure area.		
Obstacles, loose pavement, trash, and other debris on or near AOA. Construction debris (gravel, sand, mud, paving materials) on airport pavements may result in aircraft propeller, turbine engine, or tire damage. Also, loose materials may blow about, potentially causing personal injury or equipment damage.		
Inappropriate or poorly maintained fencing during construction intended to deter human and animal intrusions into the AOA. Fencing and other markings that are inadequate to separate construction areas from open AOA create aviation hazards.		
Improper or inadequate marking or lighting of runways (especially thresholds that have been displaced or runways that have been closed) and taxiways that could cause pilot confusion and provide a potential for a runway incursion. Inadequate or improper methods of marking, barricading, and lighting of temporarily closed portions of AOA create aviation hazards.		
Wildlife attractants — such as trash (food scraps not collected from construction personnel activity), grass seeds, tall grass, or standing water — on or near airports.		
Obliterated or faded temporary markings on active operational areas.		
Misleading or malfunctioning obstruction lights. Unlighted or unmarked obstructions in the approach to any open runway pose aviation hazards.		

Item	Action Required (Describe)	No Action Required (Check)
Failure to issue, update, or cancel NOTAMs about airport or runway closures or other construction related airport conditions.		
Failure to mark and identify utilities or power cables. Damage to utilities and power cables during construction activity can result in the loss of runway / taxiway lighting; loss of navigation, visual, or approach aids; disruption of weather reporting services; and/or loss of communications.		
Restrictions on ARFF access from fire stations to the runway / taxiway system or airport buildings.		
Lack of radio communications with construction vehicles in airport movement areas.		
Objects, regardless of whether they are marked or flagged, or activities anywhere on or near an airport that could be distracting, confusing, or alarming to pilots during aircraft operations.		
Water, snow, dirt, debris, or other contaminants that temporarily obscure or derogate the visibility of runway/taxiway marking, lighting, and pavement edges. Any condition or factor that obscures or diminishes the visibility of areas under construction.		
Spillage from vehicles (gasoline, diesel fuel, oil) on active pavement areas, such as runways, taxiways, aprons, and airport roadways.		
Failure to maintain drainage system integrity during construction (for example, no temporary drainage provided when working on a drainage system).		

Item	Action Required (Describe)	No Action Required (Check)
Failure to provide for proper electrical lockout and tagging procedures. At larger airports with multiple maintenance shifts/workers, construction contractors should make provisions for coordinating work on circuits.		
Failure to control dust. Consider limiting the amount of area from which the contractor is allowed to strip turf.		
Exposed wiring that creates an electrocution or fire ignition hazard. Identify and secure wiring, and place it in conduit or bury it.		
Site burning, which can cause possible obscuration.		
Construction work taking place outside of designated work areas and out of phase.		

Appendix C - Geotechnical Report

GEOTECHNICAL ENGINEERING REPORT

Taxiway B Rehabilitation

Roanoke-Blacksburg Regional Airport (ROA)

Roanoke, Virginia

Schnabel Reference #23160098.000

May 7, 2024

May 7, 2024

Mr. William Eschenfelder, PE
Delta Airport Consultants, Inc.
2700 Polo Parkway
Midlothian, Virginia 23113

Subject: Geotechnical Engineering Report, Taxiway B Rehabilitation, Roanoke-Blacksburg Regional Airport (ROA), Roanoke, Virginia (Schnabel Reference 23160098.000)

Dear Mr. Eschenfelder:

SCHNABEL ENGINEERING, LLC (Schnabel) is pleased to submit our geotechnical engineering report for this project. We provided these services in accordance with our proposal dated November 9, 2023 and per our Subconsultant Agreement with Delta Airport Consultants, Inc. dated January 25, 2024.

PROJECT DESCRIPTION

The Roanoke Regional Airport Commission is planning to rehabilitate Taxiway B at the Roanoke-Blacksburg regional Airport (ROA) in Roanoke, Virginia. Rehabilitation will be performed on Taxiway B from just northeast of Taxiway "B4" to its northeast end, and includes Taxiways "B1", "B2", and "B3". The taxiways are asphalt paved. The Roanoke Regional Airport Commission has retained the services of Delta to assess the condition of Taxiway B and to design taxiway and shoulder widening and reconfigure the northeast end of the taxiway to include elimination of the hold apron.

SITE DESCRIPTION

Taxiway B is aligned in a general northeast/southwest orientation, southeast of, and parallel to Runway 6-24. The taxiway study area is approximately 2,400 ft long and generally about 60 ft wide between "Taxiway B4" and "Taxiway B2". Taxiway B widens to include a 100 ft-wide hold apron from just southwest of "Taxiway B2" to the northeast end of Taxiway B at "Taxiway B1". The infield areas between taxiways and Runway 6-24 are grassy between "Taxiways B4" and "Taxiway B-2". The infield area between "Taxiway B2" and "Taxiway B1" is paved.

GEOLOGIC SETTING

Our research of available records and experience in the Roanoke Valley indicate that the Roanoke-Blacksburg Regional Airport lies within the Valley and Ridge Physiographic Province and is underlain primarily by carbonate rock of the Elbrook formation. Rocks of this formation are known to be susceptible to karst features such as ground subsidence, sinkholes, shallow bedrock pinnacles adjacent to deep

bedrock valleys, shallow boulders, and zones of extremely soft soil. Ground subsidence caused by the dissolution of carbonate rock and subsequent loss of soil is referred to as karstic activity, or karst. Sinkholes are present in the vicinity of the airport and highly variable depth to bedrock and zones of soft to very soft soil are common.

SUBSURFACE EXPLORATION PROGRAM

We performed a subsurface exploration program along Taxiway B between February 26 and 29, 2024. A total of 13 standard penetration test (SPT) borings were drilled by Blue Ridge Drilling of Roanoke, Virginia. All borings were drilled under the observation of Schnabel Engineering, LLC personnel. Borings were performed in accordance with ASTM D 1586. Approximate test boring locations are shown on the Test Boring Location Plan included at the end of this report. Boring locations indicated on the plan are approximate based on our measurements in the field. The boring elevations are equivalent to the top of pavement grade at the locations drilled.

The SPT samples were obtained using a hydraulically driven automatic trip hammer (ATH). Most correlations with SPT data are based on N-values collected with a safety hammer. The energy applied to the split-spoon sampler using the ATH is about 30 percent greater than that applied using the safety hammer, resulting in lower N-values. The hammer blows shown on the boring logs are uncorrected for the higher energy. However, we correct SPT N-values for the higher energy when using N-values in our description of soil consistency.

Seven of the 13 borings were drilled in existing pavement. The pavement at each of those borings was cored using a 7-inch or 8-inch diameter core barrel advanced with the drill rig. We retrieved the cores from the holes and returned them to our office for measurement and photographic documentation. The boring logs are included in Appendix A along with photographic logs of each pavement core. A summary of pavement section thicknesses recorded at the test boring locations is summarized below.

Table 1 – Pavement Section Thicknesses

Boring No.	Asphalt Thickness (in)	Depth of Laminations (in)	Cement-Treated Aggregate Thickness (in)	Stone Base Thickness (in)	Total Pavement Section Thickness (in)
B-27	10.5	NA	13.5	18.0	42.0
B-29	7.0	NA	7.75	4.25	19.0
B-32	6.0	NA	8.25	5.5	18.0
B-34	8.0	~3.5	8.0	7.0	23.0
B-36	8.5	~5.0	7.5	5.25	21.25
B-37	8.25	NA	6.25	6.5	21.0
B-38	7.25	NA	7.25	6.5	21.0

The condition of the pavement sections we encountered in the borings was generally very good. Laminations were only observed in two of the cores, at depths of 3.5 and 5 inches in Borings B-34 and B-36, respectively. Asphalt pavement thicknesses recorded ranged from 6 inches in Boring B-32 to 10.5 inches in Boring B-27. The asphalt appeared to be well consolidated and evenly mixed. Cement Treated Aggregate (CTA) was encountered beneath the asphalt pavement in all of the borings and was also in very good to excellent condition, strongly resembling cast-in-place concrete. The thickness of CTA layer

ranged from 6.25 to 13.5 inches. The composition of the CTA appeared uniform and well compacted. The underlying base stone consisted of dense-graded aggregate, generally ranging in thickness from 4.25 to 7.0 inches. An anomalously large amount of dense-graded aggregate stone (18 inches thick) was encountered in Boring B-27.

Soil Laboratory Testing

Our laboratory performed tests on jar and bulk soil samples collected during the subsurface exploration. The testing aided in the classification of materials encountered in the subsurface exploration. The results of the laboratory tests are included in Appendix B and are summarized for each stratum in the *Subsurface Conditions* section of this report. Selected test results are also shown on the boring logs in Appendix A.

Index Testing

We performed index testing on samples collected as part of the exploration to provide soil classifications and to provide parameters for use with published correlations with soil properties. Index testing included performing natural moisture content on 30 jar samples along with Atterberg Limit and gradation tests on six bulk samples of soil representing Strata A and B.

Compaction and California Bearing Ratio (CBR) Testing

We performed Modified Proctor compaction and CBR testing on six samples representing Strata A and B to evaluate compaction characteristics and to provide soil parameters for pavement design. Reported CBR values represent the 0.1 in. penetration value corrected for concavity, as applicable. We suspect that the presence of lime in some of the samples may have contributed to the anomalously high CBR values for B-34 and B-38. Table 2 summarizes the compaction and CBR testing results.

Table 2 – Soil Laboratory Compaction and CBR Test Results

Boring	Depth (ft)	USCS Classification	Max. Dry Density (pcf)	Optimum Moisture (%)	Corrected Max. Dry Density (pcf)	Corrected Optimum Moisture (%)	CBR	Percent Swell
B-27	3.5-10	CH	124.4	12.3	127.5	11.4	8.2	0.1
B-29	1.6-10	CH	107.4	20.1	NA	NA	6.4	4.6
B-30	0.2-10	CL	112.7	17.2	NA	NA	15.3	2.1
B-32	1.5-10	CL	115.5	16.5	NA	NA	12.2	2.3
B-34	1.9-10	MH	110.0	17.9	112.2	17.0	78.5 72.3*	0.4 0.4*
B-38	1.8-10	CH	112.3	17.5	NA	NA	23.2	1.8

***A second CBR test was performed on the B-34 sample to confirm the unusually high CBR value**

As previously discussed, lime within some of the samples may have contributed to anomalously high CBR values, particularly the CBR results from Borings B-34 and B-38. The lime observed in the borings did not appear to be as well mixed as would be expected in a controlled laboratory test. We therefore recommend discounting these higher CBR values. We recommend considering an average lab CBR value of 10.5, which is the average of the lab results for B-27, B-29, B-30, and B-32.

SUBSURFACE CONDITIONS

The following subsurface stratigraphy is based on the data collected during our subsurface exploration. We have characterized the following generalized subsurface soils stratigraphy based on the boring data presented in Appendix B.

Surface Cover

Six of the 13 borings were drilled in grassy infield areas between taxiway and runway pavements. At these locations, we encountered 2 to 3 inches of topsoil. As described above, the remaining seven borings were drilled through existing taxiway pavements. The thickness of asphalt, Cement-Treated Aggregate (CTA), and base stone at these seven boring locations ranged from 1.6 to 3.5 ft.

Stratum A: Existing Fill

We encountered existing fill, likely associated with the original taxiway construction, in all but one of the borings beneath the taxiway pavement section (asphalt, CTA, and crushed stone base course) to depths ranging from 4 to 12 ft, the maximum depth explored in the borings. A majority of the fill soils classified as Lean Clay (CL), Fat Clay (CH), and Elastic Silt (MH), with varying amounts of sand and gravel. As previously discussed, we observed evidence of lime stabilization within the fill stratum in samples recovered from Borings B-31, B-32, B-34, B37, and B-38. Lime was observed in the upper portions of Stratum A in these borings, generally at shallow depths beneath the bottom of the pavement section. Standard Penetration Test N-values in Stratum A typically varied from 4 to 22, indicating firm to very stiff consistency. We recorded substantially higher N-values, varying from 23 to 60, where lime was observed.

Stratum B: Residual

Residual soil consists of material derived from weathering of the underlying bedrock. Residual soils commonly retain the structure of the parent bedrock. We encountered residual soils in eight of the 13 borings. Stratum B was encountered beneath the pavement in Boring B-28, and beneath Stratum A fill in the remaining seven borings, to depths of 12 ft, the maximum depth explored in the borings. The residual soils classified as Fat Clay (CH). The residual soils contained varying amounts of sand and gravel. N-values recorded in Stratum B ranged from 5 to 25, indicating firm to very stiff consistency.

Groundwater

We observed groundwater during drilling and upon completion in Boring B-38 at depths of 7.0 and 8.8 ft. The remaining borings were dry during drilling and upon completion, with caved-dry depths ranging from 3.8 to 10.0 ft. The test boring logs in Appendix A include groundwater observations obtained during our subsurface exploration. These data include depths to groundwater encountered during drilling, upon drilling completion, and following completion of the boring. We did not obtain long-term water level readings since we grouted the test borings upon completion for safety.

The groundwater levels on the logs indicate our estimate of the hydrostatic water table at the time of our subsurface exploration. The final design should anticipate the fluctuation of the hydrostatic water table depending on variations in precipitation, surface runoff, pumping, evaporation, leaking utilities, and similar factors.

Delta Airport Consultants, Inc.
Taxiway B Rehabilitation – Geotechnical Engineering Report

We have endeavored to complete the services identified herein in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality and under similar conditions as this project. No other representation, express or implied, is included or intended, and no warranty or guarantee is included or intended in this report, or other instrument of service.

We appreciate the opportunity to be of service for this project. Please call us if you have any questions regarding this report.

Sincerely,

SCHNABEL ENGINEERING, LLC



Steven J. Winter, PE
Principal

SJW

Figure

Appendix A: Subsurface Exploration Data

Appendix B: Laboratory Test Data

Distribution:

Delta Airport Consultants, Inc.

Attn: William Eschenfelder, PE
Kate DeJarnette, ACE

FIGURE

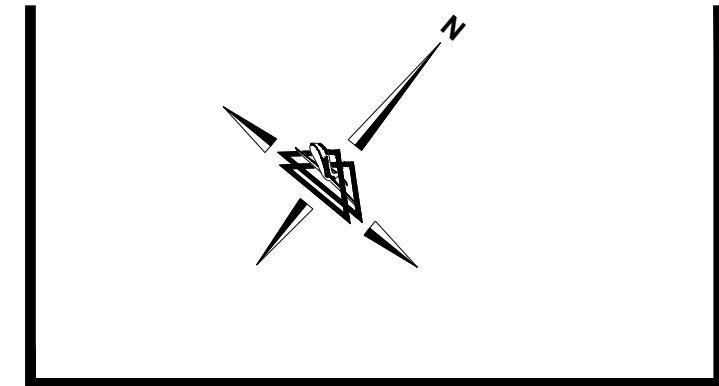
Figure 1: Boring Location Plan

Test Boring Location Plan

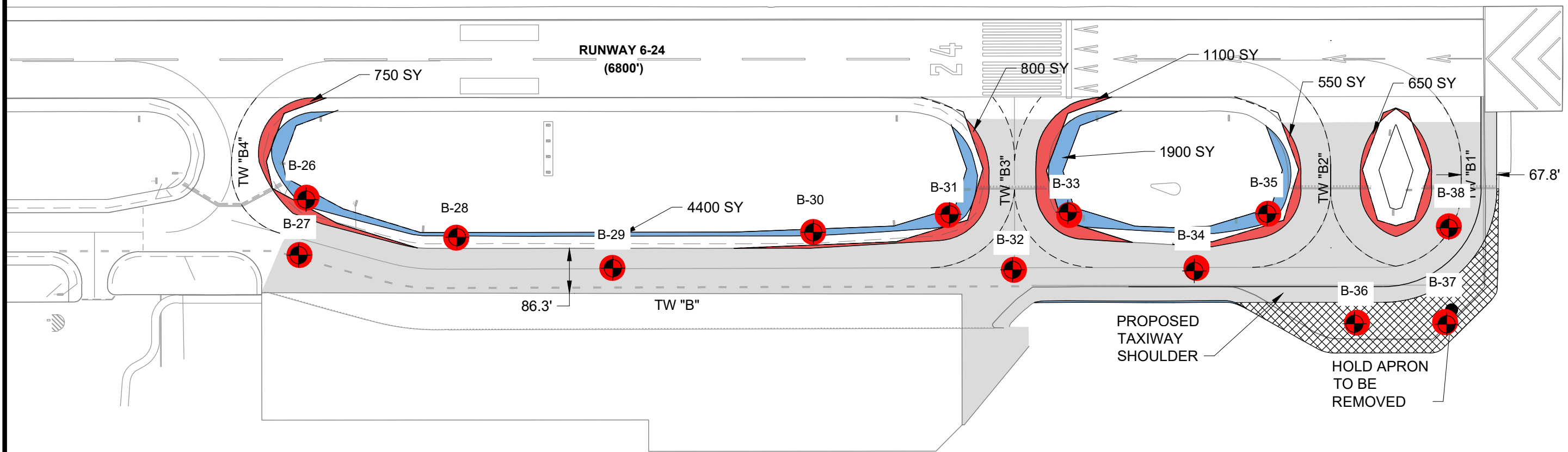
Roanoke-Blacksburg Regional Airport
Taxiway B Rehabilitation
Schnabel Project 23160098.000

LEGEND

- ADDITIONAL PAVEMENT - TAXIWAY
- ADDITIONAL PAVEMENT - SHOULDER
- LIMIT OF PAVING
- TAXIWAY TDG 5 FILLET LAYOUT



TAXIWAY DESIGN GROUP 5



B-26 Test boring number and approximate location



Schnabel Engineering, LLC

REHABILITATE TAXIWAY B - CONCEPTUAL BORING LAYOUT ROANOKE-BLACKSBURG REGIONAL AIRPORT

EXHIBIT
1

DRAWING: 8.31_recover.dwg LAYOUT: Layout1



www.deltaairport.com

DRAWN BY: MGS CHECKED BY: WME SCALE: 1" = 200' DATE: SEPTEMBER 2023

APPENDIX A

SUBSURFACE EXPLORATION DATA

Subsurface Exploration Procedures

General Notes for Subsurface Exploration Logs

Identification of Soil

Boring Logs, B-26 through B-38

Asphalt Core Photographic Logs (7)

SUBSURFACE EXPLORATION PROCEDURES

Test Borings – Hollow Stem Augers

The borings are advanced by turning a continuous flight auger with a center opening of 2¼ or 3¼ inches. A plug device blocks off the center opening while augers are advanced. Cuttings are brought to the surface by the auger flights. Sampling is performed through the center opening in the hollow stem auger, by standard methods, after removal of the plug. Usually, no water is introduced into the boring using this procedure. A 6-inch diameter core drill attachment was used to advance the borings through the asphalt pavement.

Standard Penetration Test Results

The numbers in the Sampling Data column of the boring logs represent Standard Penetration Test (SPT) results. Each number represents the blows needed to drive a 2-inch O.D., 1⅝-inch I.D. split-spoon sampler 6 inches, using a 140-pound hammer falling 30 inches. The sampler is typically driven a total of 18 or 24 inches. The first 6 inches are considered a seating interval. The total of the number of blows for the second and third 6-inch intervals is the SPT “N-value.” The SPT is performed according to ASTM D1586.

