

# CONTRACT DOCUMENTS AND SPECIFICATIONS

for

Albert J. Ellis Airport  
South GA Expansion  
February 2025  
Bid No. 101-25C  
WK Dickson No. 20240074.00.WK



Prepared for

Onslow County  
234 NW Corridor Blvd.  
Jacksonville, NC 28540

Plans & Specifications  
Prepared by  
W.K. Dickson & Co., LLC  
720 Corporate Center Drive  
Raleigh, NC 27607  
(919) 782-0495  
NC License No. F-0374



**BID DOCUMENTS – NOT FOR CONSTRUCTION**

THIS PAGE IS LEFT BLANK INTENTIONALLY

# TABLE OF CONTENTS

## DIVISION I

### CONTRACT REQUIREMENTS

Advertisement for Bids	A-1 to A-2
Instructions to Bidders	I-1 to I-5
<b>Contractor Contractual Requirements and Title VI Assurances</b>	<b>I-6 to I-36</b>
Disadvantaged Business Enterprise NCDOT – SPIG61 (rev. 1/16/24)	I-37 to I-50

### BID FORMS

Proposal	B-1 to B-3
Schedule of Work	B-4 to B-14
Bid Bond	B-15 to B-16
Equal Employment Opportunity (EEO) Report Statement	B-17
Disadvantaged Business Enterprise (DBE)	B-18 to B-20
Letter of Intent	B-21
AV-509/AV-510 DBE/MBE/WBE Vendor Payments	B-22
Certificate of Prompt Payment	B-23
Trade Restriction Certification	B-24
Buy American Certification	B-25 to B-26
Certification of Non-Segregated Facilities	B-27
Certification Regarding Debarment, Suspension, Ineligibility, And Voluntary Exclusion	B-28
Affidavit of Non-Collusion	B-29
Bidders List	B-30
E-Verify Affidavit	B-31
Iran Divestment Act	B-32 to B-33
Certification of Offerer/Bidder Regarding Tax Delinquency and Felony Convictions	B-34

### CONTRACT FORMS

Contract	C-1 to C-4
Performance Bond	C-5 to C-6
Payment Bond (Labor and Materials Bond)	C-7 to C-8

## DIVISION II

### GENERAL PROVISIONS

Section 10 Definition of Terms	GP-1
Section 20 Proposal Requirements and Conditions	GP-9
Section 30 Award and Execution of Contract	GP-12
Section 40 Scope of Work	GP-14

Section 50 Control of Work	GP-17
Section 60 Control of Materials	GP-22
Section 70 Legal Regulations and Responsibility to Public	GP-25
Section 80 Execution and Progress	GP-31
Section 90 Measurement and Payment	GP-37

## **DIVISION III**

### **SPECIAL PROVISIONS**

1. General	SP-1
2. Shop Drawings	SP-1
3. Coordination, Interpretation and Intent of Contract Documents	SP-1
4. Insurance	SP-2 to SP-3
5. Contractor	SP-3 to SP-7
6. Owner	SP-7
7. Testing and Surveying	SP-7
8. Change of the Contract Price	SP-8
9. Correction of Work before Final Payment	SP-8
10. Correction of Work after Final Payment	SP-9
11. Owner's Right to do Work	SP-9
12. Contractor, Subcontractor & Supplier Affidavit	SP-9
13. Use of Premises	SP-10
14. Limitations of Work Area	SP-10
15. Cutting, Patching and Fitting	SP-10
16. Dispute Resolution	SP-11 to SP-13
17. Taxes	SP-13 to SP-14
18. Contractor's Sales Tax Report	SP-15 to SP-16
19. Operation of Airport	SP-17
20. Severability	SP-17
21. Not Used	SP-17
22. Duties, Responsibilities and Limitations of Authority of Resident Project Representative	SP-17 to SP-21
23. Airport Project Procedures (Construction Safety Plan)	SP-21 to SP-22
24. Project Time and Liquidated Damages	SP-22
25. Project Record Documents	SP-23 to SP-24

## **DIVISION IV**

### **TECHNICAL SPECIFICATIONS - CIVIL**

Item C-100 Contractor Quality Control Program (CQCP)*	C-100-1 to C-100-7
Item C-102 Temporary Air and Water Pollution, Soil Erosion, and Siltation Control*	C-102-1 to C-102-4
Item C-105 Mobilization*	C-105-1 to C-105-3



Item C-110 Method of Estimating Percentage of Material Within Specification Limits (PWL)	C-110-1 to C-110-7
Item P-101 Demolition Pavements, Structures, Pipe	P-101-1 to P-101-5
Item P-152 Excavation, Subgrade, and Embankment	P-152-1 to P-152-11
Item P-209 Crushed Aggregate Base Course	P-209-1 to P-209-6
Item P-401 Asphalt Mix Pavement**	P-401-1 to P-401-21
Item P-603 Emulsified Asphalt Tack Coat	P-603-1 to P-603-3
Item P-610 Concrete for Miscellaneous Structures	P-610-1 to P-610-8
Item P-620 Runway and Taxiway Marking**	P-620-1 to P-620-6
Item F-162 Chain-Link Fence Gate	F-162-1 to F-162-7
Item D-701 Pipe for Storm Drains and Culverts	D-701-1 to D-701-8
Item D-751 Manholes, Catch Basins, Inlets and Inspection Holes	D-751-1 to D-751-6
Item T-901 Seeding	T-901-1 to T-901-4
Item T-905 Topsoiling	T-905-1 to T-905-3
Item T-908 Mulching	T-908-1 to T-908-3
Section 01 31 22 Pre-Engineered Hangar Buildings	01 31 22-1 to 01 31 22-11
Section 31 23 16.3 Trenching	31 23 16.3-1 to 31 23 16.3-9
Section 32 12 16 Asphalt Paving	32 12 16-1 to 32 12 16-5
Section 32 17 23 Pavement Markings	32 17 23-1 to 32 17 23-6
Section 33 01 10.58 Disinfection of Water Utility Piping Systems	33 01 10.58-1 to 33 01 10.58-3
Section 33 05 61 Concrete Manholes	33 05 61-1 to 33 05 61-8
Section 33 11 00 Water Utility Distribution Piping	33 11 00-1 to 33 11 00-9
Section 33 14 17 Site Water Service Utility Laterals	33 14 17-1 to 33 14 17-7
Section 33 31 00 Sanitary Utility Sewerage Piping	33 31 00-1 to 33 31 00-8

## TECHNICAL SPECIFICATIONS – ELECTRICAL (WE Engineering)

Item L-100 General Provisions and Requirements for Electrical Work	L-100-1 to L-100-14
Item L-104 General Electrical Safety Requirements and Temporary Airfield Lighting	L-104-1 to L-104-8
Item L-105 Alternations, Removal and Demolition	L-105-1 to L-105-6
Item L-106 Submittals, Record Documents	L-106-1 to L-106-24
Item L-108 Underground Power Cable for Airports	L-108-1 to L-108-14
Item L-110 Airport Underground Electrical Duct Banks and Conduits	L-110-1 to L-110-8
Item L-115 Electrical Manholes and Junction Structures**	L-115-1 to L-115-7
Item L-125 Installation of Airport Lighting Systems	L-125-1 to L-125-4
Item L-131 Demonstrations, Tests, and Performance Verification	L-131-1 to L-131-8

## APPENDIX

### Appendix A – Construction Safety & Phasing Plan (CSPP)

This Page Intentionally Left Blank

## Advertisement for Bids

South GA Expansion  
Albert J. Ellis Airport  
Richlands, Onslow County, North Carolina

Sealed proposals will be received by Onslow County in the Aviation Offices at Albert J. Ellis Airport in the Airport's Administration Conference Room at 264 Albert Ellis Airport Road, Richlands, NC 28574, up to **2:00 PM, March 27, 2025**, and immediately thereafter publicly opened and read for the furnishing of labor, material and equipment for the South GA Expansion project.

The project will include the construction of new taxiway, taxilane, apron, and roadway pavements, as well as the construction of two t-hangar buildings and associated utilities. The project includes approximately 33,000 cubic yards of embankment of offsite material, approximately 6,000 tons of asphalt pavement, and approximately 3,500 linear feet of new drainage pipes. The project also includes the installation of new taxiway lights and signage.

A Pre-Bid Conference has been scheduled for **Wednesday, March 5, 2025 at 2:00 PM**, local time at the Airport Administration Conference Room. Attendance at this Pre-Bid Conference is highly encouraged but not required for all bidders intending to submit a prime bid on this project. All other interested parties including, but not limited to, subcontractors, suppliers, and vendors are welcome to attend.