The SPT samples were obtained using a hydraulically driven automatic trip hammer (ATH). Most correlations with SPT data are based on N-values collected with a safety hammer. The energy applied to the split-spoon sampler using the ATH is about 30 percent greater than that applied using the safety hammer, resulting in lower N-values. The hammer blows shown on the boring logs are uncorrected for the higher energy. However, we correct SPT N-values for the higher energy when using N-values in our description of soil density and consistency.

Soil Classification Criteria

The group symbols on the logs represent the Unified Soil Classification System Group Symbols (ASTM D2487) based on visual observation and limited laboratory testing of the samples. Criteria for visual identification of soil samples are included in this appendix. Some variation can be expected between samples visually classified and samples classified in the laboratory.

Residual soils are derived through the in-place physical and chemical weathering of the underlying rock. Disintegrated rock is defined as residual material with SPT N-values between 60 blows per foot and refusal. Refusal is defined as an N-value of 50 blows for a penetration of one inch or less.

Boring Locations and Elevations

Approximate boring locations are shown on Figure 1. Locations were estimated by taping from existing site features. Ground surface elevations were not available. The grade at the tops of borings are coincident with the top of pavement grade at all of the boring locations. Boring locations should be considered no more accurate than the methods used to determine them.

GENERAL NOTES FOR SUBSURFACE EXPLORATION LOGS

1. Numbers in sampling data column next to Standard Penetration Test (SPT) symbols indicate blows required to drive a 2-inch O.D., 1 $\frac{3}{8}$ -inch I.D. sampling spoon 6 inches using a 140 pound hammer falling 30 inches. The Standard Penetration Test (SPT) N-value is the number of blows required to drive the sampler 12 inches, after a 6 inch seating interval. The Standard Penetration Test is performed in general accordance with ASTM D1586.
2. Visual classification of soil is in accordance with terminology set forth in "Identification of Soil." The ASTM D2487 group symbols (e.g., CL) shown in the classification column are based on visual observations.
3. Estimated water levels indicated on the logs are only estimates from available data and may vary with precipitation, porosity of the soil, site topography, and other factors.
4. Refusal at the surface of rock, boulder, or other obstruction is defined as an SPT resistance of 50 blows for 1 inch or less of penetration.
5. The logs and related information depict subsurface conditions only at the specific locations and at the particular time when drilled or excavated. Soil conditions at other locations may differ from conditions occurring at these locations. Also, the passage of time may result in a change in the subsurface soil and water level conditions at the subsurface exploration location.
6. The stratification lines represent the approximate boundary between soil and rock types as obtained from the subsurface exploration. Some variation may also be expected vertically between samples taken. The soil profile, water level observations and penetration resistances presented on these logs have been made with reasonable care and accuracy and must be considered only an approximate representation of subsurface conditions to be encountered at the particular location.
7. Key to symbols and abbreviations:



S-1, SPT
5+10+1

Sample No., Standard Penetration Test
Number of blows in each 6-inch increment

LL	Liquid Limit
MC	Moisture Content (percent)
PL	Plastic Limit
PP	Pocket Penetrometer Reading (tsf)
%Passing#200	Percent by weight passing a No. 200 Sieve

IDENTIFICATION OF SOIL

I. DEFINITION OF SOIL GROUP NAMES (ASTM D2487)

		SYMBOL	GROUP NAME
Coarse-Grained Soils More than 50% retained on No. 200 sieve	Gravels – More than 50% of coarse fraction retained on No. 4 sieve Coarse, ¾" to 3" Fine, No. 4 to ¾"	Clean Gravels Less than 5% fines	GW WELL GRADED GRAVEL
			GP POORLY GRADED GRAVEL
		Gravels with fines More than 12% fines	GM SILTY GRAVEL
			GC CLAYEY GRAVEL
	Sands – 50% or more of coarse Fraction passes No. 4 sieve Coarse, No. 10 to No. 4 Medium, No. 40 to No. 10 Fine, No. 200 to No. 40	Clean Sands Less than 5% fines	SW WELL GRADED SAND
			SP POORLY GRADED SAND
		Sands with fines More than 12% fines	SM SILTY SAND
			SC CLAYEY SAND
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silt and Clays – Liquid Limit less than 50 Low to medium plasticity	Inorganic	CL LEAN CLAY
			ML SILT
		Organic	OL ORGANIC CLAY
	Silt and Clays – Liquid Limit 50 or more Medium to high plasticity	Inorganic	CH FAT CLAY
			MH ELASTIC SILT
		Organic	OH ORGANIC CLAY
Highly Organic Soils	Primarily organic matter, dark in color and organic odor	PT	PEAT

II. DEFINITION OF SOIL COMPONENT PROPORTIONS (ASTM D2487)

		Examples
Adjective Form	GRAVELLY SANDY	>30% to <50% coarse grained component in a fine-grained soil
	CLAYEY SILTY	>12% to <50% fine grained component in a coarse-grained soil
"With"	WITH GRAVEL WITH SAND	>15% to <30% coarse grained component in a fine-grained soil
	WITH GRAVEL WITH SAND	>15% to <50% coarse grained component in a coarse-grained soil
	WITH SILT WITH CLAY	>5% to <12% fine grained component in a coarse-grained soil
		GRAVELLY LEAN CLAY
		SILTY SAND
		FAT CLAY WITH GRAVEL
		POORLY GRADED GRAVEL WITH SAND
		POORLY GRADED SAND WITH SILT

III. GLOSSARY OF MISCELLANEOUS TERMS

- SYMBOLS** Unified Soil Classification Symbols are shown above as group symbols. A dual symbol "-" indicates the soil belongs to two groups. A borderline symbol "/" indicates the soil belongs to two possible groups.
- FILL**..... Man-made deposit containing soil, rock and often foreign matter.
- DISINTEGRATED ROCK (DR)**..... Residual materials with a standard penetration resistance (SPT) between 60 blows per foot and refusal. Refusal is defined as an SPT of 100 blows for 2" or less penetration.
- BOULDERS & COBBLES** Boulders are considered rounded pieces of rock larger than 12 inches, while cobbles range from 3 to 12-inch size.
- LENSES**..... 0 to ½-inch seam within a material in a test pit.
- LAYERS**..... ½ to 12-inch seam within a material in a test pit.
- POCKET** Discontinuous body within a material in a test pit.
- MOISTURE CONDITIONS** Wet, moist or dry to indicate visual appearance of specimen.
- COLOR** Overall color, with modifiers such as light to dark or variation in coloration.



TEST BORING LOG

Project: Roanoke-Blacksburg Regional Airport
Taxiway B Rehabilitation
Roanoke, Virginia

Boring Number: **B-26**
Contract Number: 23160098.000
Sheet: 1 of 1

Contractor: Blue Ridge Drilling, Inc.
Blacksburg, Virginia
Contractor Foreman: P. Smith
Schnabel Representative: K. Penney
Equipment: CME-45 (Trailer)
Method: 2.25" HSA
Hammer Type: Auto Hammer (140 lb)
Dates Started: 2/29/24 **Finished:** 2/29/24
Location: See Location Plan
Plunge: -90 **Bearing:**
Ground Surface Elevation: **Total Depth:** 12.0 ft

Water Level Observations					
	Date	Time	Depth	Casing	Caved
Completion	2/29	---	Dry	---	---
Casing Pulled	2/29	---	Dry	---	9.8'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING		TESTS	REMARKS
					DEPTH	DATA		
0.2	Topsoil FILL, sampled as lean clay; moist, brown, trace sand, and gravel	FILL				S-1, SPT 1+2+4 REC=15", 83%	PP = 4.00 tsf	Fill
2.5	FILL, sampled as fat clay; moist, dark red brown, trace sand, and gravel	FILL				S-2, SPT 3+5+6 REC=15", 83%	MC = 27.3% PP = 4.50 tsf	
4.0	FILL, sampled as lean clay with sand; moist, brown, trace gravel, contains pockets of silt	FILL			5	S-3, SPT 4+6+7 REC=18", 100%	MC = 36.1% PP = 3.50 tsf	
6.0	FILL, sampled as fat clay; moist, red brown and brown, trace gravel	FILL		A		S-4, SPT 2+3+2 REC=14", 78%	MC = 37.6%	
	Change: light brown and brown	FILL			10	S-5, SPT WOH+2+3 REC=18", 100%	MC = 41.9% PP = 1.50 tsf	
11.3	FAT CLAY; moist, dark red brown	CH		B		S-6, SPT 2+4+7 REC=14", 78%	MC = 27.7% PP = 3.75 tsf	
12.0								Residual

Bottom of Boring at 12.0 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings and hole plug upon completion.

TEST BORING LOG 23160098 BORING LOGS.GPJ SCHNABEL DATA TEMPLATE 2008_07_06.GDT 5/7/24



TEST BORING LOG

Project: Roanoke-Blacksburg Regional Airport
Taxiway B Rehabilitation
Roanoke, Virginia

Boring Number: **B-27**
Contract Number: 23160098.000
Sheet: 1 of 1

Contractor: Blue Ridge Drilling, Inc.
Blacksburg, Virginia
Contractor Foreman: P. Smith
Schnabel Representative: K. Penney
Equipment: CME-45 (Trailer)
Method: 2.25" HSA,
7-inch OD Core Barrel
Hammer Type: Auto Hammer (140 lb)
Dates Started: 2/29/24 **Finished:** 2/29/24
Location: See Location Plan
Plunge: -90 **Bearing:**
Ground Surface Elevation: **Total Depth:** 12.0 ft

Water Level Observations					
	Date	Time	Depth	Casing	Caved
Completion	2/29	---	Dry	---	---
Casing Pulled	2/29	---	Dry	---	9.8'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DATA		TESTS	REMARKS
					DEPTH	DATA		
0.9	Asphalt						LL = 71 PL = 30 % Passing #200 = 57.8	Taxiway Pavement
2.0	Cement treated aggregate							
3.5	Crushed stone			A		S-1, SPT 30+26+20 REC=18", 100%		
5.0	FILL, sampled as lean clay with sand and gravel; moist, brown and gray	FILL			5	S-2, SPT 9+11+7 REC=11", 61%		Fill
6.0	FAT CLAY; moist, red brown	CH		B		S-3, SPT 5+4+8 REC=18", 100%	PP -4.00 tsf	Residual
						S-4, SPT 6+9+12 REC=18", 100%	PP = 4.50 tsf	
					10	S-5, SPT 3+7+10 REC=18", 100%	PP = 4.50 tsf	
12.0								

Bottom of Boring at 12.0 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings, hole plug and quick-setting concrete

TEST BORING LOG 23160098 BORING LOGS.GPJ SCHNABEL DATA TEMPLATE 2008_07_06.GDT 5/7/24



TEST BORING LOG

Project: Roanoke-Blacksburg Regional Airport
Taxiway B Rehabilitation
Roanoke, Virginia

Boring Number: **B-28**
Contract Number: 23160098.000
Sheet: 1 of 1

Contractor: Blue Ridge Drilling, Inc.
Blacksburg, Virginia
Contractor Foreman: P. Smith
Schnabel Representative: K. Penney
Equipment: CME-45 (Trailer)
Method: 2.25" HSA
Hammer Type: Auto Hammer (140 lb)
Dates Started: 2/29/24 **Finished:** 2/29/24
Location: See Location Plan
Plunge: -90 **Bearing:**
Ground Surface Elevation: **Total Depth:** 12.0 ft

Water Level Observations					
	Date	Time	Depth	Casing	Caved
Completion	2/29	---	Dry	---	---
Casing Pulled	2/29	---	Dry	---	9.8'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING		TESTS	REMARKS
					DEPTH	DATA		
0.2	Topsoil	FILL		A		S-1, SPT 1+3+4 REC=18", 100%	PP = 4.00 tsf	Fill
1.5	FILL, sampled as fat clay; moist, red brown, few gravel, contains root fragments							
	FAT CLAY; moist, red brown	CH		B	5	S-2, SPT 3+7+8 REC=18", 100%	PP = 3.00 tsf	Residual
						S-3, SPT 5+7+9 REC=18", 100%	PP = 4.00 tsf	
						S-4, SPT 4+8+11 REC=18", 100%	PP = 4.25 tsf	
						S-5, SPT 7+10+11 REC=18", 100%	PP = 4.50 tsf	
						S-6, SPT 3+6+10 REC=18", 100%	PP = 4.50 tsf	
12.0								

Bottom of Boring at 12.0 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings and hole plug upon completion.

TEST BORING LOG 23160098 BORING LOGS.GPJ SCHNABEL DATA TEMPLATE 2008_07_06.GDT 5/7/24



TEST BORING LOG

Project: Roanoke-Blacksburg Regional Airport
Taxiway B Rehabilitation
Roanoke, Virginia

Boring Number: **B-29**
Contract Number: 23160098.000
Sheet: 1 of 1

Contractor: Blue Ridge Drilling, Inc.
Blacksburg, Virginia
Contractor Foreman: P. Smith
Schnabel Representative: K. Penney
Equipment: CME-45 (Trailer)
Method: 2.25" HSA,
7-inch OD Core Barrel
Hammer Type: Auto Hammer (140 lb)
Dates Started: 2/28/24 **Finished:** 2/28/24
Location: See Location Plan
Plunge: -90 **Bearing:**
Ground Surface Elevation: **Total Depth:** 12.0 ft

Water Level Observations					
	Date	Time	Depth	Casing	Caved
Completion	2/28	---	Dry	---	---
Casing Pulled	2/28	---	Dry	---	9.8'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING		TESTS	REMARKS
					DEPTH	DATA		
0.6	Asphalt						LL = 78 PL = 30 % Passing #200 = 79.8	Taxiway Pavement
1.2	Cement treated aggregate							
1.6	Crushed stone							
	FILL, sampled as fat clay; moist, red brown and black, few gravel	FILL		A		S-1, SPT 50/5" REC=5", 100%		Fill
						S-2, SPT 14+14+8 REC=15", 83%	MC = 22.3% PP = 4.50 tsf	
4.0	FAT CLAY; moist, red brown	CH		B		S-3, SPT 5+8+11 REC=16", 89%	MC = 37.4% PP = 4.50 tsf	Residual
					5	S-4, SPT 4+9+12 REC=18", 100%	MC = 37.3% PP = 4.50 tsf	
					10	S-5, SPT 5+7+10 REC=18", 100%	MC = 38.1% PP = 4.50 tsf	
						S-6, SPT 4+6+10 REC=18", 100%	MC = 37.0% PP = 4.25 tsf	
12.0								

Bottom of Boring at 12.0 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings, hole plug and quick-setting concrete

TEST BORING LOG 23160098 BORING LOGS.GPJ - SCHNABEL DATA TEMPLATE 2008_07_06.GDT 5/7/24



TEST BORING LOG

Project: Roanoke-Blacksburg Regional Airport
Taxiway B Rehabilitation
Roanoke, Virginia

Boring Number: **B-30**
Contract Number: 23160098.000
Sheet: 1 of 1

Contractor: Blue Ridge Drilling, Inc.
Blacksburg, Virginia
Contractor Foreman: P. Smith
Schnabel Representative: K. Penney
Equipment: CME-45 (Trailer)
Method: 2.25" HSA
Hammer Type: Auto Hammer (140 lb)
Dates Started: 2/29/24 **Finished:** 2/29/24
Location: See Location Plan
Plunge: -90 **Bearing:**
Ground Surface Elevation: **Total Depth:** 12.0 ft

Water Level Observations					
	Date	Time	Depth	Casing	Caved
Completion	2/29	---	Dry	---	---
Casing Pulled	2/29	---	Dry	---	9.8'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING		TESTS	REMARKS
					DEPTH	DATA		
0.2	Topsoil FILL, sampled as fat clay; moist, brown and dark brown	FILL				S-1, SPT 2+4+6 REC=18", 100%	LL = 49 PL = 22 % Passing #200 = 87.6 PP = 3.00 tsf	Fill
2.5	FILL, sampled as fat clay; moist, red brown and black Change: red brown and brown	FILL		A		S-2, SPT 2+4+5 REC=18", 100%	PP = 2.75 tsf	
					5	S-3, SPT 2+2+2 REC=18", 100%	PP = 0.50 tsf	
7.0	FAT CLAY; moist, mottled black and brown	CH		B		S-4, SPT 2+2+3 REC=18", 100%	PP = 2.50 tsf	Residual
					10	S-5, SPT 3+6+9 REC=18", 100%	PP = 3.50 tsf	
						S-6, SPT 3+5+7 REC=8", 44%	PP = 3.00 tsf	Augers grinding
12.0								

Bottom of Boring at 12.0 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings and hole plug upon completion.

TEST BORING LOG 23160098 BORING LOGS.GPJ - SCHNABEL DATA TEMPLATE 2008_07_06.GDT 5/7/24



TEST BORING LOG

Project: Roanoke-Blacksburg Regional Airport
Taxiway B Rehabilitation
Roanoke, Virginia

Boring Number: **B-31**
Contract Number: 23160098.000
Sheet: 1 of 1

Contractor: Blue Ridge Drilling, Inc.
Blacksburg, Virginia
Contractor Foreman: P. Smith
Schnabel Representative: K. Penney
Equipment: CME-45 (Trailer)
Method: 2.25" HSA
Hammer Type: Auto Hammer (140 lb)
Dates Started: 2/29/24 **Finished:** 2/29/24
Location: See Location Plan
Plunge: -90 **Bearing:**
Ground Surface Elevation: **Total Depth:** 12.0 ft

Water Level Observations					
	Date	Time	Depth	Casing	Caved
Completion	2/29	---	Dry	---	---
Casing Pulled	2/29	---	Dry	---	3.8'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING		TESTS	REMARKS
					DEPTH	DATA		
0.2	Topsoil					S-1, SPT 2+6+16 REC=18", 100%		Fill
0.7	FILL, sampled as lean clay with sand; moist, brown, trace gravel	FILL						
	FILL, sampled as lean clay with sand; moist, red brown and orange brown, contains rock fragments	FILL		A		S-2, SPT 11+11+12 REC=9", 50%	MC = 35.7%	Evidence of lime stabilization observed
4.0	FAT CLAY; moist, red brown				5	S-3, SPT 5+8+10 REC=18", 100%	MC = 44.9% PP = 4.50 tsf	Residual
		CH		B		S-4, SPT 3+5+7 REC=18", 100%	MC = 41.8% PP = 4.00 tsf	
					10	S-5, SPT 4+4+5 REC=18", 100%	MC = 39.9% PP = 2.75 tsf	
						S-6, SPT 2+3+3 REC=16", 89%	MC = 37.1% PP = 2.00 tsf	
12.0								

Bottom of Boring at 12.0 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings and hole plug upon completion.