Plans, Specifications and Contract Documents may be examined at: W.K. Dickson & Co., LLC, 720 Corporate Center Drive, Raleigh, NC 27607. Plans, Specifications, and Contract Documents are available for purchase by going to Plan Room at [www.wkdickson.com](http://www.wkdickson.com). Please note that only registered plan holders may bid as a General Contractor. All bidders must be prequalified by the NCDOT as a "Bidder" prior to submitting a bid.

Each proposal shall be accompanied by a cash deposit or a certified check drawn on a bank or trust company insured by the Federal Deposit Insurance Corporation in an amount equal to not less than 5% of the proposal or a bid bond of 5% of the bid executed by a surety company licensed under the laws of North Carolina to execute such bonds. The deposits shall be made payable to the Owner and shall be retained by the Owner as liquidated damages in the event of the successful bidder fails to properly execute the contract within ten (10) days after award and to give satisfactory surety as required by law.

A bid may be withdrawn only as provided by the applicable statutes of North Carolina. If a bid is withdrawn within 90 days of the bid opening, the Bid Guarantee shall be forfeited; provided that, if the request to withdraw is made not later than 72 hours after the opening of bids, and if the withdrawal is allowed, the Owner may return the bid guarantee.

A Disadvantaged Business Enterprise (DBE) contract goal of **6.9 percent (6.9%)** has been established for this contract. The bidder/offeree shall make good faith efforts, as defined in SPIG61 to meet the contract goal by utilizing NCDOT certified DBE's in the performance of this contract.

The Owner reserves the right to reject any or all bids and to waive informalities and minor irregularities.

Christina Russell  
Onslow County Purchasing Division Head

**End of Advertisement for Bids**

## INSTRUCTIONS TO BIDDERS

The terms "Proposal" or "Bid" shall refer to the written offer of the bidder (or "proposer") (when submitted on the approved bid/proposal form) to perform the contemplated work and furnish the necessary materials in accordance with the provisions of the plans and specifications. The terms "proposal" and "bid" may be used interchangeably throughout the contract documents. The bid, to be considered, must be submitted in accordance with the complete set of documents including the plans, and bidders are specifically directed to review the bid forms, these Instructions to Bidders, and the General Provisions.

### 1.1 GENERAL

#### A. BIDS

1. Bid forms have been included in this set of contract documents. These bid forms shall be included in the sealed envelope. A full set of contract documents is not required to be submitted at the time of bid opening.
2. Requirements for the preparation and submittal of a bid are included throughout these contract documents. Prospective bidders shall familiarize themselves with the complete set of documents including the plans, and are specifically directed to the bid forms, these Instructions to Bidders, and to Sections 20 and 30 of the General Provisions.
3. In the preparation of a bid, all blank spaces for bid items and bid alternatives must be properly filled in (written in ink or typed). Unit Prices shall be stated both in words and numerals. Total prices for bid items shall also be stated both in words and numerals. Total amounts bid shall be stated both in words and numerals in the proper place in the bid form. The complete form shall be without alterations or erasures. In case of conflict between words and numerals, the words, unless obviously incorrect, shall govern.
4. The bidder shall complete the bid form as follows:
  - a. If the documents are executed by a sole proprietor, that fact shall be evidenced by the word "Owner" appearing after the name of the person executing them.
  - b. If the documents are executed by a partnership, that fact shall be evidenced by the word "Partner" appearing after the name of the partner executing them.
  - c. If the documents are executed by a corporation, they shall be executed in the name of the corporation by either the President or the Vice President and attested by the Secretary or Assistant Secretary and the corporate seal shall be impressed on each copy of the documents.
  - d. All signatures must be in ink and properly witnessed.
5. **The completed bid forms, with all required attachments, shall be submitted in a sealed envelope on or before 2:00 PM, March 27, 2025.** Bids shall be addressed and delivered to:

Albert J. Ellis Airport  
Attn: Mitch Sprunger, Airport Director  
Airport Terminal Building  
264 Albert Ellis Airport Road  
Richlands, NC 28574

6. Bids will be opened at the aforementioned address.
7. Bid packages shall be enclosed in a sealed envelope, as required by the General Provisions Section 20, PROPOSAL REQUIREMENTS AND CONDITIONS.

8. It is solely the responsibility of the bidder to deliver his bid package to the proper official at the appointed time and place prior to the announced time for the opening of bids. Late delivery of the bid package for any reason shall disqualify the bid. A bidder may withdraw a bid provided that the bidder's request for withdrawal is received by the owner in writing or by telegram before the time specified for the opening of bids.
9. Modifications to bids will be accepted only if such modifications are delivered in writing (including telegram) to the Owner prior to the time for the opening of bids. Should the bidder find discrepancies in or omissions from the drawings or documents, or should he be in doubt as to the meaning of anything in the documents, he shall at once notify the Engineer, in writing, who, when necessary, will send a written instruction to all bidders through the issuance of an addendum to the contract documents. Neither, the Owner, nor the Engineer nor their representatives will be responsible for any oral instruction or interpretation.

## **1.2 BID GUARANTY**

- A. See Section **20-10 BID GUARANTY/BID BOND, of the General Provisions.**

## **1.3 QUALIFICATIONS OF BIDDERS**

- A. By submission of a bid the bidder agrees to perform the work if awarded a contract, and to perform at least 25% of the work under the contract with his own organization and with his own employees. If during the progress of the work hereunder, The Contractor requests an adjustment of such percentage and the Engineer determines that it would be to the Owner's advantage, the percentage of the work required to be performed by the Contractor's organization may be adjusted provided prior written approval of such adjustment is obtained from the Engineer.
- B. Each bidder must furnish with his bid a breakdown of the work showing which portions of the work he will perform with his own forces and the estimated cost of these items.
- C. All bidders, including subcontractors must be properly licensed in the state and must indicate their current license number on the outside of the sealed envelope containing their bid. Additional requirements for bid submission are: Contractor's must have a current listing as pre-qualified with the NCDOT.
- D. All bidders must be prequalified by the NCDOT as a "Bidder" prior to submitting a bid and all Contractors and Subcontractors must be prequalified as a "Bidder" or "Subcontractor" prior to performing any work on this project.

## **1.4 E-VERIFY**

Effective September 4, 2013, House Bill 786/S.L. 2013-418, passed by the General Assembly of North Carolina, requires that business entities and employers with whom a public entity contracts provide proof of enrollment and participation in E-Verify, an internet based system operated by the U.S. Department of Homeland Security, which may be used to determine the eligibility of new hires to work in the United States. This legislation applies to all state agencies, cities, counties, school boards, as well as all private employers doing business in North Carolina who employ 25 or more employees in the State of North Carolina. This also applies to all city and county contracts, including all formal

purchase and construction and repair contracts let by any public entity, as well as those not subject to competitive bidding requirements, such as service contracts. For other units of local government, such as local school boards and water/sewer authorities, the prohibition only applies to purchase and construction/repair contracts in the formal bidding range.

HB786 imposes E-Verify requirements on contractors who enter into certain contracts with state agencies and local governments. The legislation specifically prohibits governmental units from entering into certain contracts “unless the contractor and the contractor’s subcontractors comply with the requirements of Article 2 of Chapter 64 of the General Statutes.” (Article 2 of Chapter 64 establishes North Carolina’s E-Verify requirements for private employers). It is important to note that the verification requirement applies to subcontractors as well as contractors.

The new laws specifically prohibit governmental units from entering into contracts with contractors who have not (or their subs have not) complied with E-Verify requirements. Although the new statutes don’t specify the consequences for entering into a contract in violation of this prohibition, it may be reasonable to assume that the contract would be void.

As proof of enrollment and participation in E-Verify, Public Entities in North Carolina require the following:

1. See E-Verify Affidavit of Agreement for North Carolina

Any violation of this provision by the Contractor, would provide grounds for a breach of contract claim by the local government. Should the contractor fail to ensure that his or her subcontractors, if any, or subsequently hired subcontractors are non-compliant, would allow for the contract to be voided by the local government.

The following websites provide further information about participation and enrollment in E-Verify: [www.uscis.gov/everify](http://www.uscis.gov/everify).

## **1.5 EXAMINATION OF CONTRACT DOCUMENTATION AND SITE**

- A. Before submitting a bid, each bidder must:
  1. Examine the bidding documents thoroughly;
  2. Visit the site to familiarize himself with local conditions that may in any manner affect cost, progress or performance of the work;
  3. Familiarize himself of federal, state and local laws, ordinances, rules and regulations that may in any manner affect cost, progress or performance of the work;
  4. Study and carefully correlate bidder's observations with the Drawings and Specifications; and
  5. Notify the Engineer in writing of any conflicts, errors or discrepancies.
- B. Before submitting a bid, the bidder may, at his own expense and assuming all risks, make any additional investigations and/or tests as the bidder may deem necessary for him to prepare his bid for performance of the work in accordance with the time, price and other terms and conditions of the Contract Documents. On request in advance, the Owner will provide each bidder access to the site to conduct such explorations and tests as each bidder deems necessary for submission of a bid. The bidder shall upon completion of such explorations fill and compact as necessary all holes, and clean and restore the site to its former condition.