TEST BORING LOG 23160098 BORING LOGS.GPJ - SCHNABEL DATA TEMPLATE 2008_07_06.GDT 5/7/24



TEST BORING LOG

Project: Roanoke-Blacksburg Regional Airport
Taxiway B Rehabilitation
Roanoke, Virginia

Boring Number: **B-32**
Contract Number: 23160098.000
Sheet: 1 of 1

Contractor: Blue Ridge Drilling, Inc.
Blacksburg, Virginia
Contractor Foreman: P. Smith
Schnabel Representative: K. Penney
Equipment: CME-45 (Trailer)
Method: 2.25" HSA,
7-inch OD Core Barrel
Hammer Type: Auto Hammer (140 lb)
Dates Started: 2/28/24 **Finished:** 2/28/24
Location: See Location Plan

Plunge: -90 **Bearing:**
Ground Surface Elevation: **Total Depth:** 12.0 ft

Water Level Observations					
	Date	Time	Depth	Casing	Caved
Completion	2/28	---	Dry	---	---
Casing Pulled	2/28	---	Dry	---	9.3'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING		TESTS	REMARKS
					DEPTH	DATA		
0.5	Asphalt						LL = 49 PL = 21 % Passing #200 = 82.3	Taxiway Pavement
	Cement treated aggregate							
1.2	Crushed stone							
1.6	FILL, sampled as lean clay with sand; moist, red brown and brown	FILL		A		S-1, SPT 14+7+27 REC=18", 100%		Fill Evidence of lime stabilization observed. Poor mixing of lime between 1.7 feet and 2.2 feet.
2.7	FILL, sampled as clayey gravel with sand; wet, light brown	FILL				S-2, SPT 7+32+28 REC=16", 89%		
4.0	FAT CLAY; moist, dark red brown					S-3, SPT 5+9+11 REC=18", 100%	PP = 4.50 tsf	Residual
	Change: red brown	CH		B		S-4, SPT 5+6+7 REC=18", 100%	PP = 2.50 tsf	
						S-5, SPT 3+6+8 REC=18", 100%	PP = 3.00 tsf	
						S-6, SPT 2+5+7 REC=18", 100%	PP = 3.00 tsf	
12.0								

Bottom of Boring at 12.0 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings, hole plug and quick-setting concrete

TEST BORING LOG 23160098 BORING LOGS.GPJ - SCHNABEL DATA TEMPLATE 2008_07_06.GDT 5/7/24



TEST BORING LOG

Project: Roanoke-Blacksburg Regional Airport
Taxiway B Rehabilitation
Roanoke, Virginia

Boring Number: **B-33**
Contract Number: 23160098.000
Sheet: 1 of 1

Contractor: Blue Ridge Drilling, Inc.
Blacksburg, Virginia
Contractor Foreman: P. Smith
Schnabel Representative: K. Penney
Equipment: CME-45 (Trailer)
Method: 2.25" HSA
Hammer Type: Auto Hammer (140 lb)
Dates Started: 2/26/24 **Finished:** 2/26/24
Location: See Location Plan
Plunge: -90 **Bearing:**
Ground Surface Elevation: **Total Depth:** 12.0 ft

Water Level Observations					
	Date	Time	Depth	Casing	Caved
Completion	2/26	---	Dry	---	---
Casing Pulled	2/26	---	Dry	---	8.8'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING		TESTS	REMARKS
					DEPTH	DATA		
0.3	Topsoil					S-1, SPT 2+4+4 REC=16", 89%	PP = 4.50 tsf	Fill
	FILL, sampled as fat clay with sand; moist, red brown and brown							
	Change: contains rock and asphalt fragments	FILL				S-2, SPT 4+3+3 REC=12", 67%	PP = 3.00 tsf	
4.0	FILL, sampled as silty gravel with sand; moist, gray	FILL				S-3, SPT 2+4+3 REC=8", 44%		
4.3	FILL, sampled as lean clay with sand; moist, brown, contains rock fragments	FILL			5			
6.0	FILL, sampled as fat clay; moist, red brown and brown			A		S-4, SPT 3+3+7 REC=18", 100%	PP = 2.25 tsf	
	Change: contains rock fragments	FILL				S-5, SPT 4+7+7 REC=18", 100%	PP = 4.00 tsf	
11.2	FILL, sampled as sandy fat clay with gravel; moist, red brown and brown, contains rock fragments	FILL			10	S-6, SPT 4+3+2 REC=18", 100%	PP = 1.50 tsf	
12.0								

Bottom of Boring at 12.0 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings and hole plug upon completion.

TEST BORING LOG 23160098 BORING LOGS.GPJ SCHNABEL DATA TEMPLATE 2008_07_06.GDT 5/7/24



TEST BORING LOG

Project: Roanoke-Blacksburg Regional Airport
Taxiway B Rehabilitation
Roanoke, Virginia

Boring Number: **B-34**
Contract Number: 23160098.000
Sheet: 1 of 1

Contractor: Blue Ridge Drilling, Inc.
Blacksburg, Virginia
Contractor Foreman: P. Smith
Schnabel Representative: K. Penney
Equipment: CME-45 (Trailer)
Method: 2.25" HSA,
8-inch OD Core Barrel
Hammer Type: Auto Hammer (140 lb)
Dates Started: 2/26/24 **Finished:** 2/26/24
Location: See Location Plan
Plunge: -90 **Bearing:**
Ground Surface Elevation: **Total Depth:** 12.0 ft

Water Level Observations					
	Date	Time	Depth	Casing	Caved
Completion	2/26	---	Dry	---	---
Casing Pulled	2/26	---	Dry	---	10.0'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING		TESTS	REMARKS
					DEPTH	DATA		
0.7	Asphalt, lamination at ~3.5 inches						LL = 60 PL = 43 % Passing #200 = 55.5	Taxiway Pavement
1.3	Cement treated aggregate							
1.9	Crushed stone							
3.0	FILL, sampled as lean clay with sand; moist, brown	FILL				S-1, SPT 21+8+32 REC=18", 100%		Fill
	FILL, sampled as elastic silt with sand and gravel; moist, brown	FILL				S-2, SPT 14+18+6 REC=13", 72%	MC = 27.7% PP = 2.50 tsf	Evidence of lime stabilization observed. Poor mixing of lime observed between 1.5 feet and 1.8 feet
		FILL				S-3, SPT 2+5+8 REC=18", 100%	MC = 20.7% PP = 4.50 tsf	
		FILL		A	5			
8.1	FILL, sampled as fat clay with sand; moist, brown and light brown, contains rock fragments	FILL				S-4, SPT 1+1+3 REC=14", 78%	MC = 26.8% PP -3.50 tsf	
		FILL				S-5, SPT 3+2+5 REC=18", 100%	MC = 31.0% PP = 2.50 tsf	
		FILL				S-6, SPT 2+4+5 REC=18", 100%	MC = 27.2% PP = 4.00 tsf	
12.0	Change: brown and red brown							

Bottom of Boring at 12.0 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings, hole plug and quick-setting concrete

TEST BORING LOG 23160098 BORING LOGS.GPJ - SCHNABEL DATA TEMPLATE 2008_07_06.GDT 5/7/24



TEST BORING LOG

Project: Roanoke-Blacksburg Regional Airport
Taxiway B Rehabilitation
Roanoke, Virginia

Boring Number: **B-35**
Contract Number: 23160098.000
Sheet: 1 of 1

Contractor: Blue Ridge Drilling, Inc.
Blacksburg, Virginia
Contractor Foreman: P. Smith
Schnabel Representative: K. Penney
Equipment: CME-45 (Trailer)
Method: 2.25" HSA
Hammer Type: Auto Hammer (140 lb)
Dates Started: 2/26/24 **Finished:** 2/26/24
Location: See Location Plan
Plunge: -90 **Bearing:**
Ground Surface Elevation: **Total Depth:** 12.0 ft

Water Level Observations					
	Date	Time	Depth	Casing	Caved
Completion	2/26	---	Dry	---	---
Casing Pulled	2/26	---	Dry	---	9.5'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING		TESTS	REMARKS
					DEPTH	DATA		
0.3	Topsoil					S-1, SPT 2+4+4 REC=15", 83%	PP = 3.50 tsf	Fill
	FILL, sampled as fat clay with sand; moist, brown, trace gravel	FILL						
3.7	FILL, sampled as fat clay; moist, red brown, trace gravel	FILL				S-2, SPT 3+6+4 REC=15", 83%		
					5	S-3, SPT 3+4+6 REC=18", 100%	PP = 4.00 tsf	
7.0	FILL, sampled as fat clay; moist, brown and light brown, trace sand, and gravel	FILL		A		S-4, SPT 3+3+2 REC=18", 100%	PP = 1.25 tsf	
					10	S-5, SPT 2+2+3 REC=14", 78%	PP = 1.50 tsf	
						S-6, SPT 1+2+3 REC=18", 100%	PP = 1.50 tsf	
12.0								

Bottom of Boring at 12.0 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings and hole plug upon completion.

TEST BORING LOG 23160098 BORING LOGS.GPJ SCHNABEL DATA TEMPLATE 2008_07_06.GDT 5/7/24



TEST BORING LOG

Project: Roanoke-Blacksburg Regional Airport
Taxiway B Rehabilitation
Roanoke, Virginia

Boring Number: **B-36**
Contract Number: 23160098.000
Sheet: 1 of 1

Contractor: Blue Ridge Drilling, Inc.
Blacksburg, Virginia
Contractor Foreman: P. Smith
Schnabel Representative: K. Penney
Equipment: CME-45 (Trailer)
Method: 2.25" HSA,
7-inch OD Core Barrel
Hammer Type: Auto Hammer (140 lb)
Dates Started: 2/27/24 **Finished:** 2/27/24
Location: See Location Plan
Plunge: -90 **Bearing:**
Ground Surface Elevation: **Total Depth:** 12.0 ft

Water Level Observations					
	Date	Time	Depth	Casing	Caved
Completion	2/27	---	Dry	---	---
Casing Pulled	2/27	---	Dry	---	9.6'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING		TESTS	REMARKS
					DEPTH	DATA		
0.7	Asphalt, lamination at ~5.0 inches							Taxiway Pavement
1.3	Cement treated aggregate							
1.8	Crushed stone							
3.1	FILL, sampled as lean clay with sand; moist, red brown	FILL		A		S-1, SPT 13+20+28 REC=18", 100%		Fill Evidence of lime stabilization observed
4.0	FILL, sampled as clayey gravel with sand; wet, brown and gray	FILL				S-2, SPT 6+23+27 REC=18", 100%	MC = 23.4%	
7.2	FILL, sampled as lean clay with gravel; moist, brown and gray	FILL			5	S-3, SPT 12+13+10 REC=16", 89%	MC = 21.6%	
7.2	FAT CLAY; moist, dark red brown, trace gravel	CH		B		S-4, SPT 3+4+5 REC=18", 100%	MC = 22.9% PP = 3.00 tsf	Residual
					10	S-5, SPT 3+6+9 REC=18", 100%	MC = 25.8% PP = 4.50 tsf	
12.0						S-6, SPT 4+10+15 REC=18", 100%	MC = 25.2% PP = 4.50 tsf	

Bottom of Boring at 12.0 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings, hole plug and quick-setting concrete

TEST BORING LOG 23160098 BORING LOGS.GPJ - SCHNABEL DATA TEMPLATE 2008_07_06.GDT 5/7/24



TEST BORING LOG

Project: Roanoke-Blacksburg Regional Airport
Taxiway B Rehabilitation
Roanoke, Virginia

Boring Number: **B-37**
Contract Number: 23160098.000
Sheet: 1 of 1

Contractor: Blue Ridge Drilling, Inc.
Blacksburg, Virginia
Contractor Foreman: P. Smith
Schnabel Representative: K. Penney
Equipment: CME-45 (Trailer)
Method: 2.25" HSA,
7-inch OD Core Barrel
Hammer Type: Auto Hammer (140 lb)
Dates Started: 2/28/24 **Finished:** 2/28/24
Location: See Location Plan
Plunge: -90 **Bearing:**
Ground Surface Elevation: **Total Depth:** 12.0 ft

Water Level Observations					
	Date	Time	Depth	Casing	Caved
Completion	2/28	---	Dry	---	---
Casing Pulled	2/28	---	Dry	---	9.6'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING		TESTS	REMARKS
					DEPTH	DATA		
0.7	Asphalt							Taxiway Pavement
1.2	Cement treated aggregate							
1.8	Crushed stone							
1.8	FILL, sampled as lean clay with sand; moist, red brown Change: trace gravel	FILL				S-1, SPT 12+19+15 REC=18", 100%		Fill Evidence of lime stabilization observed within sample
4.0	FILL, sampled as lean clay with sand; moist, red brown	FILL				S-2, SPT 7+20+24 REC=18", 100%		
4.0	FILL, sampled as lean clay with sand; moist, red brown	FILL			5	S-3, SPT 2+2+4 REC=7", 39%		
6.0	FILL, sampled as fat clay; moist, red brown, trace sand	FILL		A				
7.6	Crushed stone					S-4, SPT 2+3+13 REC=12", 67%	PP = 2.75 tsf	
9.4	FILL, sampled as fat clay; moist, red brown and gray brown, trace sand	FILL			10	S-5, SPT 6+3+2 REC=15", 83%	PP = 4.00 tsf	
12.0						S-6, SPT 3+4+5 REC=18", 100%	PP = 2.00 tsf	

Bottom of Boring at 12.0 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings, hole plug and quick-setting concrete

TEST BORING LOG 23160098 BORING LOGS.GPJ - SCHNABEL DATA TEMPLATE 2008_07_06.GDT 5/7/24



TEST BORING LOG

Project: Roanoke-Blacksburg Regional Airport
Taxiway B Rehabilitation
Roanoke, Virginia

Boring Number: **B-38**
Contract Number: 23160098.000
Sheet: 1 of 1

Contractor: Blue Ridge Drilling, Inc.
Blacksburg, Virginia
Contractor Foreman: P. Smith
Schnabel Representative: K. Penney
Equipment: CME-45 (Trailer)
Method: 2.25" HSA,
7-inch OD Core Barrel
Hammer Type: Auto Hammer (140 lb)
Dates Started: 2/28/24 **Finished:** 2/28/24
Location: See Location Plan

Plunge: -90 **Bearing:**
Ground Surface Elevation: **Total Depth:** 12.0 ft

Water Level Observations						
	Date	Time	Depth	Casing	Caved	
Encountered	2/28	---	7.0'	---	---	
Completion	2/28	---	8.8'	---	9.8'	
Casing Pulled	2/28	---	8.8'	---	9.8'	

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING		TESTS	REMARKS
					DEPTH	DATA		
0.6	Asphalt						LL = 53 PL = 27 % Passing #200 = 62.4	Taxiway Pavement
1.2	Cement treated aggregate							
1.8	Crushed stone							
1.8	FILL, sampled as lean clay with sand; moist, orange brown and brown, trace gravel	FILL				S-1, SPT 32+22+17 REC=18", 100%		Fill
4.0	FILL, sampled as fat clay; moist, red brown and brown, trace sand, and gravel	FILL				S-2, SPT 5+13+12 REC=14", 78%	MC = 30.5%	Evidence of lime stabilization observed.
5.0				A		S-3, SPT 2+3+4 REC=18", 100%	MC = 35.8% PP = 2.75 tsf	
10.0						S-4, SPT 2+4+4 REC=16", 89%	MC = 33.2% PP = 4.25 tsf	
10.0						S-5, SPT 2+3+3 REC=18", 100%	MC = 32.4% PP = 2.75 tsf	
12.0						S-6, SPT 1+3+5 REC=18", 100%	MC = 17.6% PP = 3.00 tsf	

Bottom of Boring at 12.0 ft.
Boring terminated at selected depth.
Boring backfilled with cuttings, hole plug and quick-setting concrete

TEST BORING LOG 23160098 BORING LOGS.GPJ - SCHNABEL DATA TEMPLATE 2008_07_06.GDT 5/7/24

	SCHNABEL #:	BORING #:	DRILL DATE:
	23160098.000	B-27	2/29/2024



Additional Comments: Asphalt Pavement – approx. 10.5 inches
 Cement Treated Aggregate – approx. 13.5 inches
 Base Course – Crushed Stone, approx. 18.0 inches

PAVEMENT CORE PHOTOGRAPHIC LOG



Photo Taken By: KJP
 Reviewed By: SJW
 Date Taken: 3-6-2024

Roanoke-Blacksburg Regional Airport
 Taxiway B Rehabilitation
 Roanoke, Virginia

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 1 of 7

	SCHNABEL #:	BORING #:	DRILL DATE:
	23160098.000	B-29	2/28/2024



Additional Comments: Asphalt Pavement – approx. 7.0 inches
 Cement Treated Aggregate – approx. 7.75 inches
 Base Course – Crushed Stone, approx. 4.25 inches

PAVEMENT CORE PHOTOGRAPHIC LOG



Photo Taken By: KJP
 Reviewed By: SJW
 Date Taken: 3-6-2024

Roanoke-Blacksburg Regional Airport
 Taxiway B Rehabilitation
 Roanoke, Virginia

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 2 of 7

	SCHNABEL #:	BORING #:	DRILL DATE:
	23160098.000	B-32	2/28/2024



Additional Comments: Asphalt Pavement – approx. 6.0 inches
 Cement Treated Aggregate – approx. 8.25 inches
 Base Course – Crushed Stone, approx. 5.5 inches

PAVEMENT CORE PHOTOGRAPHIC LOG



Photo Taken By: KJP
 Reviewed By: SJW
 Date Taken: 3-6-2024

Roanoke-Blacksburg Regional Airport
 Taxiway B Rehabilitation
 Roanoke, Virginia

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	SCHNABEL #:	BORING #:	DRILL DATE:
	23160098.000	B-34	2/26/2024



Additional Comments: Asphalt Pavement – approx. 8.0 inches
Lamination at about 3.5 inches
Cement Treated Aggregate – approx. 8.0 inches
Base Course – Crushed Stone, approx. 7.0 inches

PAVEMENT CORE PHOTOGRAPHIC LOG



Photo Taken By: KJP
Reviewed By: SJW
Date Taken: 3-6-2024

**Roanoke-Blacksburg Regional Airport
Taxiway B Rehabilitation
Roanoke, Virginia**

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	SCHNABEL #:	BORING #:	DRILL DATE:
	23160098.000	B-36	2/27/2024



Additional Comments: Asphalt Pavement – approx. 8.5 inches
Lamination at about 5.0 inches
Cement Treated Aggregate – approx. 7.5 inches
Base Course – Crushed Stone, approx. 5.25 inches

PAVEMENT CORE PHOTOGRAPHIC LOG



Photo Taken By: KJP
Reviewed By: SJW
Date Taken: 3-6-2024

**Roanoke-Blacksburg Regional Airport
Taxiway B Rehabilitation
Roanoke, Virginia**

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	SCHNABEL #:	BORING #:	DRILL DATE:
	23160098.000	B-37	2/28/2024



Additional Comments: Asphalt Pavement – approx. 8.25 inches
 Cement Treated Aggregate – approx. 6.25 inches
 Base Course – Crushed Stone, approx. 6.5 inches

PAVEMENT CORE PHOTOGRAPHIC LOG



Photo Taken By: KJP
 Reviewed By: SJW
 Date Taken: 3-6-2024

Roanoke-Blacksburg Regional Airport
 Taxiway B Rehabilitation
 Roanoke, Virginia

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	SCHNABEL #:	BORING #:	DRILL DATE:
	23160098.000	B-38	2/28/2024



Additional Comments: Asphalt Pavement – approx. 7.25 inches
 Cement Treated Aggregate – approx. 7.25 inches
 Base Course – Crushed Stone, approx. 6.5 inches

PAVEMENT CORE PHOTOGRAPHIC LOG



Photo Taken By: KJP
 Reviewed By: SJW
 Date Taken: 3-6-2024

Roanoke-Blacksburg Regional Airport
 Taxiway B Rehabilitation
 Roanoke, Virginia

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APPENDIX B

SOIL LABORATORY TEST DATA

Summary of Soil Laboratory Tests (1)
Atterberg Limits
Gradation Test Curves (6)
Moisture Density Relationship Curves (6)
California Bearing Ratio Test Curves (7)

Summary Of Laboratory Tests

Appendix
Sheet 1 of 1
Project Number: 23160098.000

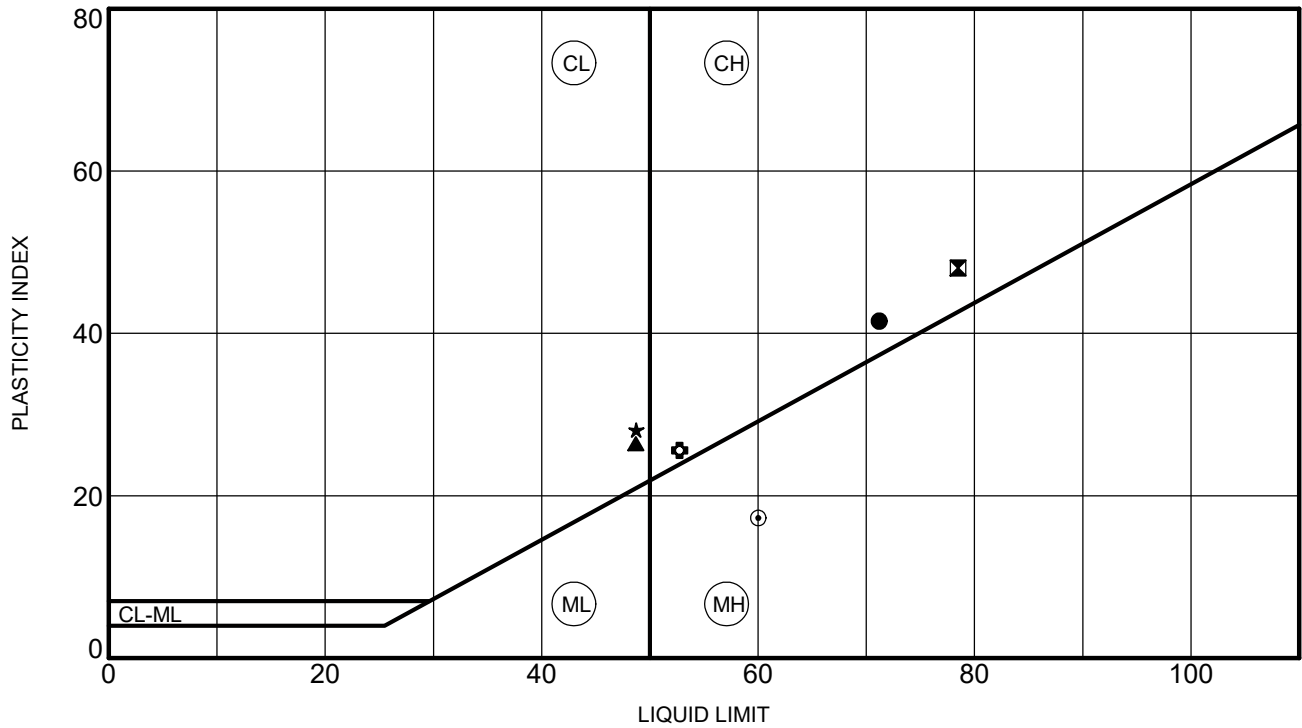
Boring No.	Sample Depth		Sample Type	Description of Soil Specimen	Liquid Limit	Plasticity Index	% Passing No. 200 Sieve	Percent Sand	Percent Gravel	Maximum Dry Density (pcf)	Optimum Moisture Content (%)	Corrected Max. Dry Density (pcf)	Corrected Optimum Moisture Content (%)	Proctor Test Method	CBR Value	CBR Percent Swell	CBR Surcharge Pressure (psf)	Testing Laboratory
	ft	Elevation ft																
B-27	3.5 - 10.0		Bulk	SANDY FAT CLAY WITH GRAVEL (CH), reddish brown	71	41	57.8	27.1	15.1	124.4	12.3	127.5	11.4	1557B	8.2	0.1	50	BLAC
B-29	1.6 - 10.0		Bulk	FAT CLAY WITH SAND (CH), trace gravel, reddish brown	78	48	79.8	17.7	2.5	107.4	20.1	--	--	1557B	6.4	4.6	50	BLAC
B-30	0.2 - 10.0		Bulk	LEAN CLAY (CL), few sand, brown	49	27	87.6	12.4	0.0	112.7	17.2	--	--	1557A	15.3	2.1	50	BLAC
B-32	1.5 - 10.0		Bulk	LEAN CLAY WITH SAND (CL), trace gravel, reddish brown	49	28	82.3	17.3	0.4	115.5	16.5	--	--	1557B	12.2	2.3	50	BLAC
B-34	1.9 - 10.0		Bulk	SANDY ELASTIC SILT (MH), few gravel, orangish brown; lime augmentation observed	60	17	55.5	34.1	10.4	110.0	17.9	112.2	17.0	1557B	78.5 72.3	0.4 0.4	50 50	BLAC
B-38	1.8 - 10.0		Bulk	SANDY FAT CLAY (CH), few gravel, brown	53	26	62.4	28.1	9.5	112.3	17.5	--	--	1557B	23.2	1.8	50	BLAC

- Notes:
1. Soil tests in general accordance with ASTM standards.
 2. Soil classifications are in general accordance with ASTM D2487 (as applicable), based on testing indicated and visual classification.
 3. Key to abbreviations: NP=Non-Plastic; -- indicates no test performed; ND=Not Detected



Schnabel
ENGINEERING

Project: Roanoke-Blacksburg Regional Airport
Taxiway B Rehabilitation
Roanoke, Virginia



PLOTTED DATA REPRESENTS SOIL PASSING NO. 40 SIEVE

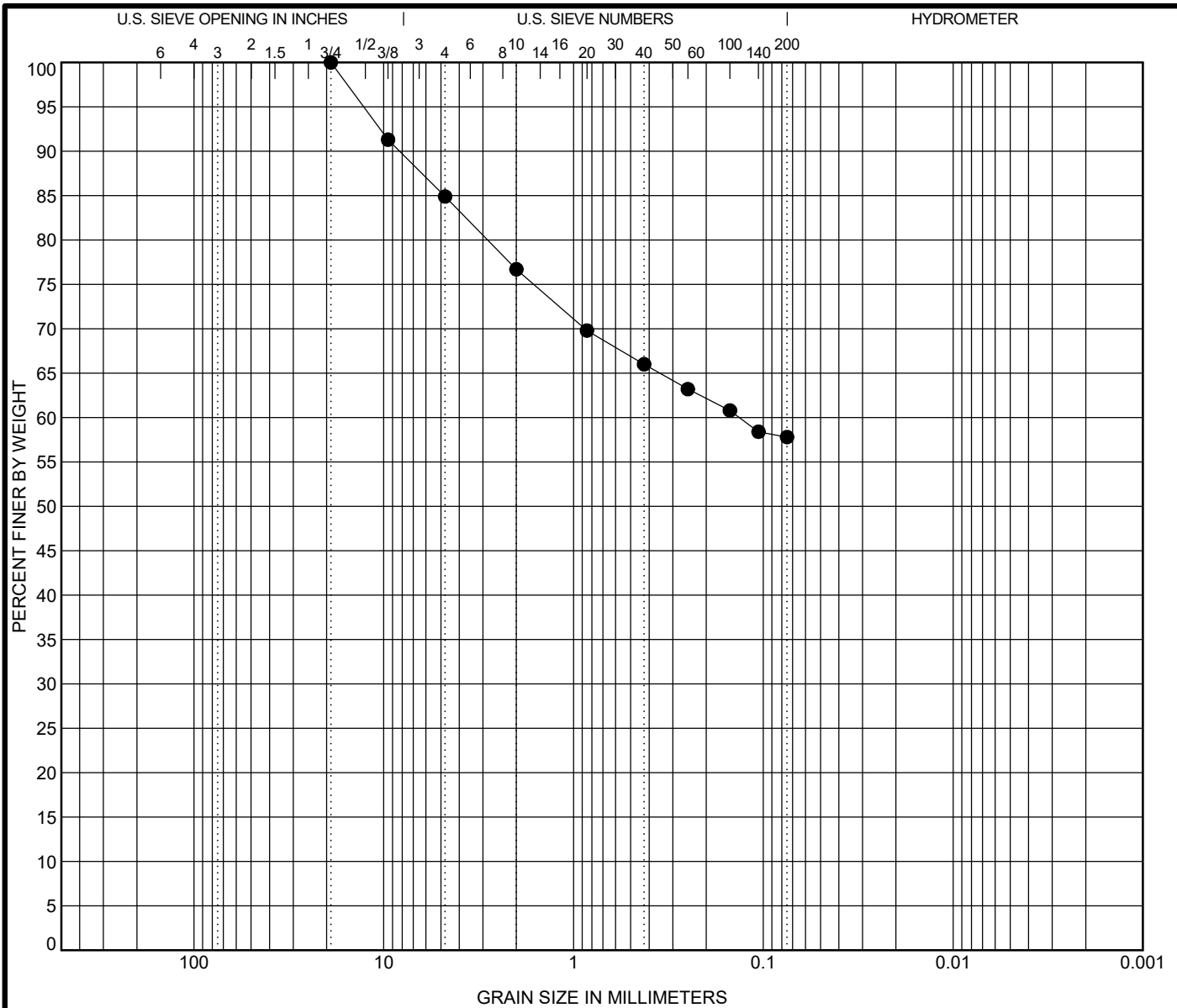
Specimen	LL	PL	PI	Fines	Testing Lab	Description
● B-27	71	30	41	58	BLAC	SANDY FAT CLAY WITH GRAVEL (CH), reddish brown
⊠ B-29	78	30	48	80	BLAC	FAT CLAY WITH SAND (CH), trace gravel, reddish brown
▲ B-30	49	22	27	88	BLAC	LEAN CLAY (CL), few sand, brown
★ B-32	49	21	28	82	BLAC	LEAN CLAY WITH SAND (CL), trace gravel, reddish brown
⊙ B-34	60	43	17	56	BLAC	SANDY ELASTIC SILT (MH), few gravel, orangish brown; lime augmentation observed
⊕ B-38	53	27	26	62	BLAC	SANDY FAT CLAY (CH), few gravel, brown

ATTERBERG LIMITS 23160098.000 LAB.GPJ SCHNABEL DATA TEMPLATE 2008_04 22.GDT 5/1/24



ATTERBERG LIMITS

Project: Roanoke-Blacksburg Regional Airport
Taxiway B Rehabilitation
Roanoke, Virginia
Contract: 23160098.000



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen	Sample Description					LL	PL	PI		
B-27	SANDY FAT CLAY WITH GRAVEL (CH), reddish brown					71	30	41		
Test Method	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
ASTM D422	19	0.134			15.1	27.1	57.8			

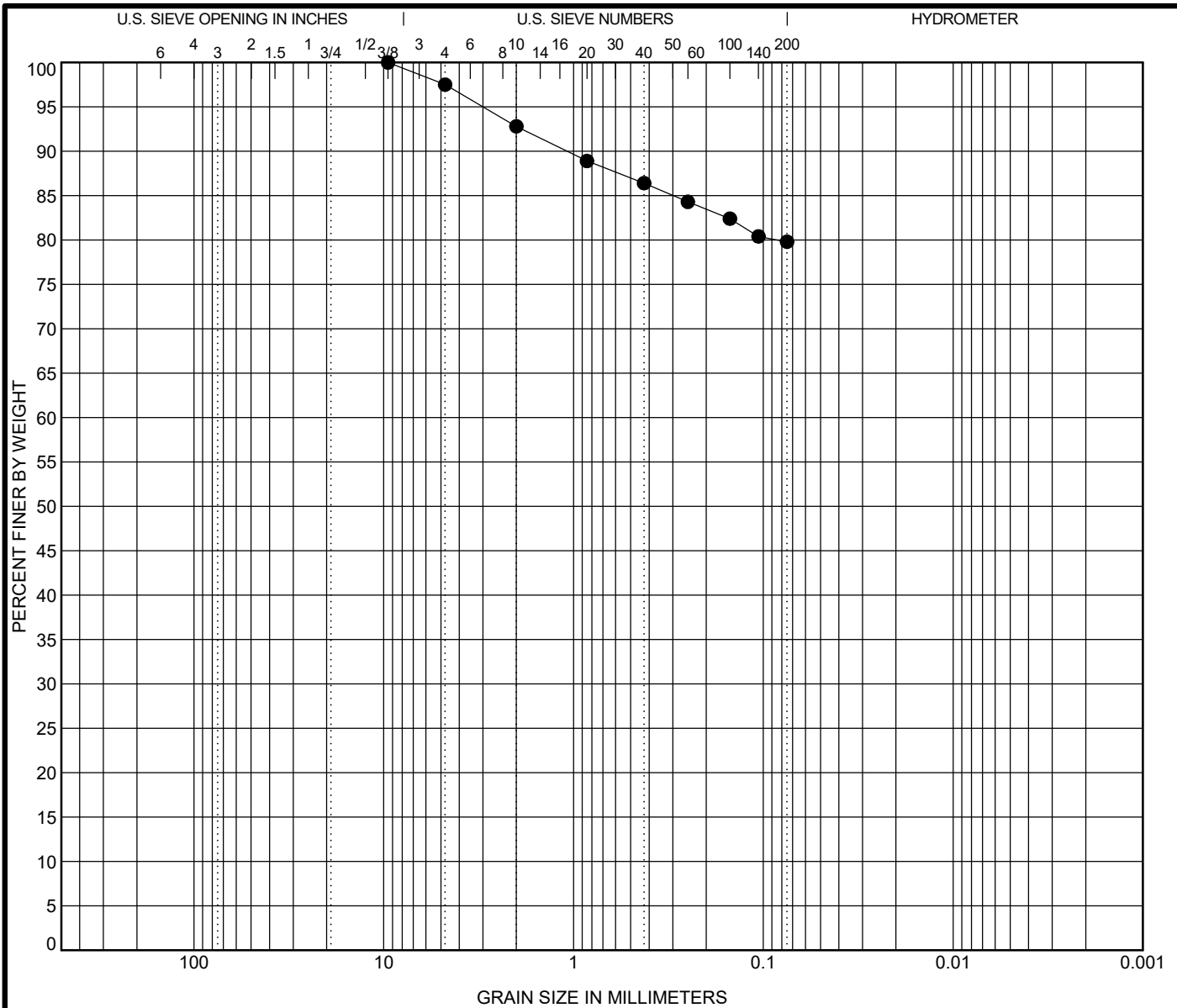
Percent Finer										
Sieve Size	No. 200	No. 140	No. 100	No. 60	No. 40	No. 20	No. 10	No. 4	3/8 in.	3/4 in.
% Finer	57.8	58.4	60.8	63.2	66.0	69.8	76.7	84.9	91.3	100.0

Tested By	Tested Date	Reviewed By	Calc By
MJF	3/5/24	ACL	MJF



GRADATION CURVE
Project: Roanoke-Blacksburg Regional Airport
 Taxiway B Rehabilitation
 Roanoke, Virginia
Contract: 23160098.000 **Testing Lab:** BLAC

SIEVE 1/SHEET 23160098.000 LAB.GPJ SCHNABEL DATA TEMPLATE 2008_04_22.GDT 5/1/24



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen	Sample Description					LL	PL	PI		
B-29	FAT CLAY WITH SAND (CH), trace gravel, reddish brown					78	30	48		
Test Method	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
ASTM D422	9.5				2.5	17.7	79.8			

Percent Finer									
Sieve Size	No. 200	No. 140	No. 100	No. 60	No. 40	No. 20	No. 10	No. 4	3/8 in.
% Finer	79.8	80.4	82.4	84.3	86.4	88.9	92.8	97.5	100.0

Tested By	Tested Date	Reviewed By	Calc By
MJF	3/5/24	ACL	MJF

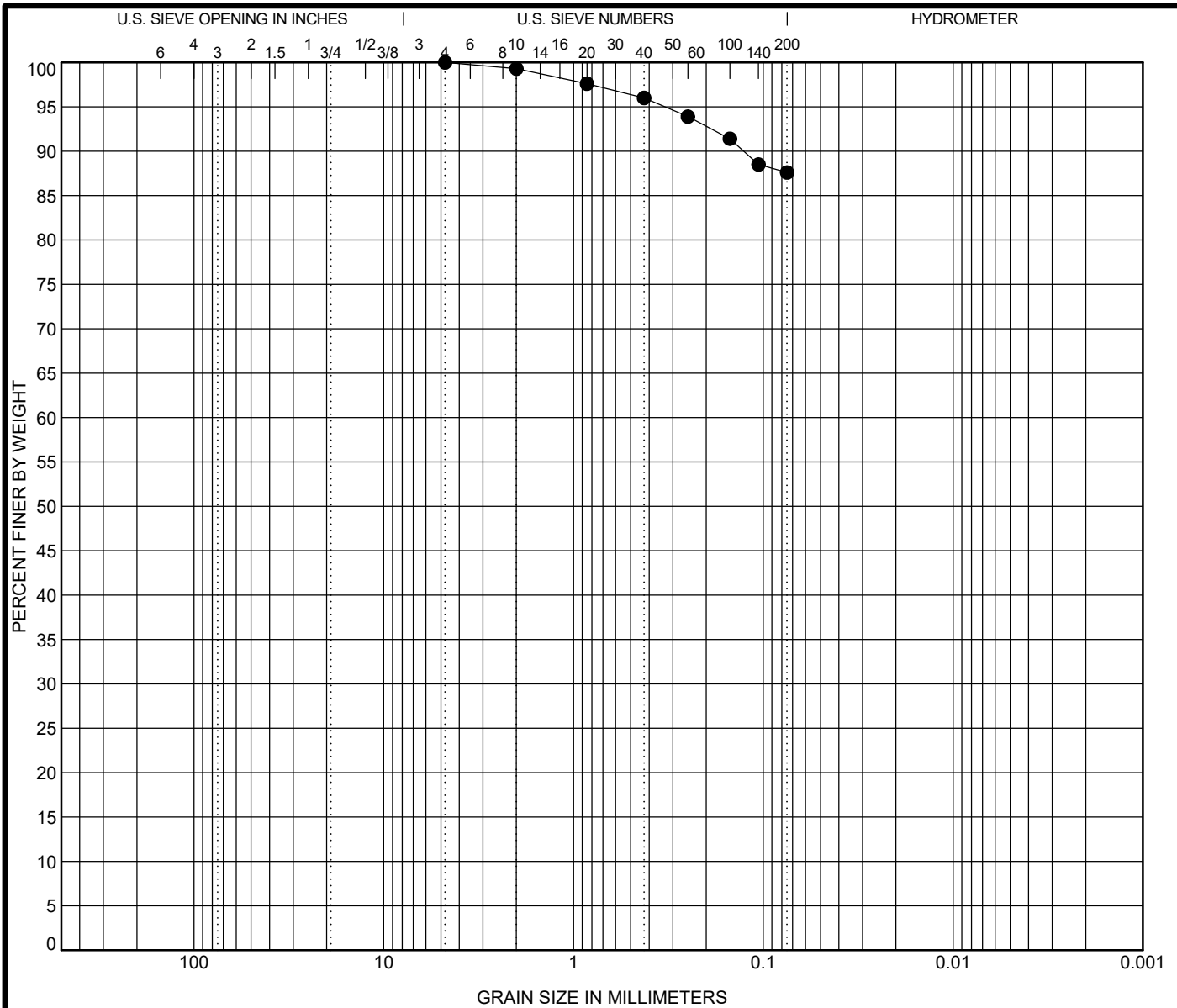


GRADATION CURVE

Project: Roanoke-Blacksburg Regional Airport
Taxiway B Rehabilitation
Roanoke, Virginia