- C. The Submission of a bid will constitute an incontrovertible representation by the bidder that he has complied with every requirement to bid the project and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance of the work.

## **1.6 ADDENDA**

- A. All questions concerning the meaning or intent of the Contract Documents are to be directed to the Engineer. During the bidding process, such inquiries must be made in writing. Interpretations or clarifications considered necessary by the Engineer in response to such questions will be made through the issuance of addenda to the Contract Documents. Any addenda to the Contract Documents issued during the time of bidding will be considered a part of the Contract Documents and will become a part of the Contract. Receipt of addenda shall be acknowledged by the bidder on the bid form.

## **1.7 INTERPRETATION OF ESTIMATED PROPOSAL QUANTITIES**

- A. See Section 20-05 **INTERPRETATION OF ESTIMATED PROPOSAL QUANTITIES, of the General Provisions.**

## **1.8 AWARD OF CONTRACT**

- A. The Award of the Contract will be made to the lowest responsive and responsible bidder as soon as practicable. The Owner reserves the right to reject any or all bids and to waive informalities and minor irregularities. The Owner may require the apparent low bidder to qualify himself to be a responsible bidder by furnishing financial statements, experience in completion of similar projects, the names of holders of trade licenses and similar information.
- B. The NC Department of Transportation has agreed to reimburse the Owner for portions of the project costs. The Owner will not accept or consider proposals from which any Contractor whose name, at the time of opening of bids or award, appears on the current list of ineligible contractors published by the Comptroller General of the United States under Section 5.6 (b) of the Regulations of the Secretary of Labor (29 CFR Part 5), NC Department of Transportation list of ineligible contractors nor a proposal from any firm, corporation, partnership or proprietorship in which an ineligible Contractor has a substantial interest.
- C. All contractors and subcontractors must be pre-qualified with NCDOT to perform work on the project.

## **1.9 CANCELLATION OF AWARD**

- A. The Owner reserves the right to cancel the award without liability to the bidder, except return of the bid guaranty, at any time before a contract has been fully executed by all parties and approved by the Owner.



#### **1.10 PERFORMANCE AND LABOR AND MATERIALS PAYMENT BONDS**

- A. The Contractor shall furnish Performance, Labor, and Materials Payment surety bonds in the form indicated in the Contract Documents executed by a surety company authorized to do business in the state. Each such bond shall be in an amount equal to one hundred percent (100%) of the Contract price. Separate surety bonds shall be provided for the faithful performance of the Contract, for the payment of all persons performing labor on the project, and for furnishing materials in connection therewith.

#### **1.11 BIDS TO BE RETAINED**

- A. No bid shall be withdrawn within 90 days after the scheduled time for the receipt of bids pending the execution of a Contract between the Owner and the successful bidder. Should the successful bidder default and not execute a contract, the Contract may be offered to the next lowest bidder. In this event the low bidder's bid guaranty will be kept by the Owner as liquidated damages.

**END OF SECTION**

This Page Intentionally Left Blank

**CONTRACTOR CONTRACTUAL REQUIREMENTS  
AND  
TITLE VI ASSURANCES**

THIS PAGE IS LEFT BLANK INTENTIONALLY

## CIVIL RIGHTS ACT OF 1964, TITLE VI - CONTRACTOR CONTRACTUAL 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 shall 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, shall 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 shall not participate either directly or indirectly in the discrimination prohibited by 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 shall be notified by the contractor of the contractor's obligations under this contract and the Regulations relative to nondiscrimination on the grounds of race, color, or national origin.
4. **Information and Reports.** The contractor shall provide all information and reports required by the Acts, the Regulations and directives issued pursuant thereto and shall 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 (FAA) 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 this information, the contractor shall so certify to the sponsor or the FAA, as appropriate, and shall set forth what efforts it has made to obtain the information.
5. **Sanctions for Noncompliance.** In the event of the contractor's noncompliance with the nondiscrimination provisions of this contract, the sponsor shall impose such contract sanctions as it or the FAA may determine to be appropriate, including, but not limited to:
  - a. Withholding of payments to the contractor under the contract until the contractor complies, and/or
  - b. Cancellation, termination, or suspension of the contract, in whole or in part.
6. **Incorporation of Provisions.** The contractor shall include the provisions of paragraphs 1 through 6 in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations or directives issued pursuant thereto. The contractor shall take such action with respect to any subcontract or procurement as the sponsor or the FAA may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, however, that in the event a contractor becomes involved

in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the contractor may request (the Sponsor) to enter into such litigation to protect the interests of the sponsor and, in addition, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

## **AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, SECTION 520 - GENERAL CIVIL RIGHTS PROVISIONS**

The contractor assures that it will comply with pertinent statutes, Executive orders and such rules as are promulgated to assure that no person shall, on the grounds of race, creed, color, national origin, sex, age, or disability be excluded from participating in any activity conducted with or benefiting from Federal assistance. This provision binds the Contractor and subcontractors from the bid solicitation period through the completion of the contract. This provision is in addition to that required by Title VI of the Civil Rights Act of 1964.

## **DISADVANTAGED BUSINESS ENTERPRISES**

1. **Contract Assurance.** The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of NCDOT SPIG61 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.

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

## **CERTIFICATION REGARDING LOBBYING**

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

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

Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

- (3) The undersigned shall require that the language of this certification be included in the award documents for all sub-awards at all tiers (including subcontracts, 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.

## **ACCESS TO RECORDS AND REPORTS**

The Contractor shall maintain an acceptable cost accounting system. The Contractor agrees to provide the Sponsor, 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.

## **BREACH OF CONTRACT TERMS**

For all contracts that exceed the simplified acquisition threshold, presently set at \$150,000.

Any violation or breach of terms of this contract on the part of the contractor or their 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 shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law.

## **RIGHTS TO INVENTIONS**

All rights to inventions and materials generated under this contract are subject to regulations issued by the FAA and the Sponsor of the Federal grant under which this contract is executed.

## **TRADE RESTRICTION CLAUSE**

The contractor or subcontractor, by submission of an offer and/or execution of a contract, certifies that it:

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

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

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

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

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

Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by this provision. The knowledge and information



of a contractor is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

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

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

## **TERMINATION OF CONTRACT**

1. The Sponsor may, by written notice, terminate this contract in whole or in part at any time, either for the Sponsor's convenience or because of failure to fulfill the contract obligations. Upon receipt of such notice services shall be immediately discontinued (unless the notice directs otherwise) and all materials as may have been accumulated in performing this contract, whether completed or in progress, delivered to the Sponsor.
2. If the termination is for the convenience of the Sponsor, an equitable adjustment in the contract price shall be made, but no amount shall be allowed for anticipated profit on unperformed services.
3. If the termination is due to failure to fulfill the contractor's obligations, the Sponsor may take over the work and prosecute the same to completion by contract or otherwise. In such case, the contractor shall be liable to the Sponsor for any additional cost occasioned to the Sponsor thereby.
4. If, after notice of termination for failure to fulfill contract obligations, it is determined that the contractor had not so failed, the termination shall be deemed to have been effected for the convenience of the Sponsor. In such event, adjustment in the contract price shall be made as provided in paragraph 2 of this clause.
5. The rights and remedies of the sponsor provided in this clause are in addition to any other rights and remedies provided by law or under this contract.

## **CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION**

For all contracts that exceed \$25,000, and funded under the AIP, the bidder/offeror certifies, by submission of this proposal or acceptance of this contract, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency. It further agrees by submitting this proposal that it will include this clause without modification in all lower tier transactions, solicitations, proposals, contracts, and

subcontracts. Where the bidder/offeror/contractor or any lower tier participant is unable to certify to this statement, it shall attach an explanation to this solicitation/proposal.

## **ENERGY CONSERVATION REQUIREMENTS**

The contractor agrees to comply with mandatory standards and policies relating to energy efficiency that are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act (42USC 6201 et seq).

## **VETERAN'S PREFERENCE**

In the employment of labor (except in executive, administrative, and supervisory positions), preference shall be given to Veterans of the Vietnam, Persian Gulf and Afghanistan-Iraq war era and small business concerns owned and controlled by disabled veterans as defined in Title 49 United States Code, Section 47112. However, this preference shall apply only where the individuals are available and qualified to perform the work to which the employment relates.

## **DAVIS BACON REQUIREMENTS**

### **1. Minimum Wages**

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

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

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

- (1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and
- (2) The classification is utilized in the area by the construction industry; and
- (3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 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.