Contract: 23160098.000 **Testing Lab:** BLAC

SIEVE 1/SHEET 23160098.000 LAB.GPJ SCHNABEL DATA TEMPLATE 2008_04_22.GDT 5/1/24



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen	Sample Description					LL	PL	PI		
B-30	LEAN CLAY (CL), few sand, brown					49	22	27		
Test Method	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
ASTM D422	4.75				0.0	12.4	87.6			

Percent Finer								
Sieve Size	No. 200	No. 140	No. 100	No. 60	No. 40	No. 20	No. 10	No. 4
% Finer	87.6	88.5	91.4	93.9	96.0	97.6	99.3	100.0

Tested By	Tested Date	Reviewed By	Calc By
MJF	3/5/24	ACL	MJF

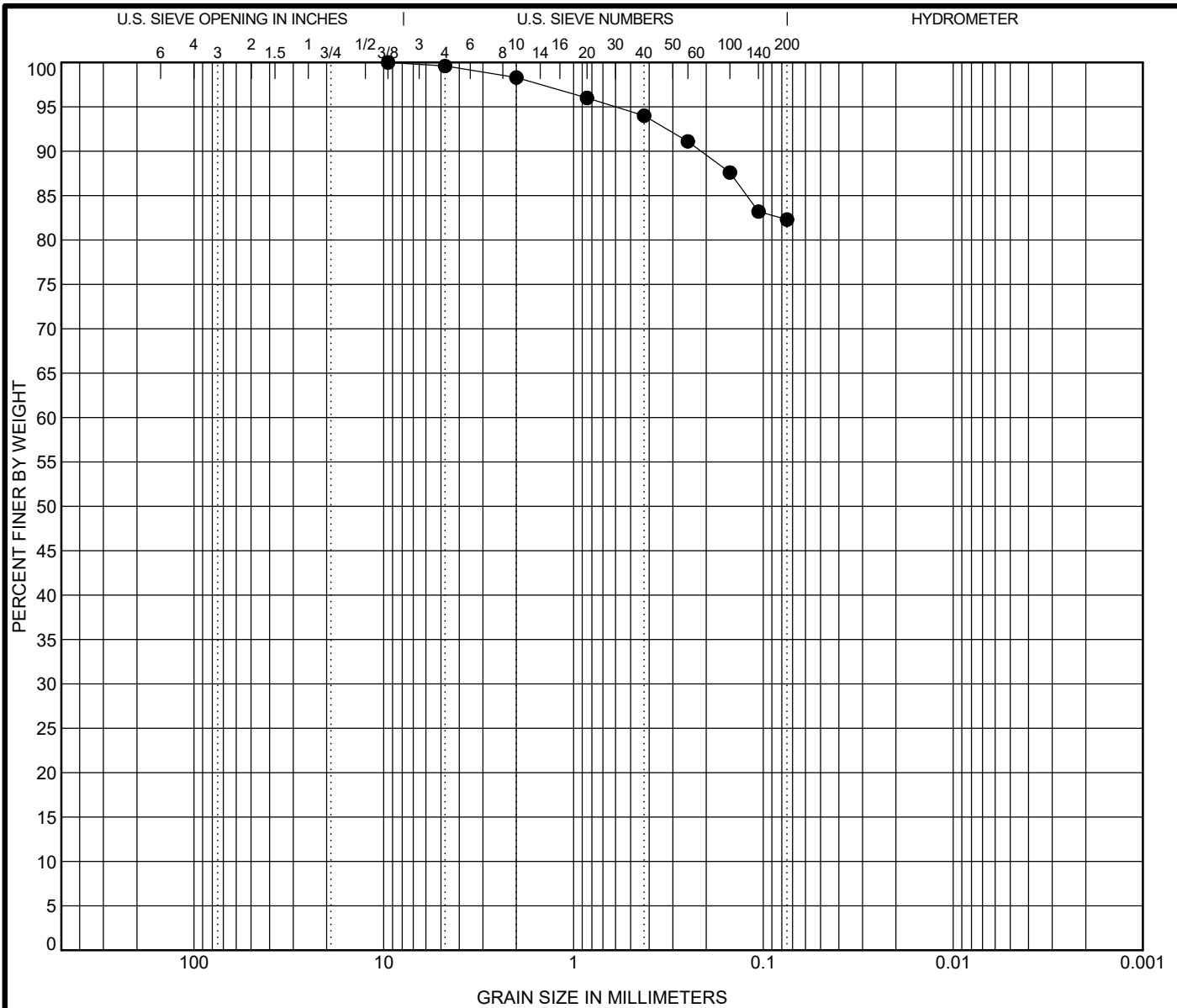


GRADATION CURVE

Project: Roanoke-Blacksburg Regional Airport
Taxiway B Rehabilitation
Roanoke, Virginia

Contract: 23160098.000 **Testing Lab:** BLAC

SIEVE 1/SHEET 23160098.000 LAB.GPJ SCHNABEL DATA TEMPLATE 2008_04_22.GDT 5/1/24



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen	Sample Description					LL	PL	PI		
B-32	LEAN CLAY WITH SAND (CL), trace gravel, reddish brown					49	21	28		
Test Method	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
ASTM D422	9.5				0.4	17.3	82.3			

Percent Finer

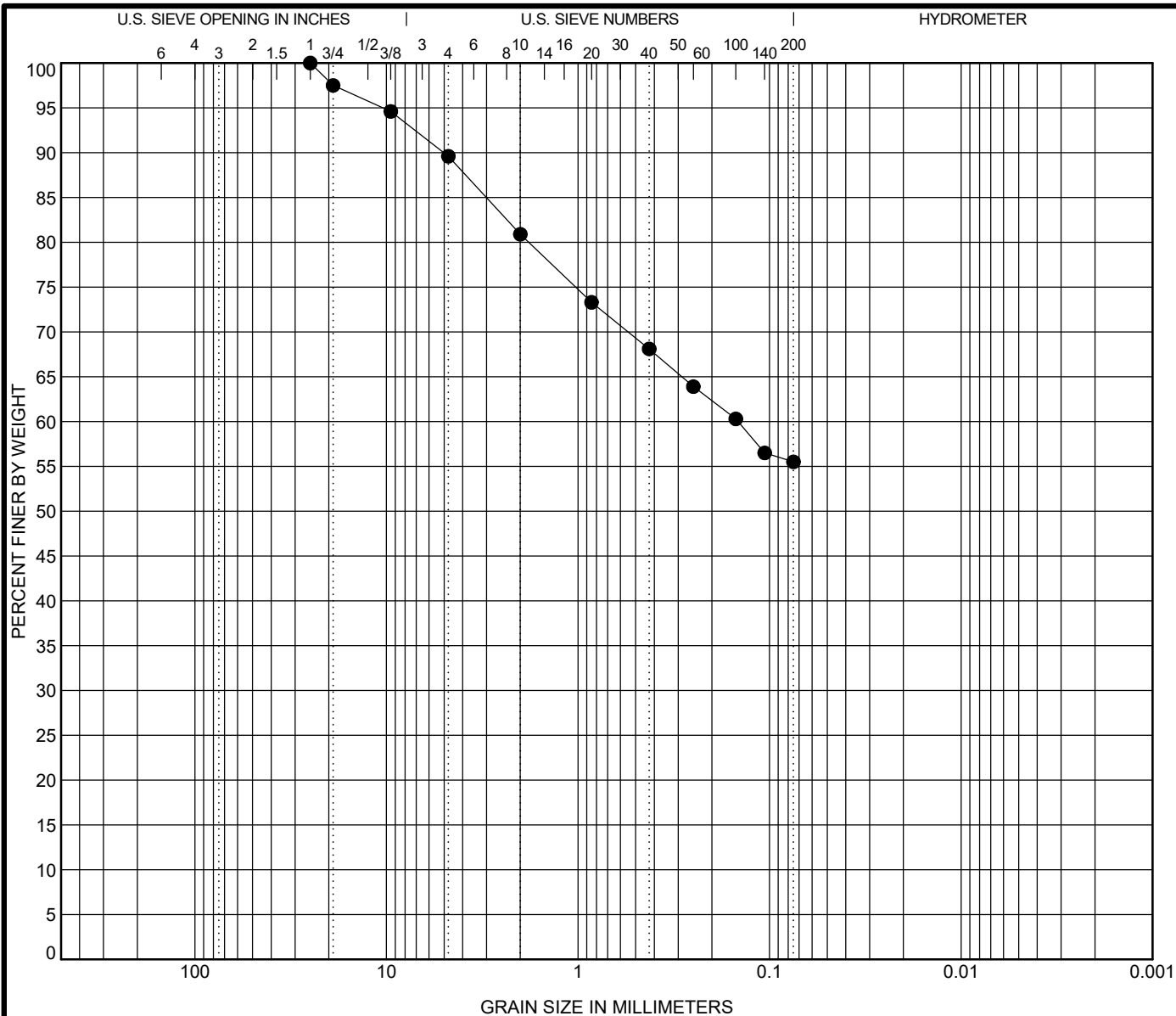
Sieve Size	No. 200	No. 140	No. 100	No. 60	No. 40	No. 20	No. 10	No. 4	3/8 in.
% Finer	82.3	83.2	87.6	91.1	94.0	96.0	98.3	99.6	100.0

Tested By	Tested Date	Reviewed By	Calc By
MJF	3/5/24	ACL	MJF



GRADATION CURVE
Project: Roanoke-Blacksburg Regional Airport
 Taxiway B Rehabilitation
 Roanoke, Virginia
Contract: 23160098.000 **Testing Lab:** BLAC

SIEVE 1/SHEET 23160098.000 LAB.GPJ SCHNABEL DATA TEMPLATE 2008_04_22.GDT 5/1/24



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen	Sample Description					LL	PL	PI		
B-34	SANDY ELASTIC SILT (MH), few gravel, orangish brown; lime augmentation observed					60	43	17		
Test Method	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
ASTM D422	25	0.146			10.4	34.1	55.5			

Percent Finer

Sieve Size	No. 200	No. 140	No. 100	No. 60	No. 40	No. 20	No. 10	No. 4	3/8 in.	3/4 in.	1 in.
% Finer	55.5	56.5	60.3	63.9	68.1	73.3	80.9	89.6	94.6	97.5	100.0

Tested By	Tested Date	Reviewed By	Calc By
MJF	2/28/24	ACL	MJF

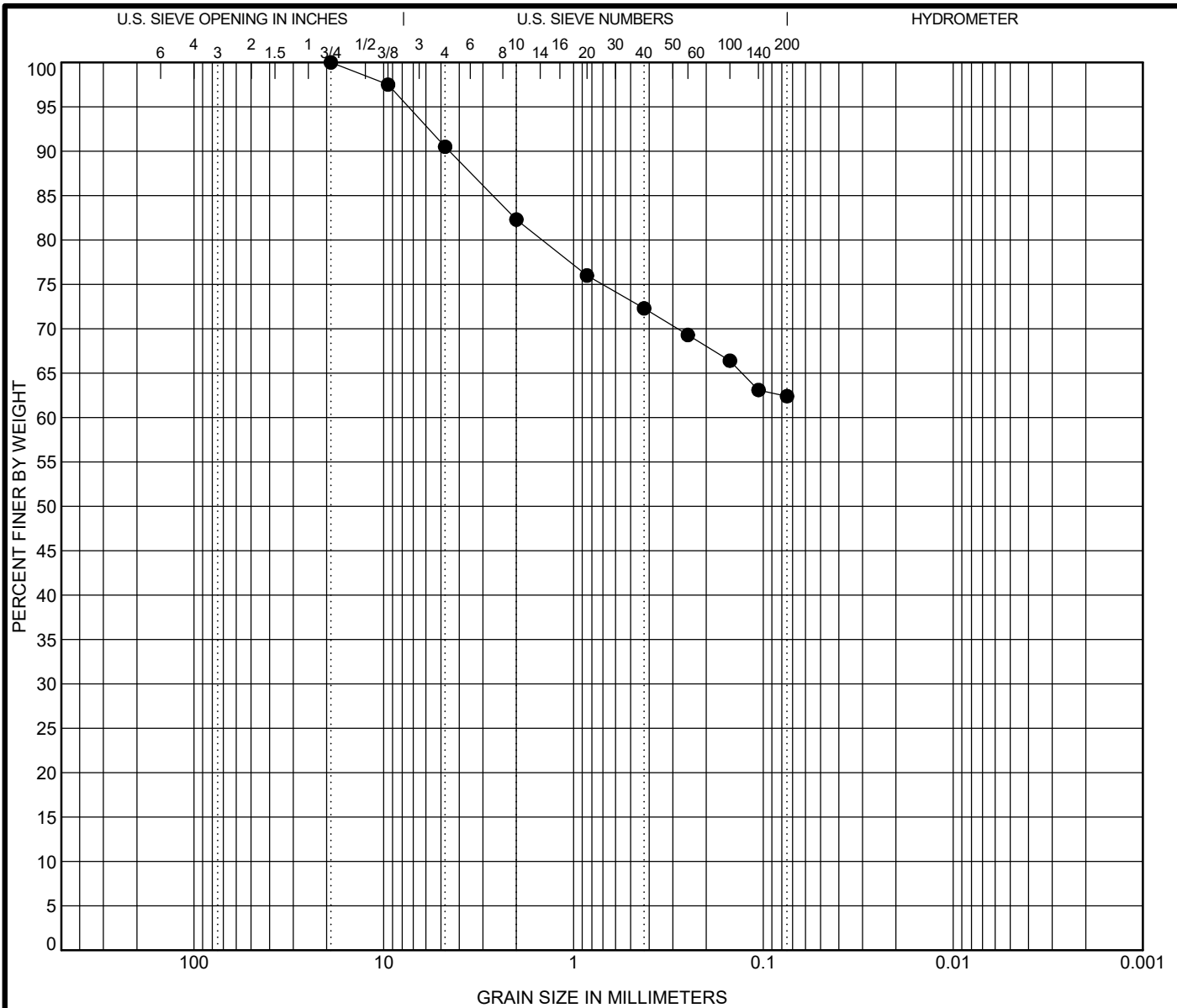


GRADATION CURVE

Project: Roanoke-Blacksburg Regional Airport
Taxiway B Rehabilitation
Roanoke, Virginia

Contract: 23160098.000 **Testing Lab:** BLAC

SIEVE 1/SHEET 23160098.000 LAB.GPJ SCHNABEL DATA TEMPLATE 2008_04_22.GDT 5/1/24



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen	Sample Description					LL	PL	PI		
B-38	SANDY FAT CLAY (CH), few gravel, brown					53	27	26		
Test Method	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
ASTM D422	19				9.5	28.1	62.4			

Percent Finer										
Sieve Size	No. 200	No. 140	No. 100	No. 60	No. 40	No. 20	No. 10	No. 4	3/8 in.	3/4 in.
% Finer	62.4	63.1	66.4	69.3	72.3	76.0	82.3	90.5	97.5	100.0

Tested By	Tested Date	Reviewed By	Calc By
MJF	3/5/24	ACL	MJF

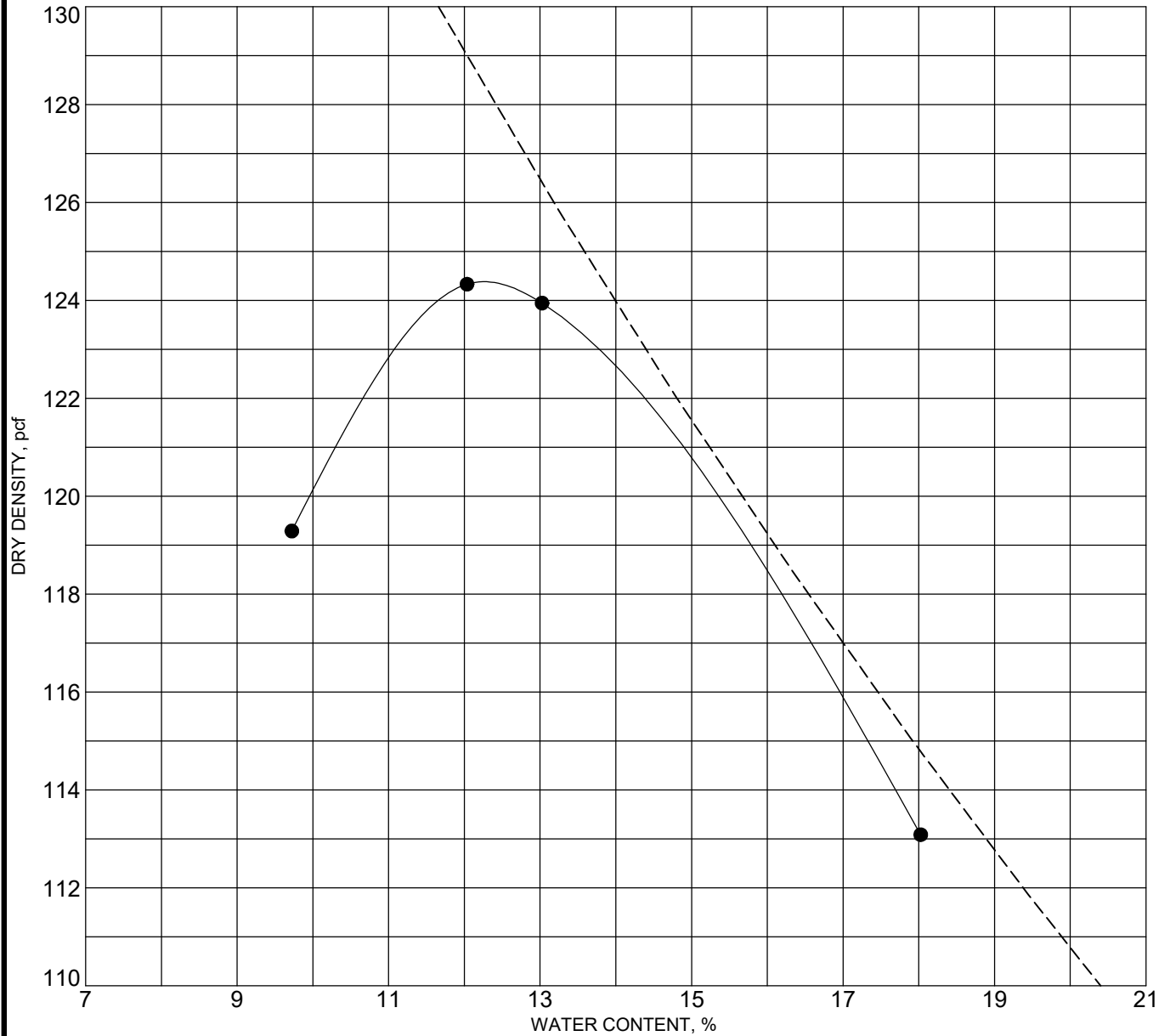


GRADATION CURVE

Project: Roanoke-Blacksburg Regional Airport
Taxiway B Rehabilitation
Roanoke, Virginia

Contract: 23160098.000 **Testing Lab:** BLAC

SIEVE 1/SHEET 23160098.000 LAB.GPJ SCHNABEL DATA TEMPLATE 2008_04_22.GDT 5/1/24



COMPACTION 23160098.000.LAB.GPJ SCHNABEL DATA TEMPLATE 2008_04_22.GDT 5/11/24

Sample Description: SANDY FAT CLAY WITH GRAVEL (CH), reddish brown

Sample Source: B-27
 Test Methods: ASTM D1557 Method B
 Oversize Fraction Sieve Size: 3/8 in.
 Percent Oversized Retained: 8.7%