General Decision Number: NC20250090 01/03/2025

Superseded General Decision Number: NC20240090

State: North Carolina

Construction Type: Highway

Counties: Brunswick, Cumberland, Currituck, Edgecombe, Franklin, Greene, Hoke, Johnston, Nash, New Hanover, Onslow, Pender, Pitt, Wake and Wayne Counties in North Carolina.

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

SUNC2014-005 11/17/2014

	Rates	Fringes
BLASTER.....	\$ 21.04	
CARPENTER.....	\$ 13.72 **	
CEMENT MASON/CONCRETE FINISHER...	\$ 14.48 **	
ELECTRICIAN		
Electrician.....	\$ 17.97	
Telecommunications Technician.....	\$ 16.79 **	.63
IRONWORKER.....	\$ 16.02 **	
LABORER		
Asphalt Raker and Spreader..	\$ 12.46 **	
Asphalt Screed/Jackman.....	\$ 14.33 **	
Carpenter Tender.....	\$ 12.88 **	
Cement Mason/Concrete Finisher Tender.....	\$ 12.54 **	
Common or General.....	\$ 10.20 **	
Guardrail/Fence Installer...	\$ 12.87 **	
Pipelayer.....	\$ 12.17 **	
Traffic Signal/Lighting Installer.....	\$ 14.89 **	
PAINTER		
Bridge.....	\$ 24.57	
POWER EQUIPMENT OPERATOR		
Asphalt Broom Tractor.....	\$ 11.85 **	
Bulldozer Fine.....	\$ 17.04 **	

Bulldozer Rough.....	\$ 14.34 **	
Concrete Grinder/Groover....	\$ 20.34	2.30
Crane Boom Trucks.....	\$ 20.54	
Crane Other.....	\$ 20.08	
Crane Rough/All Terrain.....	\$ 20.67	
Drill Operator Rock.....	\$ 14.38 **	
Drill Operator Structure....	\$ 21.14	
Excavator Fine.....	\$ 16.60 **	
Excavator Rough.....	\$ 14.00 **	
Grader/Blade Fine.....	\$ 18.47	
Grader/Blade Rough.....	\$ 14.62 **	
Loader 2 Cubic Yards or Less.....	\$ 13.76 **	
Loader Greater Than 2 Cubic Yards.....	\$ 14.14 **	
Material Transfer Vehicle (Shuttle Buggy).....	\$ 15.18 **	
Mechanic.....	\$ 17.55 **	
Milling Machine.....	\$ 15.36 **	
Off-Road Hauler/Water Tanker.....	\$ 11.36 **	
Oiler/Greaser.....	\$ 13.55 **	
Pavement Marking Equipment..	\$ 12.11 **	
Paver Asphalt.....	\$ 15.59 **	
Paver Concrete.....	\$ 18.20	
Roller Asphalt Breakdown....	\$ 12.45 **	
Roller Asphalt Finish.....	\$ 13.85 **	
Roller Other.....	\$ 11.36 **	
Scraper Finish.....	\$ 12.71 **	
Scraper Rough.....	\$ 11.35 **	
Slip Form Machine.....	\$ 16.50 **	
Tack Truck/Distributor Operator.....	\$ 14.52 **	

#### TRUCK DRIVER

GVWR of 26,000 or Less.....	\$ 11.12 **
GVWR of 26,001 Lbs or Greater.....	\$ 12.37 **

-----

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

=====

\*\* 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](mailto: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](mailto: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](mailto: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.

---

END OF GENERAL DECISION

## 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 David-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of work, all or part of the wages required by the contract, the Federal Aviation Administration may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

### 3. Payrolls and basic records.

(A)(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 which 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) The contractor shall submit weekly for each week in which any contract work is performed a copy of all 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 maintained under

paragraph (3)(i) above 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, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is

registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Bureau of Apprenticeship and Training, or a State Apprenticeship Agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

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

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

## 5. Compliance With Copeland Act Requirements.

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

6. Subcontracts.

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

7. Contract Termination: Debarment.

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

8. Compliance with Davis-Bacon and Related Act Requirements.

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

9. Disputes Concerning Labor Standards.

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

10. Certification of Eligibility.

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

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

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

**EQUAL EMPLOYMENT OPPORTUNITY - 41 CFR PART 60-1.4(b)**

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

1. The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay

or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

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

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

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

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

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

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

## **CERTIFICATION OF NONSEGREGATED FACILITIES - 41 CFR PART 60-1.8**

### **Notice to Prospective Federally Assisted Construction Contractors**

1. A Certification of Non-segregated Facilities shall be submitted prior to the award of a federally-assisted construction contract exceeding \$10,000 which is not exempt from the provisions of the Equal Opportunity Clause.

2. Contractors receiving federally-assisted construction contract awards exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity Clause will be required to provide for the forwarding of the following notice to prospective subcontractors for supplies and construction contracts where the subcontracts exceed \$10,000 and are not exempt from the provisions of the Equal Opportunity Clause. NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

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

1. A Certification of Non-segregated Facilities shall be submitted prior to the award of a subcontract exceeding \$10,000, which is not exempt from the provisions of the Equal Opportunity Clause.

2. Contractors receiving subcontract awards exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity Clause will be required to provide for the forwarding of this notice to prospective subcontractors for supplies and construction contracts where the subcontracts exceed \$10,000 and are not exempt from the provisions of the Equal Opportunity Clause. NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

#### **PROHIBITION OF SEGREGATED FACILITIES**

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

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



## **STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT SPECIFICATIONS - 41 CFR Part 60.4.3**

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

4. The contractor shall implement the specific affirmative action standards provided in paragraphs 18.7a through 18.7p of these specifications. The goals set forth in the solicitation from which this contract

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

5. Neither the provisions of any collective bargaining agreement nor the failure by a union with whom the contractor has a collective bargaining agreement to refer either minorities or women shall excuse the contractor's obligations under these specifications, Executive Order 11246 or the regulations promulgated pursuant thereto.

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

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

- a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the contractor's employees are assigned to work. The contractor, where possible, will assign two or more women to each construction project. The contractor shall specifically ensure that all foremen, superintendents, and other onsite supervisory personnel are aware of and carry out the contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.
- b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.
- c. Maintain a current file of the names, addresses, and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source, or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the contractor by the union or, if referred, not employed by the contractor, this shall be documented in the file with the reason therefore along with whatever additional actions the contractor may have taken.
- d. Provide immediate written notification to the Director when the union or unions with which the contractor has a collective bargaining agreement has not referred to the contractor a minority person or

female sent by the contractor, or when the contractor has other information that the union referral process has impeded the contractor's efforts to meet its obligations.

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

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

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

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

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

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

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

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

m. Ensure that seniority practices, job classifications, work assignments, and other personnel practices

do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the contractor's obligations under these specifications are being carried out.

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

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

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

8. Contractors are encouraged to participate in voluntary associations, which assist in fulfilling one or more of their affirmative action obligations (18.7a through 18.7p). The efforts of a contractor association, joint contractor union, contractor community, or other similar groups of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 18.7a through 18.7p of these specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the contractor. The obligation to comply, however, is the contractor's and failure of such a group to fulfill an obligation shall not be a defense for the contractor's noncompliance.

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

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

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

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

13. The contractor, in fulfilling its obligations under these specifications, shall implement specific

affirmative action steps, at least as extensive as those standards prescribed in paragraph 18.7 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 60-4.8.

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

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

## **NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION - 41 CFR PART 60-2**

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.

The goals and timetables for minority and female participation, expressed in percentage terms for the contractor's aggregate work force in each trade on all construction work in the covered area, are as follows:

### **Timetables**

Goals for minority participation in each trade  
**23.5%**

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

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

The contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its efforts to meet the goals. The hours of minority and female employment and training shall 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.

2. The contractor shall provide written notification to the Director, 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 subcontract; and the geographical area in which the subcontract is to be performed.

3. As used in this notice and in the contract resulting from this solicitation, the “covered area” is Onslow County, North Carolina.

## **CONTRACT WORKHOURS AND SAFETY STANDARDS ACT REQUIREMENTS 29 CFR PART 5**

### **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) above, the contractor and any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph 1 above, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph 1 above.

### **3. Withholding for Unpaid Wages and Liquidated Damages.**

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 any monies 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 above.