Liquid Limit (LL): 71
 Plasticity Index (PI): 41
 % Retained #4 Sieve: 15.1
 % Passing # 200 Sieve: 57.8

Assumed Specific Gravity: 2.75
 Uncorrected Max. Dry Density (pcf): 124.4
 Uncorrected Opt. Moisture (%): 12.3
 Assumed Oversize Specific Gravity: 2.50
 Corrected Max. Dry Density (pcf): 127.5
 Corrected Opt. Moisture (%): 11.4

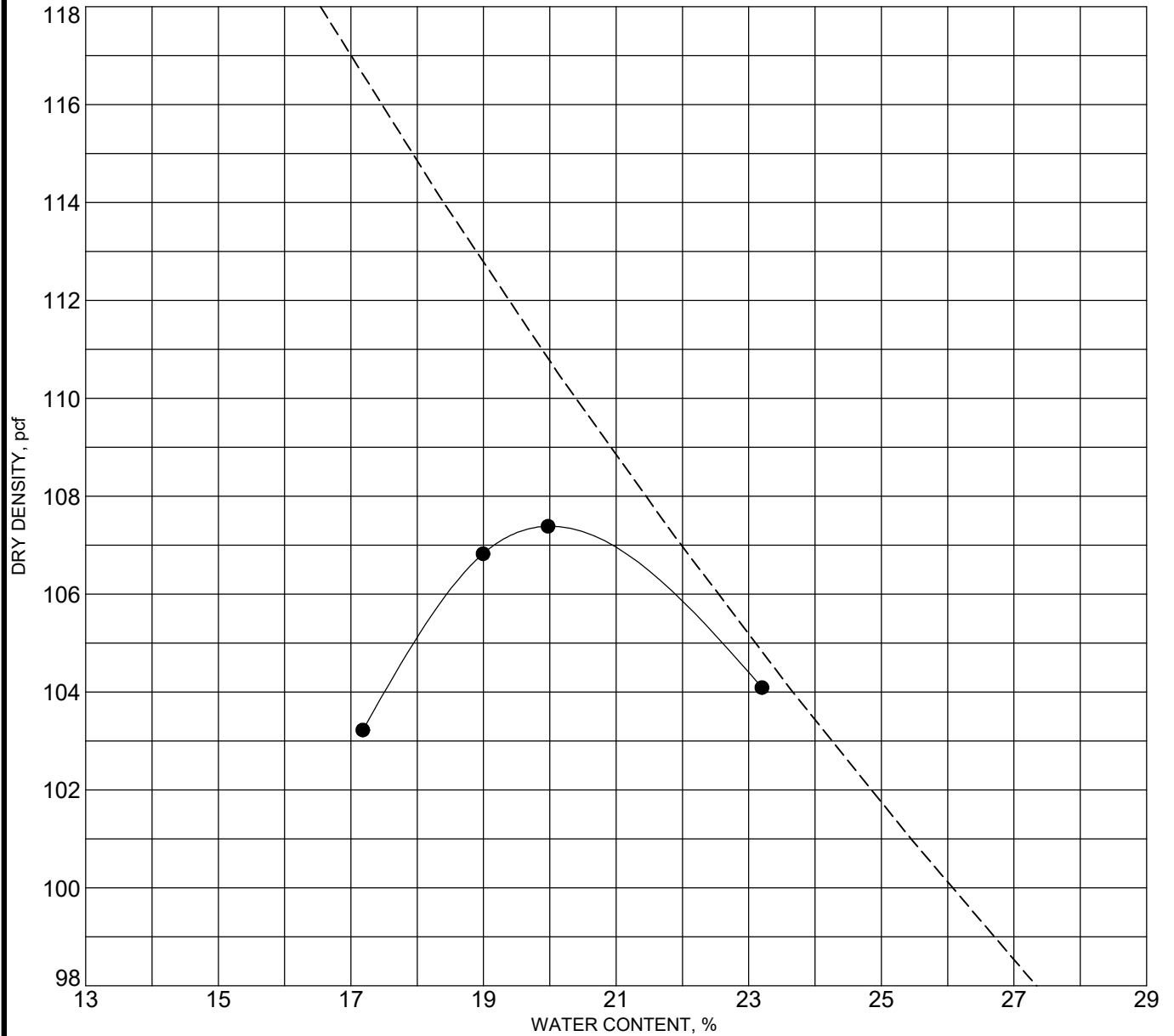
Comments:



MOISTURE DENSITY RELATIONSHIP

Project: Roanoke-Blacksburg Regional Airport
 Taxiway B Rehabilitation
 Roanoke, Virginia

Contract: 23160098.000 **Testing Lab:** BLAC



Sample Description: FAT CLAY WITH SAND (CH), trace gravel, reddish brown

Assumed Specific Gravity: 2.75

Max. Dry Density (pcf): 107.4

Opt. Moisture (%): 20.1

Sample Source: B-29

Test Methods: ASTM D1557 Method B

Liquid Limit (LL): 78

Plasticity Index (PI): 48

% Retained #4 Sieve: 2.5

% Passing # 200 Sieve: 79.8

Comments:

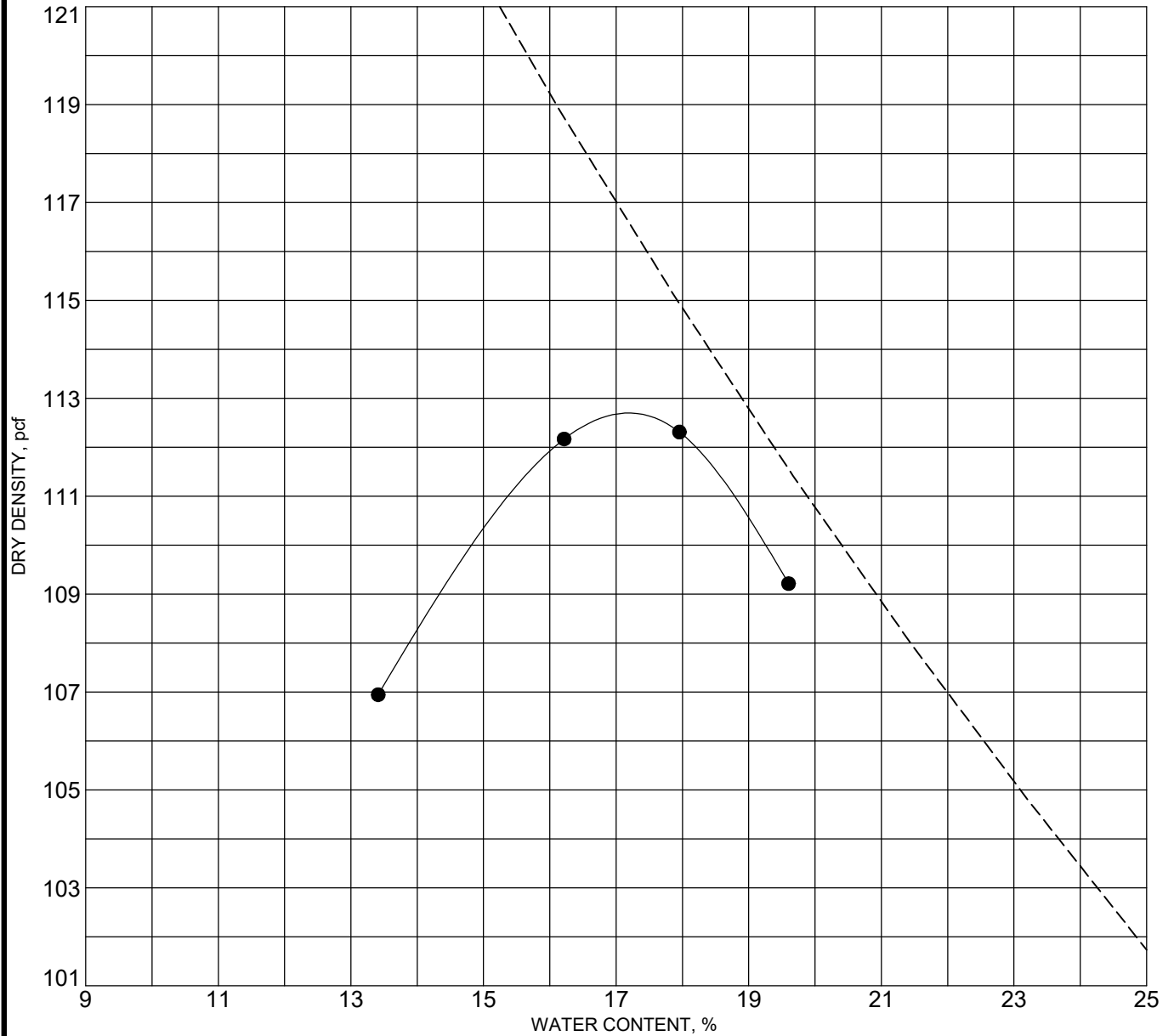


Schnabel
ENGINEERING

MOISTURE DENSITY RELATIONSHIP

Project: Roanoke-Blacksburg Regional Airport
Taxiway B Rehabilitation
Roanoke, Virginia

Contract: 23160098.000 **Testing Lab:** BLAC



Sample Description: LEAN CLAY (CL), few sand, brown

Assumed Specific Gravity: 2.75

Max. Dry Density (pcf): 112.7

Opt. Moisture (%): 17.2

Sample Source: B-30

Test Methods: ASTM D1557 Method A

Liquid Limit (LL): 49

Plasticity Index (PI): 27

% Retained #4 Sieve: 0.0

% Passing # 200 Sieve: 87.6

Comments:

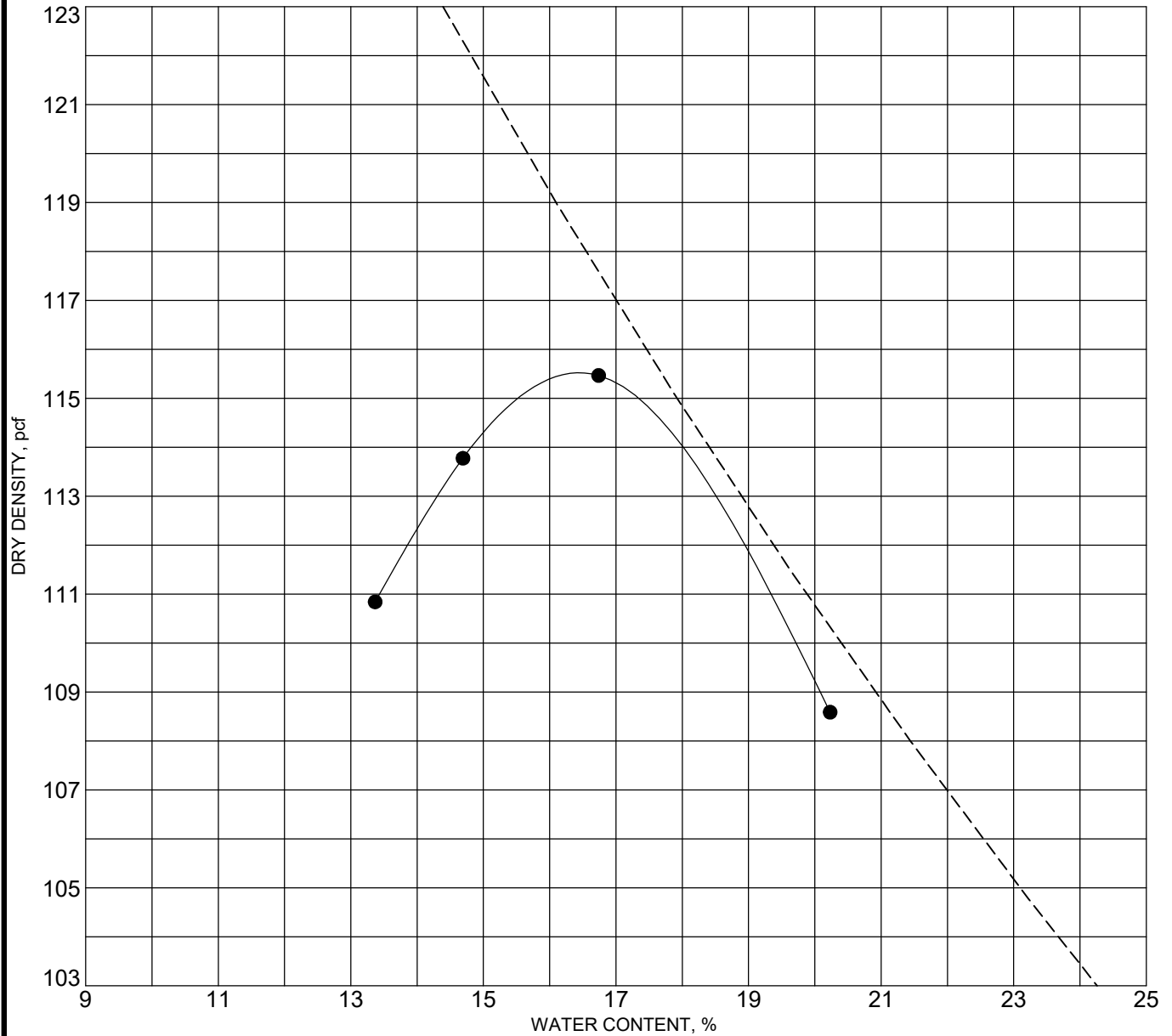


Schnabel
ENGINEERING

MOISTURE DENSITY RELATIONSHIP

Project: Roanoke-Blacksburg Regional Airport
Taxiway B Rehabilitation
Roanoke, Virginia

Contract: 23160098.000 **Testing Lab:** BLAC



Sample Description: LEAN CLAY WITH SAND (CL), trace gravel, reddish brown

Assumed Specific Gravity: 2.75

Max. Dry Density (pcf): 115.5

Opt. Moisture (%): 16.5

Sample Source: B-32

Test Methods: ASTM D1557 Method B

Liquid Limit (LL): 49

Plasticity Index (PI): 28

% Retained #4 Sieve: 0.4

% Passing # 200 Sieve: 82.3

Comments:

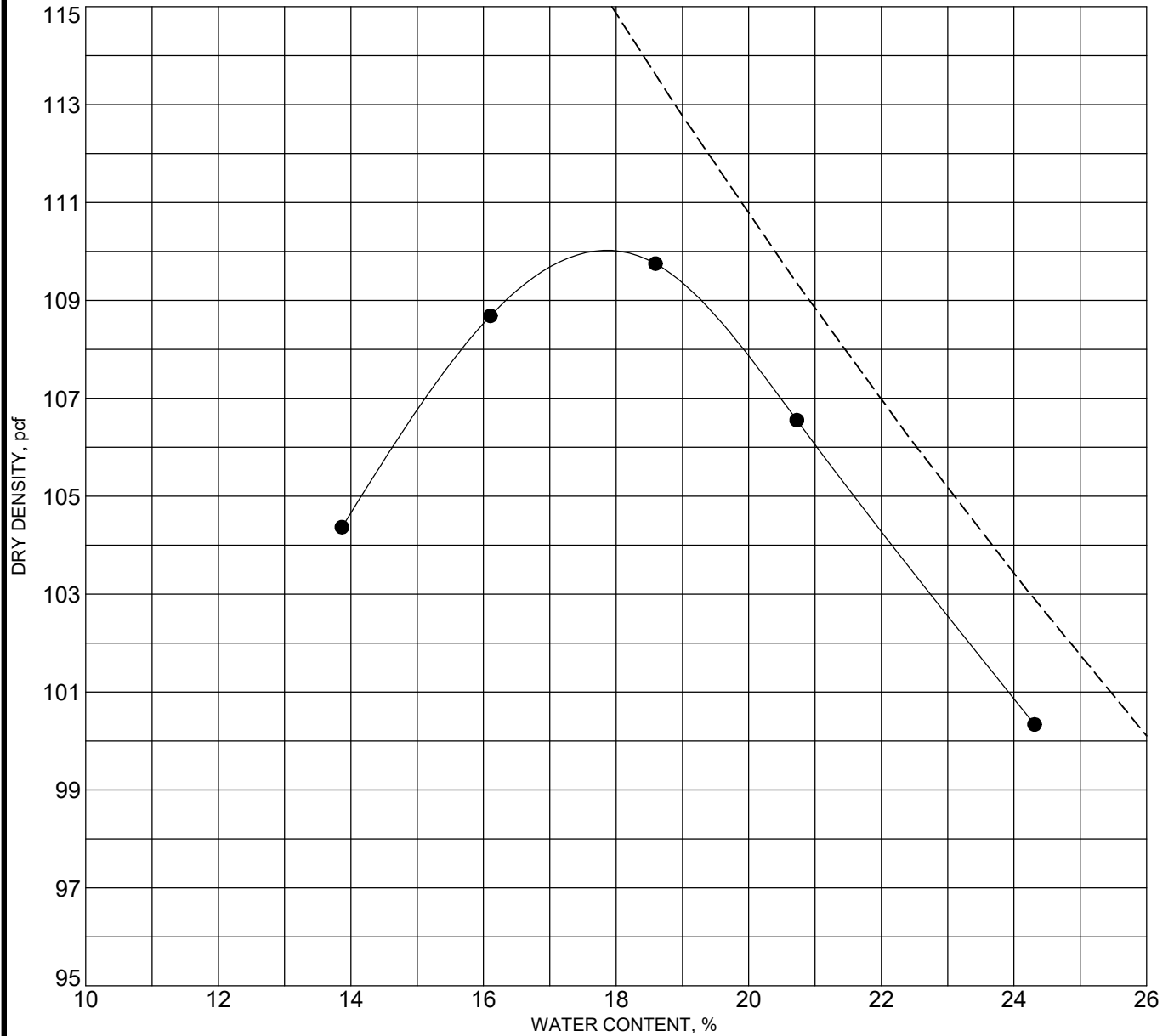


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MOISTURE DENSITY RELATIONSHIP

Project: Roanoke-Blacksburg Regional Airport
Taxiway B Rehabilitation
Roanoke, Virginia

Contract: 23160098.000 **Testing Lab:** BLAC



Sample Description: SANDY ELASTIC SILT (MH), few gravel, orangish brown; lime augmentation observed

Sample Source: B-34

Test Methods: ASTM D1557 Method B

Override Fraction Sieve Size: 3/8 in.