### **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 section.

## **CLEAN AIR AND WATER POLLUTION CONTROL**

Contractors and subcontractors agree:

- a. That any facility to be used in the performance of the contract or subcontract or to benefit from the contract is not listed on the Environmental Protection Agency (EPA) List of Violating Facilities;
- b. To comply with all the requirements of Section 114 of the Clean Air Act, as amended, 42 U.S.C. 1857 et seq. and Section 308 of the Federal Water Pollution Control Act, as amended, 33 U.S.C. 1251 et seq. relating to inspection, monitoring, entry, reports, and information, as well as all other requirements specified in Section 114 and Section 308 of the Acts, respectively, and all other regulations and guidelines issued thereunder;
- c. That, as a condition for the award of this contract, the contractor or subcontractor will notify the awarding official of the receipt of any communication from the EPA indicating that a facility to be used for the performance of or benefit from the contract is under consideration to be listed on the EPA List of Violating Facilities;
- d. To include or cause to be included in any construction contract or subcontract which exceeds \$150,000 the aforementioned criteria and requirements.

## **OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970**

(Reference 20 CFR part 1910)

All contracts and subcontracts that result from this solicitation incorporate the following provisions by reference, with the same force and effect as if given in full text. The contractor has full responsibility to monitor compliance to the referenced statute or regulation. The contractor 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.

<b>Requirement</b>	<b>Federal Agency with Enforcement Responsibilities</b>
Occupational Safety and Health Act of 1970 (20 CFR Part 1910)	U.S. Department of Labor – Occupational Safety and Health Administration

## **TEXTING WHEN DRIVING**

(References: Executive Order 13513, and DOT Order 3902.10)

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), FAA 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 sub-grant.

### **COPELAND “ANTI-KICKBACK” ACT**

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

### **FEDERAL FAIR LABOR STANDARDS ACT (MINIMUM WAGE)**

All contracts and subcontracts that result from this solicitation incorporate by reference the provisions of 29 CFR part 201, the Federal Fair Labor Standards Act (FLSA), with the same force and effect as if given in full text. The FLSA sets minimum wage, overtime pay, recordkeeping, and child labor standards for full and part-time workers. The Contractor has full responsibility to monitor compliance to the referenced statute or regulation. The Contractor must address any claims or disputes that arise from this requirement directly with the U.S. Department of Labor – Wage and Hour Division.

### **PROCUREMENT OF RECOVERED MATERIALS**

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

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

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



- b) the contract performance schedule;
- c) Fails to meet reasonable contract performance requirements; or
- c) Is only available at an unreasonable price.

## **DISADVANTAGED BUSINESS ENTERPRISE:**

(10-16-07)(Rev. 1-16-24)

102-15(J)

SP1 G61

### **Description**

The purpose of this Special Provision is to carry out the U.S. Department of Transportation's policy of ensuring nondiscrimination in the award and administration of contracts financed in whole or in part with Federal funds. This provision is guided by 49 CFR Part 26.

### **Definitions**

*Additional DBE Subcontractors* - Any DBE submitted at the time of bid that will not be used to meet the DBE goal. No submittal of a Letter of Intent is required.

*Committed DBE Subcontractor* - Any DBE submitted at the time of bid that is being used to meet the DBE goal by submission of a Letter of Intent. Or any DBE used as a replacement for a previously committed DBE firm.

*Contract Goal Requirement* - The approved DBE participation at time of award, but not greater than the advertised contract goal.

*DBE Goal* - A portion of the total contract, expressed as a percentage, that is to be performed by committed DBE subcontractor(s).

*Disadvantaged Business Enterprise (DBE)* - A firm certified as a Disadvantaged Business Enterprise through the North Carolina Unified Certification Program.

*Goal Confirmation Letter* - Written documentation from the Department to the bidder confirming the Contractor's approved, committed DBE participation along with a listing of the committed DBE firms.

*Manufacturer* - A firm that operates or maintains a factory or establishment that produces on the premises, the materials or supplies obtained by the Contractor.

*Regular Dealer* - A firm that owns, operates, or maintains a store, warehouse, or other establishment in which the materials or supplies required for the performance of the contract are bought, kept in stock, and regularly sold to the public in the usual course of business. A regular dealer engages in, as its principal business and in its own name, the purchase and sale or lease of the products in question. A regular dealer in such bulk items as steel, cement, gravel, stone, and petroleum products need not keep such products in stock, if it owns and operates distribution equipment for the products. Brokers and packagers are not regarded as manufacturers or regular dealers within the meaning of this section.

*Replacement / Substitution* – A full or partial reduction in the amount of work subcontracted to a committed (or an approved substitute) DBE firm.

*North Carolina Unified Certification Program (NCUCP)* - A program that provides comprehensive services and information to applicants for DBE certification, such that an applicant is required to apply only once for a DBE certification that will be honored by all recipients of USDOT funds in the state and not limited to the Department of Transportation only. The Certification Program is in accordance with 49 CFR Part 26.

United States Department of Transportation (USDOT) - Federal agency responsible for issuing regulations (49 CFR Part 26) and official guidance for the DBE program.

### **Forms and Websites Referenced in this Provision**

*DBE Payment Tracking System* - On-line system in which the Contractor enters the payments made to DBE subcontractors who have performed work on the project.  
<https://apps.dot.state.nc.us/Vendor/PaymentTracking/>

*DBE-IS Subcontractor Payment Information* - Form for reporting the payments made to all DBE firms working on the project. This form is for paper bid projects only.  
<https://connect.ncdot.gov/business/Turnpike/Documents/Form%20DBE-IS%20Subcontractor%20Payment%20Information.pdf>

*RF-1 DBE Replacement Request Form* - Form for replacing a committed DBE.  
<https://connect.ncdot.gov/projects/construction/Construction%20Forms/DBE%20MBE%20WBE%20Replacement%20Form%20and%20Instructions.pdf>

*SAF Subcontract Approval Form* - Form required for approval to sublet the contract.  
<https://connect.ncdot.gov/projects/construction/Construction%20Forms/SAF%20Form%20-%20Subcontract%20Approval%20Form%20Revised%2004-19.xlsm>

*JC-1 Joint Check Notification Form* - Form and procedures for joint check notification. The form acts as a written joint check agreement among the parties providing full and prompt disclosure of the expected use of joint checks.  
<http://connect.ncdot.gov/projects/construction/Construction%20Forms/Joint%20Check%20Notification%20Form.pdf>

*Letter of Intent* - Form signed by the Contractor and the DBE subcontractor, manufacturer or regular dealer that affirms that a portion of said contract is going to be performed by the signed DBE for the estimated amount (based on quantities and unit prices) listed at the time of bid.  
<http://connect.ncdot.gov/letting/LetCentral/Letter%20of%20Intent%20to%20Perform%20as%20a%20Subcontractor.pdf>

*Listing of DBE Subcontractors Form* - Form for entering DBE subcontractors on a project that will meet this DBE goal. This form is for paper bids only.  
[http://connect.ncdot.gov/municipalities/Bid%20Proposals%20for%20LGA%20Content/08%20DBE%20Subcontractors%20\(Federal\).docx](http://connect.ncdot.gov/municipalities/Bid%20Proposals%20for%20LGA%20Content/08%20DBE%20Subcontractors%20(Federal).docx)

*Subcontractor Quote Comparison Sheet* - Spreadsheet for showing all subcontractor quotes in the work areas where DBEs quoted on the project. This sheet is submitted with good faith effort packages.  
<http://connect.ncdot.gov/business/SmallBusiness/Documents/DBE%20Subcontractor%20Quote%20Comparison%20Example.xls>

## **DBE Goal**

The following DBE goal for participation by Disadvantaged Business Enterprises is established for this contract:

### **Disadvantaged Business Enterprises 6.9 %**

- (A) *If the DBE goal is more than zero*, the Contractor shall exercise all necessary and reasonable steps to ensure that DBEs participate in at least the percent of the contract as set forth above as the DBE goal.
- (B) *If the DBE goal is zero*, the Contractor shall make an effort to recruit and use DBEs during the performance of the contract. Any DBE participation obtained shall be reported to the Department.

### **Directory of Transportation Firms (Directory)**

Real-time information is available about firms doing business with the Department and firms that are certified through NCUCP in the Directory of Transportation Firms. Only firms identified in the Directory as DBE certified shall be used to meet the DBE goal. The Directory can be found at the following link. <https://www.ebs.nc.gov/VendorDirectory/default.html>

The listing of an individual firm in the directory shall not be construed as an endorsement of the firm's capability to perform certain work.

### **Listing of DBE Subcontractors**

At the time of bid, bidders shall submit all DBE participation that they anticipate using during the life of the contract. Only those identified to meet the DBE goal will be considered committed, even though the listing shall include both committed DBE subcontractors and additional DBE subcontractors. Additional DBE subcontractor participation submitted at the time of bid will be used toward the Department's overall race-neutral goal. Only those firms with current DBE certification at the time of bid opening will be acceptable for listing in the bidder's submittal of DBE participation. The Contractor shall indicate the following required information:

#### **(A) Electronic Bids**

Bidders shall submit a listing of DBE participation in the appropriate section of the electronic submittal file.