Percent Oversized Retained: 5.4%

Liquid Limit (LL): 60

Plasticity Index (PI): 17

% Retained #4 Sieve: 10.4

% Passing # 200 Sieve: 55.5

Assumed Specific Gravity: 2.75

Uncorrected Max. Dry Density (pcf): 110.0

Uncorrected Opt. Moisture (%): 17.9

Assumed Oversize Specific Gravity: 2.50

Corrected Max. Dry Density (pcf): 112.2

Corrected Opt. Moisture (%): 17.0

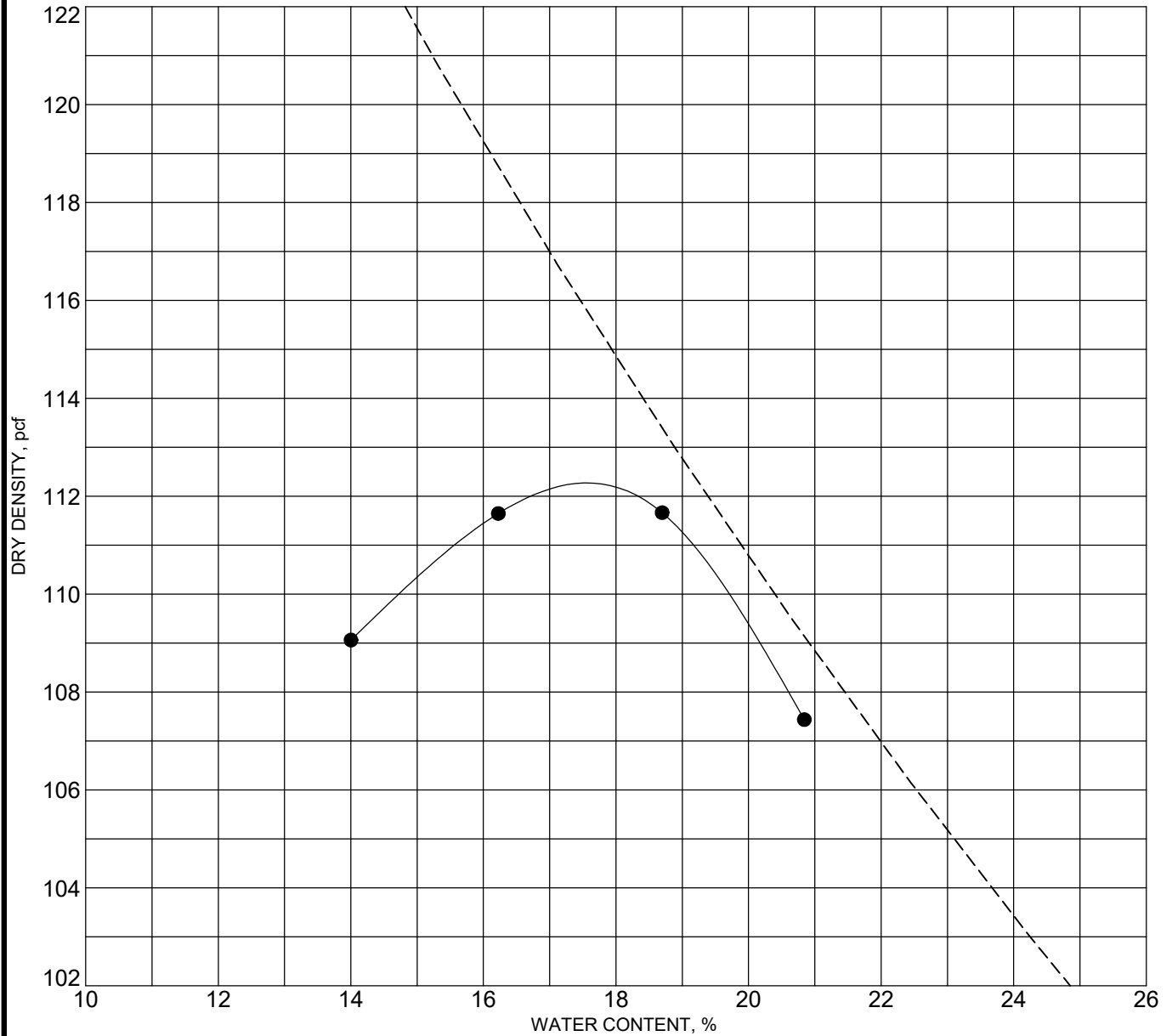
Comments:



MOISTURE DENSITY RELATIONSHIP

Project: Roanoke-Blacksburg Regional Airport
Taxiway B Rehabilitation
Roanoke, Virginia

Contract: 23160098.000 **Testing Lab:** BLAC



COMPACTION 23160098.000.LAB.GPJ SCHNABEL DATA TEMPLATE 2008_04_22.GDT 5/1/24

Sample Description: SANDY FAT CLAY (CH), few gravel, brown

Sample Source: B-38
 Test Methods: ASTM D1557 Method B

Assumed Specific Gravity: 2.75
 Max. Dry Density (pcf): 112.3
 Opt. Moisture (%): 17.5

Liquid Limit (LL): 53
 Plasticity Index (PI): 26
 % Retained #4 Sieve: 9.5
 % Passing # 200 Sieve: 62.4

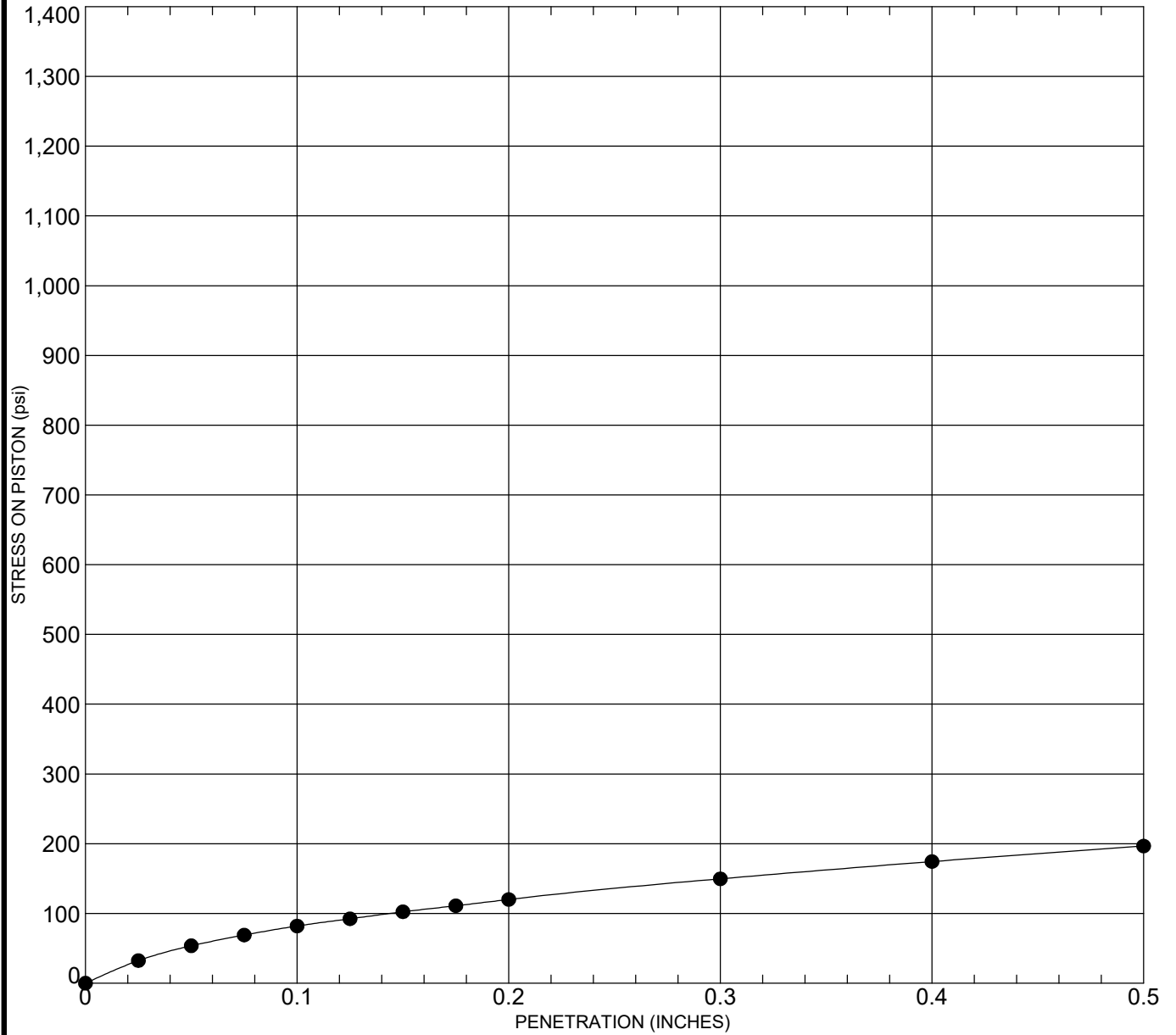
Comments:



MOISTURE DENSITY RELATIONSHIP

Project: Roanoke-Blacksburg Regional Airport
 Taxiway B Rehabilitation
 Roanoke, Virginia

Contract: 23160098.000 **Testing Lab:** BLAC



CBR SINGLE POINT: 23160098.000 LAB.GPJ SCHNABEL DATA TEMPLATE 2008_04_22.GDT 5/1/24

Sample Description: SANDY FAT CLAY WITH GRAVEL (CH),
reddish brown

Sample Source: B-27
Sample Depth: 3.5 - 10.0 ft
Test Method: ASTM D1883

Liquid Limit (LL): 71
Plasticity Index (PI): 41
% Retained #4 Sieve: 15.1
% Passing # 200 Sieve: 57.8

Dry Density Before Soaking (pcf): 122.6
Dry Density After Soaking (pcf): 122.5
Maximum Dry Density (pcf): 124.4
Moisture Content Before Soaking (%): 13.7
Moisture Content After Soaking (Avg) (%): 14.3
Moisture Content Top Inch After Soak (%): 14.0
Optimum Moisture Content (%): 12.3

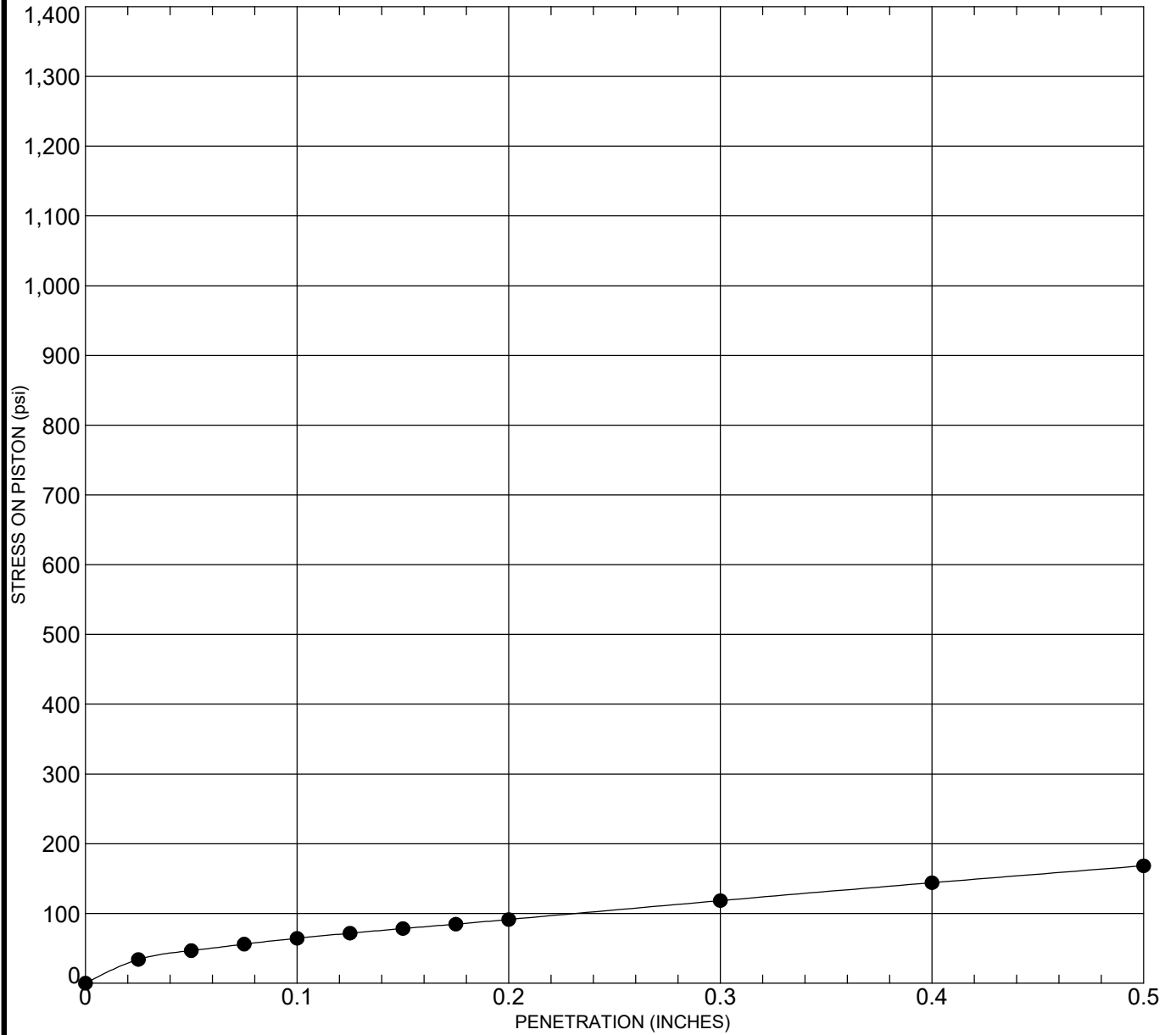
CBR: 8.2, Soaked
Surcharge (psf): 50
Swell (%): 0.1



CALIFORNIA BEARING RATIO TEST

Project: Roanoke-Blacksburg Regional Airport
Taxiway B Rehabilitation
Roanoke, Virginia

Contract: 23160098.000 **Testing Lab:** BLAC



Sample Description: FAT CLAY WITH SAND (CH), trace gravel, reddish brown

Sample Source: B-29
 Sample Depth: 1.6 - 10.0 ft
 Test Method: ASTM D1883

Liquid Limit (LL): 78
 Plasticity Index (PI): 48
 % Retained #4 Sieve: 2.5
 % Passing # 200 Sieve: 79.8

Dry Density Before Soaking (pcf): 104.2
 Dry Density After Soaking (pcf): 99.6
 Maximum Dry Density (pcf): 107.4
 Moisture Content Before Soaking (%): 21.4
 Moisture Content After Soaking (Avg) (%): 26.7
 Moisture Content Top Inch After Soak (%): 28.4
 Optimum Moisture Content (%): 20.1

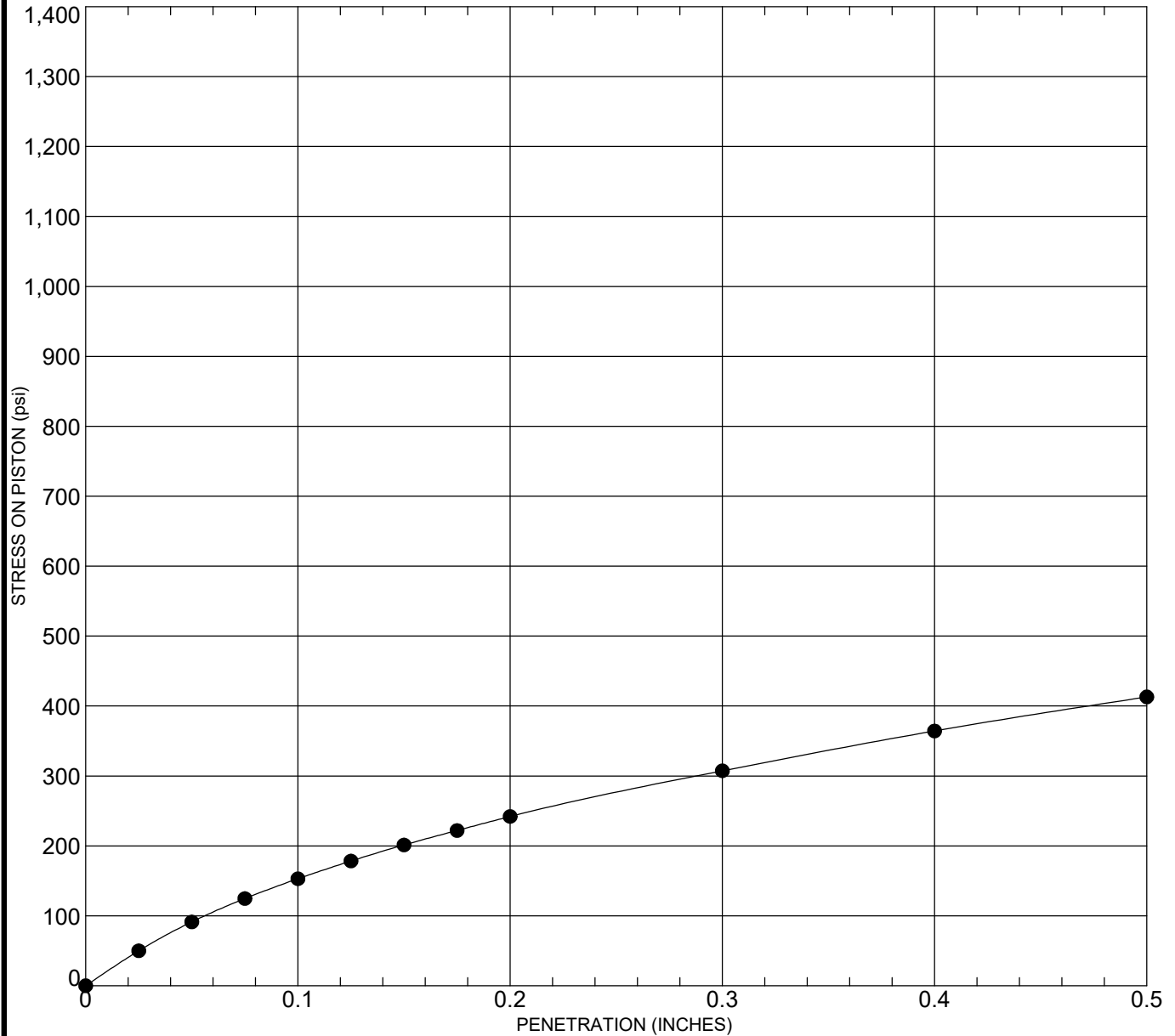
CBR: 6.4, Soaked
 Surcharge (psf): 50
 Swell (%): 4.6



CALIFORNIA BEARING RATIO TEST

Project: Roanoke-Blacksburg Regional Airport
 Taxiway B Rehabilitation
 Roanoke, Virginia

Contract: 23160098.000 **Testing Lab:** BLAC



CBR SINGLE POINT: 23160098.000 LAB.GPJ SCHNABEL DATA TEMPLATE 2008_04_22.GDT 5/1/24

Sample Description: LEAN CLAY (CL), few sand, brown

Sample Source: B-30
 Sample Depth: 0.2 - 10.0 ft
 Test Method: ASTM D1883

Liquid Limit (LL): 49
 Plasticity Index (PI): 27
 % Retained #4 Sieve: 0.0
 % Passing # 200 Sieve: 87.6

Dry Density Before Soaking (pcf): 110.8
 Dry Density After Soaking (pcf): 108.6
 Maximum Dry Density (pcf): 112.7
 Moisture Content Before Soaking (%): 17.4
 Moisture Content After Soaking (Avg) (%): 20.3
 Moisture Content Top Inch After Soak (%): 23.3
 Optimum Moisture Content (%): 17.2