- (1) Submit the names and addresses of DBE firms identified to participate in the contract. If the bidder uses the updated listing of DBE firms shown in the electronic submittal file, the bidder may use the dropdown menu to access the name and address of the DBE firm.
- (2) Submit the contract line numbers of work to be performed by each DBE firm. When no figures or firms are entered, the bidder will be considered to have no DBE participation.

- (3) The bidder shall be responsible for ensuring that the DBE is certified at the time of bid by checking the Directory of Transportation Firms. If the firm is not certified at the time of the bid-letting, that DBE's participation will not count towards achieving the DBE goal.
- (B) Paper Bids
- (1) *If the DBE goal is more than zero,*
    - (a) Bidders, at the time the bid proposal is submitted, shall submit a listing of DBE participation, including the names and addresses on *Listing of DBE Subcontractors* contained elsewhere in the contract documents in order for the bid to be considered responsive. Bidders shall indicate the total dollar value of the DBE participation for the contract.
    - (b) If bidders have no DBE participation, they shall indicate this on the *Listing of DBE Subcontractors* by entering the word "None" or the number "0." This form shall be completed in its entirety. **Blank forms will not be deemed to represent zero participation.** Bids submitted that do not have DBE participation indicated on the appropriate form will not be read publicly during the opening of bids. The Department will not consider these bids for award and the proposal will be rejected.
    - (c) The bidder shall be responsible for ensuring that the DBE is certified at the time of bid by checking the Directory of Transportation Firms. If the firm is not certified at the time of the bid-letting, that DBE's participation will not count towards achieving the corresponding goal.
  - (2) *If the DBE goal is zero,* entries on the *Listing of DBE Subcontractors* are not required for the zero goal, however any DBE participation that is achieved during the project shall be reported in accordance with requirements contained elsewhere in the special provision.

### **DBE Prime Contractor**

When a certified DBE firm bids on a contract that contains a DBE goal, the DBE firm is responsible for meeting the goal or making good faith efforts to meet the goal, just like any other bidder. In most cases, a DBE bidder on a contract will meet the DBE goal by virtue of the work it performs on the contract with its own forces. However, all the work that is performed by the DBE bidder and any other DBE subcontractors will count toward the DBE goal. The DBE bidder shall list itself along with any DBE subcontractors, if any, in order to receive credit toward the DBE goal.

For example, if the DBE goal is 45% and the DBE bidder will only perform 40% of the contract work, the prime will list itself at 40%, and the additional 5% shall be obtained through additional DBE participation with DBE subcontractors or documented through a good faith effort.

DBE prime contractors shall also follow Sections A and B listed under *Listing of DBE Subcontractor* just as a non-DBE bidder would.

## **Written Documentation – Letter of Intent**

The bidder shall submit written documentation for each DBE that will be used to meet the DBE goal of the contract, indicating the bidder's commitment to use the DBE in the contract. This documentation shall be submitted on the Department's form titled *Letter of Intent*.

The documentation shall be received in the office of the State Contractor Utilization Engineer or at DBE@ncdot.gov no later than 10:00 a.m. of the sixth calendar day following opening of bids, unless the sixth day falls on an official state holiday. In that situation, it is due in the office of the State Contractor Utilization Engineer no later than 10:00 a.m. on the next official state business day.

If the bidder fails to submit the Letter of Intent from each committed DBE to be used toward the DBE goal, or if the form is incomplete (i.e. both signatures are not present), the DBE participation will not count toward meeting the DBE goal. If the lack of this participation drops the commitment below the DBE goal, the Contractor shall submit evidence of good faith efforts, completed in its entirety, to the State Contractor Utilization Engineer or DBE@ncdot.gov no later than 10:00 a.m. on the eighth calendar day following opening of bids, unless the eighth day falls on an official state holiday. In that situation, it is due in the office of the State Contractor Utilization Engineer no later than 10:00 a.m. on the next official state business day.

## **Submission of Good Faith Effort**

If the bidder fails to meet or exceed the DBE goal, the apparent lowest responsive bidder shall submit to the Department documentation of adequate good faith efforts made to reach the DBE goal.

A hard copy and an electronic copy of this information shall be received in the office of the State Contractor Utilization Engineer or at DBE@ncdot.gov no later than 10:00 a.m. on the sixth calendar day following opening of bids unless the sixth day falls on an official state holiday. In that situation, it is due in the office of the State Contractor Utilization Engineer no later than 10:00 a.m. on the next official state business day. If the contractor cannot send the information electronically, then one complete set and 5 copies of this information shall be received under the same time constraints above.

Note: Where the information submitted includes repetitious solicitation letters, it will be acceptable to submit a representative letter along with a distribution list of the firms that were solicited. Documentation of DBE quotations shall be a part of the good faith effort submittal. This documentation may include written subcontractor quotations, telephone log notations of verbal quotations, or other types of quotation documentation.

## **Consideration of Good Faith Effort for Projects with DBE Goals More Than Zero**

Adequate good faith efforts mean that the bidder took all necessary and reasonable steps to achieve the goal which, by their scope, intensity, and appropriateness, could reasonably be expected to obtain sufficient DBE participation. Adequate good faith efforts also mean that the bidder actively and aggressively sought DBE participation. Mere *pro forma* efforts are not considered good faith efforts.

The Department will consider the quality, quantity, and intensity of the different kinds of efforts a bidder has made. Listed below are examples of the types of actions a bidder will take in making a good faith effort to meet the goal and are not intended to be exclusive or exhaustive, nor is it intended to be a mandatory checklist.

- (A) Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising, written notices, use of verifiable electronic means through the use of the NCDOT Directory of Transportation Firms) the interest of all certified DBEs who have the capability to perform the work of the contract. The bidder must solicit this interest within at least 10 days prior to bid opening to allow the DBEs to respond to the solicitation. Solicitation shall provide the opportunity to DBEs within the Division and surrounding Divisions where the project is located. The bidder must determine with certainty if the DBEs are interested by taking appropriate steps to follow up initial solicitations.
- (B) Selecting portions of the work to be performed by DBEs in order to increase the likelihood that the DBE goals will be achieved.
  - (1) Where appropriate, break out contract work items into economically feasible units to facilitate DBE participation, even when the prime contractor might otherwise prefer to perform these work items with its own forces.
  - (2) Negotiate with subcontractors to assume part of the responsibility to meet the contract DBE goal when the work to be sublet includes potential for DBE participation (2<sup>nd</sup> and 3<sup>rd</sup> tier subcontractors).
- (C) Providing interested DBEs with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.
- (D)
  - (1) Negotiating in good faith with interested DBEs. It is the bidder's responsibility to make a portion of the work available to DBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available DBE subcontractors and suppliers, to facilitate DBE participation. Evidence of such negotiation includes the names, addresses, and telephone numbers of DBEs that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for DBEs to perform the work.
  - (2) A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including DBE subcontractors, and would take a firm's price and capabilities as well as contract goals into consideration. However, the fact that there may be some additional costs involved in finding and using DBEs is not in itself sufficient reason for a bidder's failure to meet the contract DBE goal, as long as such costs are reasonable. Also, the ability or desire of a prime contractor to perform the work of a contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts. Bidding contractors are not, however, required to accept higher quotes from DBEs if the price difference is excessive or unreasonable.

- (E) Not rejecting DBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities. The bidder's standing within its industry, membership in specific groups, organizations, or associates and political or social affiliations (for example, union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids in the bidder's efforts to meet the project goal.
- (F) Making efforts to assist interested DBEs in obtaining bonding, lines of credit, or insurance as required by the recipient or bidder.
- (G) Making efforts to assist interested DBEs in obtaining necessary equipment, supplies, materials, or related assistance or services.
- (H) Effectively using the services of available minority/women community organizations; minority/women contractors' groups; Federal, State, and local minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of DBEs. Contact within 7 days from the bid opening the Business Opportunity and Work Force Development Unit at BOWD@ncdot.gov to give notification of the bidder's inability to get DBE quotes.
- (I) Any other evidence that the bidder submits which shows that the bidder has made reasonable good faith efforts to meet the DBE goal.

In addition, the Department may take into account the following:

- (1) Whether the bidder's documentation reflects a clear and realistic plan for achieving the DBE goal.
- (2) The bidders' past performance in meeting the DBE goals.
- (3) The performance of other bidders in meeting the DBE goal. For example, when the apparent successful bidder fails to meet the DBE goal, but others meet it, you may reasonably raise the question of whether, with additional reasonable efforts the apparent successful bidder could have met the goal. If the apparent successful bidder fails to meet the DBE goal, but meets or exceeds the average DBE participation obtained by other bidders, the Department may view this, in conjunction with other factors, as evidence of the apparent successful bidder having made a good faith effort.

If the Department does not award the contract to the apparent lowest responsive bidder, the Department reserves the right to award the contract to the next lowest responsive bidder that can satisfy to the Department that the DBE goal can be met or that an adequate good faith effort has been made to meet the DBE goal.

### **Non-Good Faith Appeal**

The State Prequalification Engineer will notify the contractor verbally and in writing of non-good faith. A contractor may appeal a determination of non-good faith made by the Goal Compliance Committee. If a contractor wishes to appeal the determination made by the Committee, they shall provide written notification



to the State Prequalification Engineer or at DBE@ncdot.gov. The appeal shall be made within 2 business days of notification of the determination of non-good faith.

### **Counting DBE Participation Toward Meeting DBE Goal**

(A) Participation

The total dollar value of the participation by a committed DBE will be counted toward the contract goal requirement. The total dollar value of participation by a committed DBE will be based upon the value of work actually performed by the DBE and the actual payments to DBE firms by the Contractor.

(B) Joint Checks

Prior notification of joint check use shall be required when counting DBE participation for services or purchases that involves the use of a joint check. Notification shall be through submission of Form JC-1 (*Joint Check Notification Form*) and the use of joint checks shall be in accordance with the Department's Joint Check Procedures.

(C) Subcontracts (Non-Trucking)

A DBE may enter into subcontracts. Work that a DBE subcontracts to another DBE firm may be counted toward the contract goal requirement. Work that a DBE subcontracts to a non-DBE firm does not count toward the contract goal requirement. If a DBE contractor or subcontractor subcontracts a significantly greater portion of the work of the contract than would be expected on the basis of standard industry practices, it shall be presumed that the DBE is not performing a commercially useful function. The DBE may present evidence to rebut this presumption to the Department. The Department's decision on the rebuttal of this presumption is subject to review by the Federal Highway Administration but is not administratively appealable to USDOT.

(D) Joint Venture

When a DBE performs as a participant in a joint venture, the Contractor may count toward its contract goal requirement a portion of the total value of participation with the DBE in the joint venture, that portion of the total dollar value being a distinct clearly defined portion of work that the DBE performs with its forces.

(E) Suppliers

A contractor may count toward its DBE requirement 60 percent of its expenditures for materials and supplies required to complete the contract and obtained from a DBE regular dealer and 100 percent of such expenditures from a DBE manufacturer.

(F) Manufacturers and Regular Dealers

A contractor may count toward its DBE requirement the following expenditures to DBE firms that are not manufacturers or regular dealers:

- (1) The fees or commissions charged by a DBE firm for providing a *bona fide* service, such as professional, technical, consultant, or managerial services, or for providing bonds or insurance specifically required for the performance of a DOT-assisted contract, provided the fees or commissions are determined to be reasonable and not excessive as compared with fees and commissions customarily allowed for similar services.
- (2) With respect to materials or supplies purchased from a DBE, which is neither a manufacturer nor a regular dealer, count the entire amount of fees or commissions charged for assistance in the procurement of the materials and supplies, or fees or transportation charges for the delivery of materials or supplies required on a job site (but not the cost of the materials and supplies themselves), provided the fees are determined to be reasonable and not excessive as compared with fees customarily allowed for similar services.

**Commercially Useful Function**

(A) DBE Utilization

The Contractor may count toward its contract goal requirement only expenditures to DBEs that perform a commercially useful function in the work of a contract. A DBE performs a commercially useful function when it is responsible for execution of the work of the contract and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. To perform a commercially useful function, the DBE shall also be responsible with respect to materials and supplies used on the contract, for negotiating price, determining quality and quantity, ordering the material and installing (where applicable) and paying for the material itself. To determine whether a DBE is performing a commercially useful function, the Department will evaluate the amount of work subcontracted, industry practices, whether the amount the firm is to be paid under the contract is commensurate with the work it is actually performing and the DBE credit claimed for its performance of the work, and any other relevant factors.

(B) DBE Utilization in Trucking

The following factors will be used to determine if a DBE trucking firm is performing a commercially useful function:

- (1) The DBE shall be responsible for the management and supervision of the entire trucking operation for which it is responsible on a particular contract, and there shall not be a contrived arrangement for the purpose of meeting DBE goals.
- (2) The DBE shall itself own and operate at least one fully licensed, insured, and operational truck used on the contract.

- (3) The DBE receives credit for the total value of the transportation services it provides on the contract using trucks it owns, insures, and operates using drivers it employs.
- (4) The DBE may subcontract the work to another DBE firm, including an owner-operator who is certified as a DBE. The DBE who subcontracts work to another DBE receives credit for the total value of the transportation services the subcontracted DBE provides on the contract.
- (5) The DBE may also subcontract the work to a non-DBE firm, including from an owner-operator. The DBE who subcontracts the work to a non-DBE is entitled to credit for the total value of transportation services provided by the non-DBE subcontractor not to exceed the value of transportation services provided by DBE-owned trucks on the contract. Additional participation by non-DBE subcontractors receives credit only for the fee or commission it receives as a result of the subcontract arrangement. The value of services performed under subcontract agreements between the DBE and the Contractor will not count towards the DBE contract requirement.
- (6) A DBE may lease truck(s) from an established equipment leasing business open to the general public. The lease must indicate that the DBE has exclusive use of and control over the truck. This requirement does not preclude the leased truck from working for others during the term of the lease with the consent of the DBE, so long as the lease gives the DBE absolute priority for use of the leased truck. This type of lease may count toward the DBE's credit as long as the driver is under the DBE's payroll.
- (7) Subcontracted/leased trucks shall display clearly on the dashboard the name of the DBE that they are subcontracted/leased to and their own company name if it is not identified on the truck itself. Magnetic door signs are not permitted.

### **DBE Replacement**

When a Contractor has relied on a commitment to a DBE subcontractor (or an approved substitute DBE subcontractor) to meet all or part of a contract goal requirement, the contractor shall not terminate the DBE subcontractor for convenience. This includes, but is not limited to, instances in which the Contractor seeks to perform the work of the terminated subcontractor with another DBE subcontractor, a non-DBE subcontractor, or with the Contractor's own forces or those of an affiliate.

The Contractor must give notice in writing both by certified mail and email to the DBE subcontractor, with a copy to the Engineer of its intent to request to terminate and/or substitute, and the reason for the request. The Contractor must give the DBE subcontractor five (5) business days to respond to the Contractor's Notice of Intent to Request Termination and/or Substitution. If the DBE subcontractor objects to the intended termination/substitution, the DBE, within five (5) business days must advise the Contractor and the Department of the reasons why the action should not be approved. The five-day notice period shall begin on the next business day after written notice is provided to the DBE subcontractor.

A committed DBE subcontractor may only be terminated after receiving the Department's written approval based upon a finding of good cause for the proposed termination and/or substitution. For purposes of this section, good cause shall include the following circumstances:

- (a) The listed DBE subcontractor fails or refuses to execute a written contract;
- (b) The listed DBE subcontractor fails or refuses to perform the work of its subcontract in a way consistent with normal industry standards. Provided, however, that good cause does not exist if the failure or refusal of the DBE subcontractor to perform its work on the subcontract results from the bad faith or discriminatory action of the prime contractor;
- (c) The listed DBE subcontractor fails or refuses to meet the prime contractor's reasonable, nondiscriminatory bond requirements;
- (d) The listed DBE subcontractor becomes bankrupt, insolvent, or exhibits credit unworthiness;
- (e) The listed DBE subcontractor is ineligible to work on public works projects because of suspension and debarment proceedings pursuant to 2 CFR Parts 180, 215 and 1,200 or applicable state law;
- (f) The listed DBE subcontractor is not a responsible contractor;
- (g) The listed DBE voluntarily withdraws from the project and provides written notice of withdrawal;
- (h) The listed DBE is ineligible to receive DBE credit for the type of work required;
- (i) A DBE owner dies or becomes disabled with the result that the listed DBE contractor is unable to complete its work on the contract;
- (j) Other documented good cause that compels the termination of the DBE subcontractor. Provided, that good cause does not exist if the prime contractor seeks to terminate a DBE it relied upon to obtain the contract so that the prime contractor can self-perform the work for which the DBE contractor was engaged or so that the prime contractor can substitute another DBE or non-DBE contractor after contract award.

The Contractor shall comply with the following for replacement of a committed DBE:

(A) Performance Related Replacement

When a committed DBE is terminated for good cause as stated above, an additional DBE that was submitted at the time of bid may be used to fulfill the DBE commitment. A good faith effort will only be required for removing a committed DBE if there were no additional DBEs submitted at the time of bid to cover the same amount of work as the DBE that was terminated.