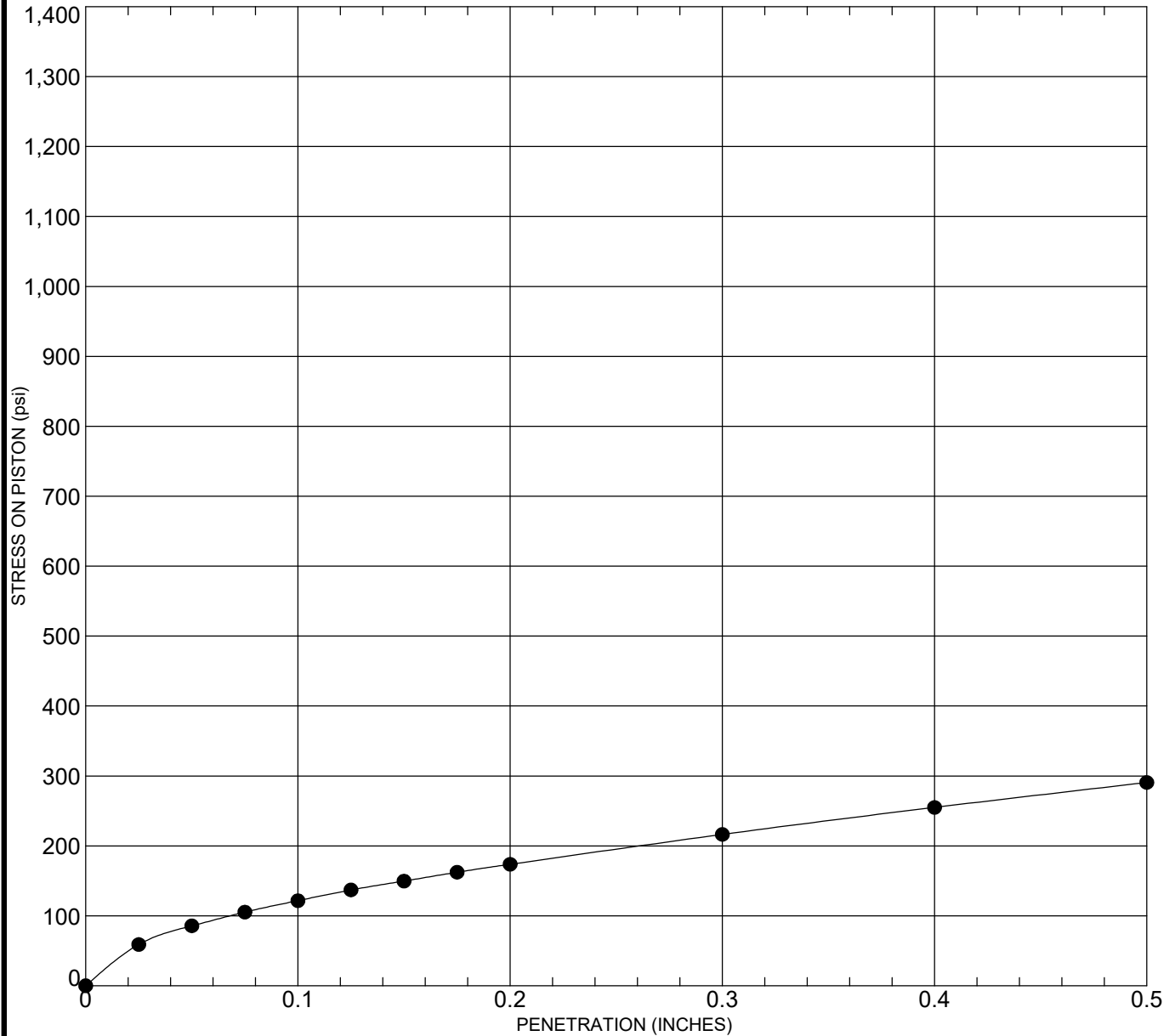
CBR: 15.3, Soaked
 Surcharge (psf): 50
 Swell (%): 2.1



CALIFORNIA BEARING RATIO TEST

Project: Roanoke-Blacksburg Regional Airport
 Taxiway B Rehabilitation
 Roanoke, Virginia

Contract: 23160098.000 **Testing Lab:** BLAC



Sample Description: LEAN CLAY WITH SAND (CL), trace gravel, reddish brown

Sample Source: B-32
 Sample Depth: 1.5 - 10.0 ft
 Test Method: ASTM D1883

Liquid Limit (LL): 49
 Plasticity Index (PI): 28
 % Retained #4 Sieve: 0.4
 % Passing # 200 Sieve: 82.3

Dry Density Before Soaking (pcf): 113.8
 Dry Density After Soaking (pcf): 111.2
 Maximum Dry Density (pcf): 115.5
 Moisture Content Before Soaking (%): 16.2
 Moisture Content After Soaking (Avg) (%): 19.4
 Moisture Content Top Inch After Soak (%): 22.8
 Optimum Moisture Content (%): 16.5

CBR: 12.2, Soaked
 Surcharge (psf): 50
 Swell (%): 2.3

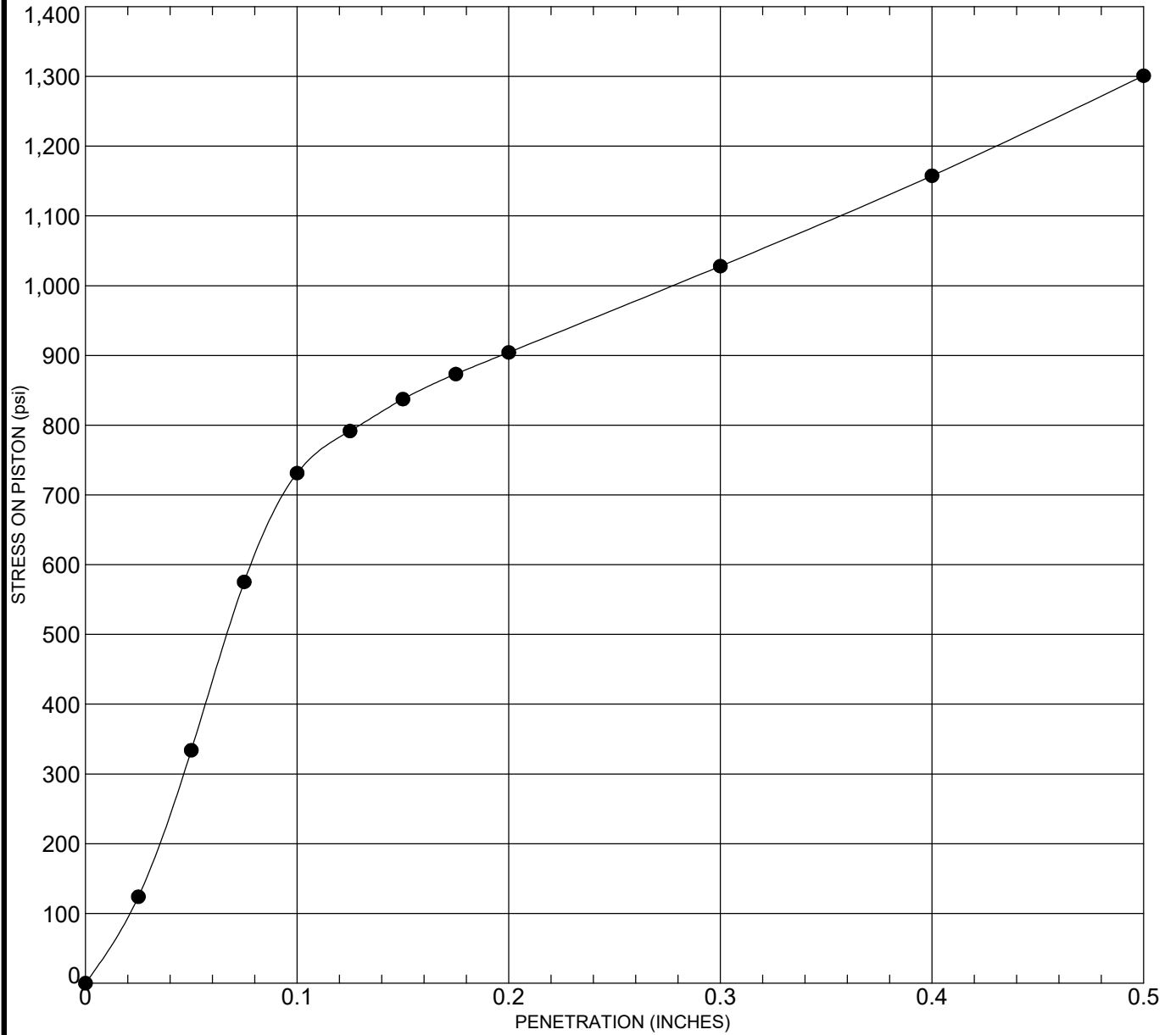


CALIFORNIA BEARING RATIO TEST

Project: Roanoke-Blacksburg Regional Airport
 Taxiway B Rehabilitation
 Roanoke, Virginia

Contract: 23160098.000 **Testing Lab:** BLAC

CBR SINGLE POINT_23160098.000 LAB.GPJ SCHNABEL DATA TEMPLATE 2008_04_22.GDT 5/1/24



CBR SINGLE POINT: 23160098.000 LAB.GPJ SCHNABEL DATA TEMPLATE 2008_04_22.GDT 5/1/24

Sample Description: SANDY ELASTIC SILT (MH), few gravel, orangish brown; lime augmentation observed

Sample Source: B-34
 Sample Depth: 1.9 - 10.0 ft
 Test Method: ASTM D1883

Liquid Limit (LL): 60
 Plasticity Index (PI): 17
 % Retained #4 Sieve: 10.4
 % Passing # 200 Sieve: 55.5

Dry Density Before Soaking (pcf): 111.9
 Dry Density After Soaking (pcf): 111.5
 Maximum Dry Density (pcf): 110
 Moisture Content Before Soaking (%): 16.6
 Moisture Content After Soaking (Avg) (%): 18.5
 Moisture Content Top Inch After Soak (%): 22.1
 Optimum Moisture Content (%): 17.9

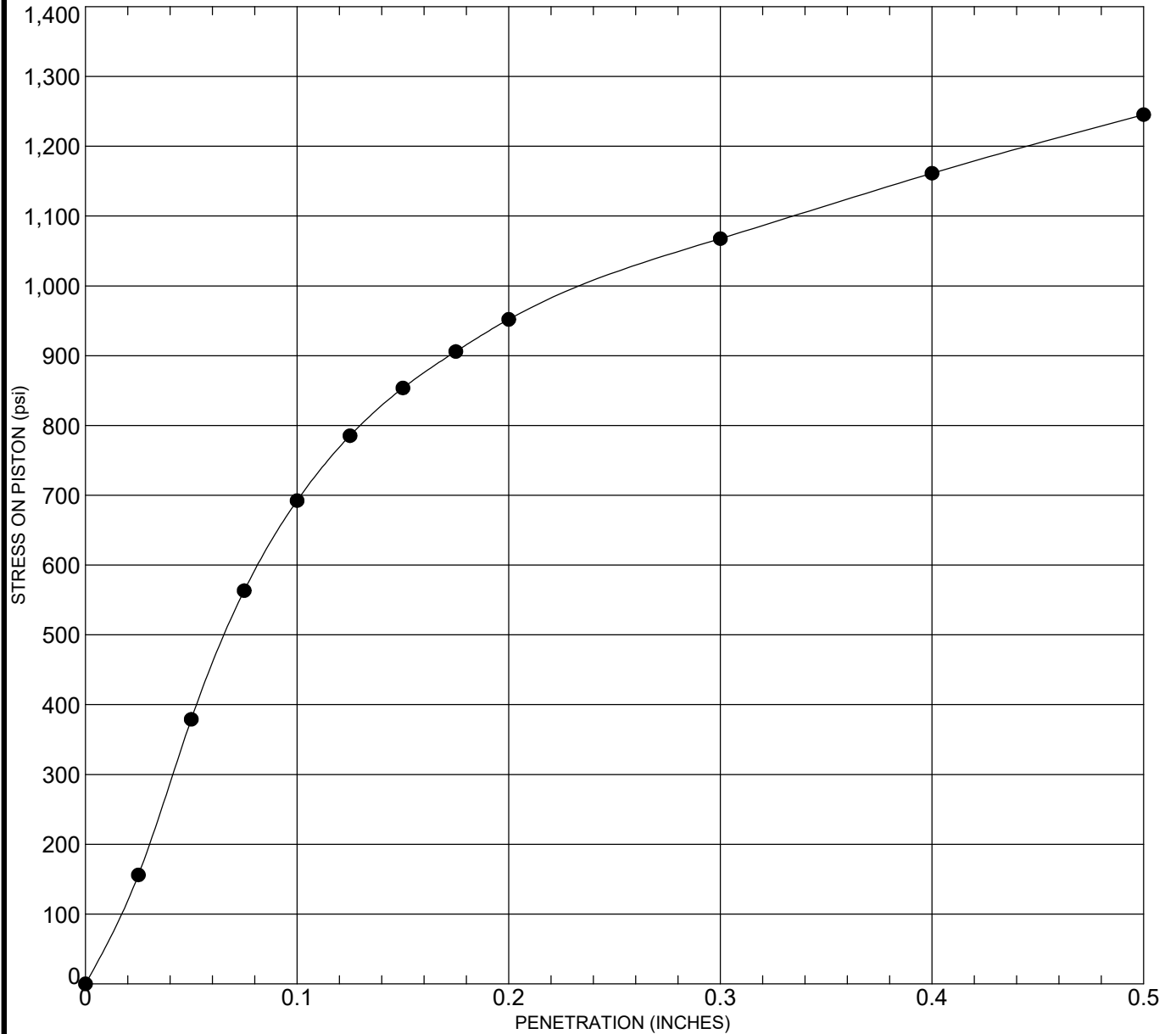
CBR: 78.5, Soaked
 Surcharge (psf): 50
 Swell (%): 0.4



CALIFORNIA BEARING RATIO TEST

Project: Roanoke-Blacksburg Regional Airport
 Taxiway B Rehabilitation
 Roanoke, Virginia

Contract: 23160098.000 **Testing Lab:** BLAC



CBR SINGLE POINT: 23160098.000 LAB.GPJ SCHNABEL DATA TEMPLATE 2008_04_22.GDT 5/1/24

Sample Description: SANDY ELASTIC SILT (MH), few gravel, orangish brown; lime augmentation observed

Sample Source: B-34
 Sample Depth: 1.8 - 10.0 ft
 Test Method: ASTM D1883

Liquid Limit (LL): 60
 Plasticity Index (PI): 17
 % Retained #4 Sieve: 10.4
 % Passing # 200 Sieve: 55.5

Dry Density Before Soaking (pcf): 107.5
 Dry Density After Soaking (pcf): 107.1
 Maximum Dry Density (pcf): 110
 Moisture Content Before Soaking (%): 17.2
 Moisture Content After Soaking (Avg) (%): 21.2
 Moisture Content Top Inch After Soak (%): 24.4
 Optimum Moisture Content (%): 17.9

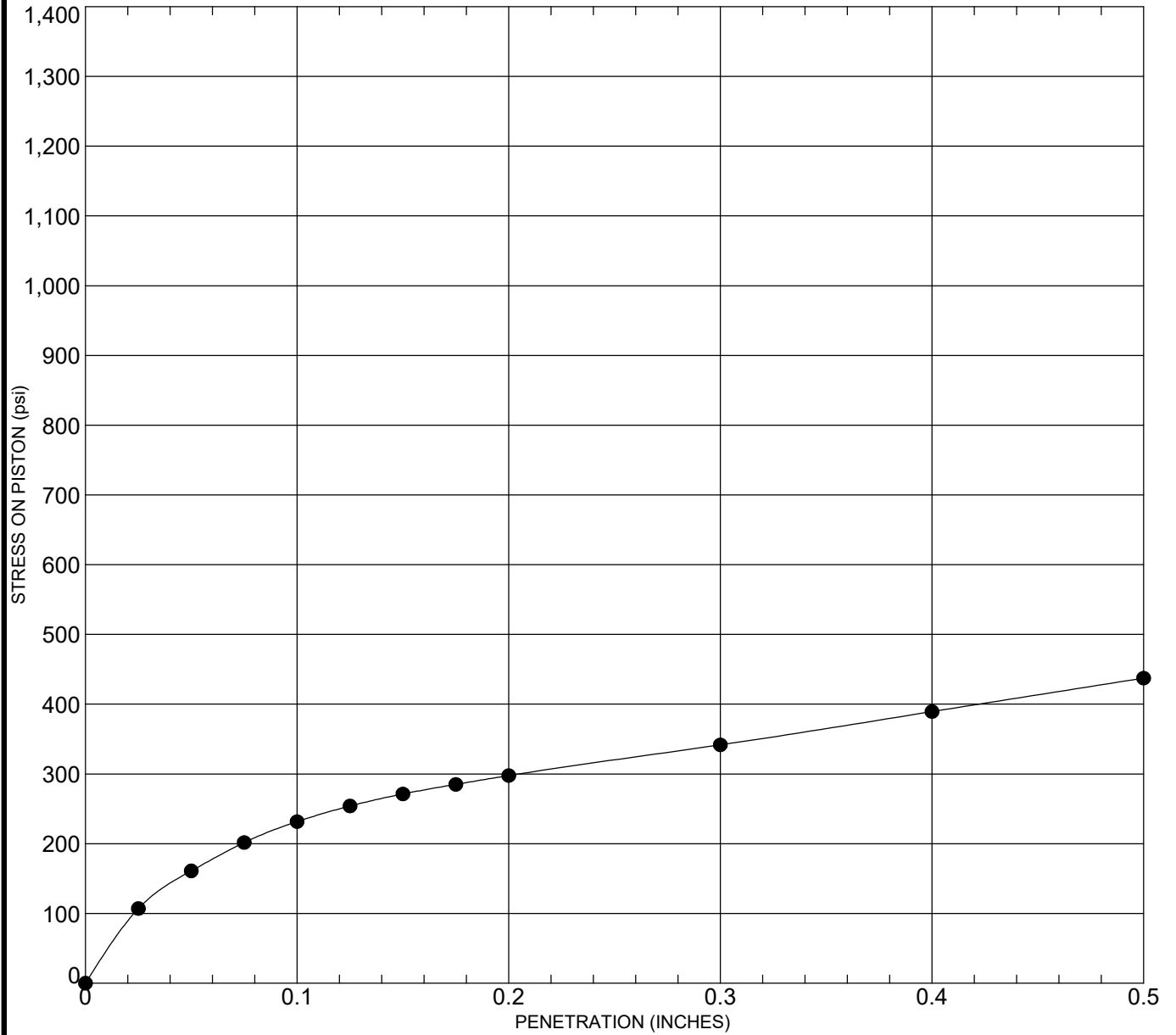
CBR: 72.3, Soaked
 Surcharge (psf): 50
 Swell (%): 0.4



CALIFORNIA BEARING RATIO TEST

Project: Roanoke-Blacksburg Regional Airport
 Taxiway B Rehabilitation
 Roanoke, Virginia

Contract: 23160098.000 **Testing Lab:** BLAC



CBR SINGLE POINT. 23160098.000 LAB.GPJ SCHNABEL DATA TEMPLATE 2008_04_22.GDT 5/1/24

Sample Description: SANDY FAT CLAY (CH), few gravel, brown

Sample Source: B-38
 Sample Depth: 0.0 ft
 Test Method: ASTM D1883

Liquid Limit (LL): 53
 Plasticity Index (PI): 26
 % Retained #4 Sieve: 9.5
 % Passing # 200 Sieve: 62.4

Dry Density Before Soaking (pcf): 113.5
 Dry Density After Soaking (pcf): 111.5
 Maximum Dry Density (pcf): 112.3
 Moisture Content Before Soaking (%): 17.4
 Moisture Content After Soaking (Avg) (%): 19.3
 Moisture Content Top Inch After Soak (%): 23.5
 Optimum Moisture Content (%): 17.5

CBR: 23.2, Soaked
 Surcharge (psf): 50
 Swell (%): 1.8



CALIFORNIA BEARING RATIO TEST

Project: Roanoke-Blacksburg Regional Airport
 Taxiway B Rehabilitation
 Roanoke, Virginia

Contract: 23160098.000 **Testing Lab:** BLAC