If a replacement DBE is not found that can perform at least the same amount of work as the terminated DBE, the Contractor shall submit a good faith effort documenting the steps taken. Such documentation shall include, but not be limited to, the following:

- (1) Copies of written notification to DBEs that their interest is solicited in contracting the work defaulted by the previous DBE or in subcontracting other items of work in the contract.
- (2) Efforts to negotiate with DBEs for specific subbids including, at a minimum:
  - (a) The names, addresses, and telephone numbers of DBEs who were contacted.
  - (b) A description of the information provided to DBEs regarding the plans and specifications for portions of the work to be performed.
- (3) A list of reasons why DBE quotes were not accepted.

- (4) Efforts made to assist the DBEs contacted, if needed, in obtaining bonding or insurance required by the Contractor.

(B) Decertification Replacement

- (1) When a committed DBE is decertified by the Department after the SAF (*Subcontract Approval Form*) has been received by the Department, the Department will not require the Contractor to solicit replacement DBE participation equal to the remaining work to be performed by the decertified firm. The participation equal to the remaining work performed by the decertified firm will count toward the contract goal requirement.
- (2) When a committed DBE is decertified prior to the Department receiving the SAF (*Subcontract Approval Form*) for the named DBE firm, the Contractor shall take all necessary and reasonable steps to replace the DBE subcontractor with another DBE subcontractor to perform at least the same amount of work to meet the DBE goal requirement. If a DBE firm is not found to do the same amount of work, a good faith effort must be submitted to NCDOT (see A herein for required documentation).
- (3) Exception: If the DBE's ineligibility is caused solely by its having exceeded the size standard during the performance of the contract, the Department will not require the Contractor to solicit replacement DBE participation equal to the remaining work to be performed by the decertified firm. The participation equal to the remaining work performed by the decertified firm will count toward the contract goal requirement and overall goal.

All requests for replacement of a committed DBE firm shall be submitted to the Engineer for approval on Form RF-1 (*DBE Replacement Request*). If the Contractor fails to follow this procedure, the Contractor may be disqualified from further bidding for a period of up to 6 months.

### **Changes in the Work**

When the Engineer makes changes that result in the reduction or elimination of work to be performed by a committed DBE, the Contractor will not be required to seek additional participation. When the Engineer makes changes that result in additional work to be performed by a DBE based upon the Contractor's commitment, the DBE shall participate in additional work to the same extent as the DBE participated in the original contract work.

When the Engineer makes changes that result in extra work, which has more than a minimal impact on the contract amount, the Contractor shall seek additional participation by DBEs unless otherwise approved by the Engineer.

When the Engineer makes changes that result in an alteration of plans or details of construction, and a portion or all of the work had been expected to be performed by a committed DBE, the Contractor shall seek participation by DBEs unless otherwise approved by the Engineer.

When the Contractor requests changes in the work that result in the reduction or elimination of work that the Contractor committed to be performed by a DBE, the Contractor shall seek additional participation by DBEs equal to the reduced DBE participation caused by the changes.

## **Reports and Documentation**

A SAF (*Subcontract Approval Form*) shall be submitted for all work which is to be performed by a DBE subcontractor. The Department reserves the right to require copies of actual subcontract agreements involving DBE subcontractors.

When using transportation services to meet the contract commitment, the Contractor shall submit a proposed trucking plan in addition to the SAF. The plan shall be submitted prior to beginning construction on the project. The plan shall include the names of all trucking firms proposed for use, their certification type(s), the number of trucks owned by the firm, as well as the individual truck identification numbers, and the line item(s) being performed.

Within 30 calendar days of entering into an agreement with a DBE for materials, supplies or services, not otherwise documented by the SAF as specified above, the Contractor shall furnish the Engineer a copy of the agreement. The documentation shall also indicate the percentage (60% or 100%) of expenditures claimed for DBE credit.

## **Reporting Disadvantaged Business Enterprise Participation**

The Contractor shall provide the Engineer with an accounting of payments made to all DBE firms, including material suppliers and contractors at all levels (prime, subcontractor, or second tier subcontractor). This accounting shall be furnished to the Engineer for any given month by the end of the following month. Failure to submit this information accordingly may result in the following action:

- (A) Withholding of money due in the next partial pay estimate; or
- (B) Removal of an approved contractor from the prequalified bidders' list or the removal of other entities from the approved subcontractors list.

While each contractor (prime, subcontractor, 2nd tier subcontractor) is responsible for accurate accounting of payments to DBEs, it shall be the prime contractor's responsibility to report all monthly and final payment information in the correct reporting manner.

Failure on the part of the Contractor to submit the required information in the time frame specified may result in the disqualification of that contractor and any affiliate companies from further bidding until the required information is submitted.

Failure on the part of any subcontractor to submit the required information in the time frame specified may result in the disqualification of that contractor and any affiliate companies from being approved for work on future DOT projects until the required information is submitted.

Contractors reporting transportation services provided by non-DBE lessees shall evaluate the value of services provided during the month of the reporting period only.

At any time, the Engineer can request written verification of subcontractor payments.

The Contractor shall report the accounting of payments through the Department's DBE Payment Tracking System.

**Failure to Meet Contract Requirements**

Failure to meet contract requirements in accordance with Subarticle 102-15(J) of the *Standard Specifications* may be cause to disqualify the Contractor.

This Page Intentionally Left Blank



## **BID FORMS**

Date: \_\_\_\_\_

TO:     Albert J. Ellis Airport  
          Mitch Sprunger, Airport Director  
          Airport Terminal Building  
          264 Albert Ellis Airport Road  
          Richlands, NC 28574

The undersigned, as bidder, hereby declares that the only person or persons interested in this bid as principal or principals is or are named herein and that no person other than those herein mentioned, has any interest in the bid or in the contract to be entered into; that this bid is made without connection with any other person, company or parties making a bid; and that it is in all respects fair and in good faith without collusion or fraud.

The bidder further declares that he has examined the site of the work and informed himself fully in regard to all conditions pertaining to the place where the work is to be done, that he has examined the specifications for the work and contract documents relative thereto, and has read all special provisions furnished prior to the opening of bids; that he has satisfied himself relative to the work performed. In case of conflict between words and figures, the words will govern.

The bidder proposes and agrees that if this bid is accepted, to contract with the Onslow County in the form of contract specified, to furnish all necessary transportation and labor necessary to perform all construction in full and complete agreement with the plans and specifications and contract documents to the full and entire satisfaction of Onslow County as computed from the schedule of unit prices hereinafter shown. The quantities of work shown by unit prices are approximations only and the contract price will be based on the actual quantities included in the work.

The bidder agrees not to withdraw his bid within 90 days after the scheduled closing time for receipt of bids.

A bidder shall be considered disqualified for any of the following reasons, among others:

(a) Submitting more than one bid 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.

The Owner reserves that right to reject any or all bids or sections thereof or to accept such bids or sections thereof, as it appears in its judgment to be in the best interest of the Owner.

Bidders are hereby notified that all bids may be rejected if the lowest responsible bid(s) received exceeds the Engineer's estimate by more than 7% and it is determined that an award of the contract would cause excessive inflationary impact. Nothing in this paragraph shall limit in any manner the Owner's right to reject any and all bids if it appears in its judgment to be its best interest to do so. The bidder agrees, if awarded the contract to commence work on the commencement date stated in the Notice to Proceed or within ten (10) days after such specified commencement date. The bidder further agrees that in the case or failure on his part to execute said contract and the bonds required within ten (10) consecutive calendar days after written notice is given of

B-1

Albert J. Ellis Airport  
South GA Expansion  
Bid No. 101-25C  
WK Dickson Project No. 20240074.00.WK

the award of the contract, the bid bond accompanying this bid shall be paid into the hands of the Owner, as liquidated damages for such failure; otherwise, the bid bond accompanying this bid shall be returned to the undersigned.

Bidders are hereby notified that all bids may be rejected if the lowest responsible bid(s) received exceeds the Engineer's estimate by more than 7% and it is determined that an award of the contract would cause excessive inflationary impact. Nothing in this paragraph shall limit in any manner the Owner's right to reject any and all bids if it appears in its judgment to be its best interest to do so.

**Respectfully submitted,**

Signature of Bidder:

a. If an Individual doing business as: \_\_\_\_\_

b. If a Partnership: \_\_\_\_\_  
(Member of Firm)

c. If a Corporation: \_\_\_\_\_  
(Name of Corporation)

\_\_\_\_\_  
(Officer)

\_\_\_\_\_  
(Title)

ATTEST: \_\_\_\_\_  
(Witness)

Date: \_\_\_\_\_

Current Contractor's North Carolina Registration Number: \_\_\_\_\_

Business Address: \_\_\_\_\_  
\_\_\_\_\_

## **ADDENDA ACKNOWLEDGE**

Receipt of the following Addenda is hereby acknowledged:

Addendum No.

Addendum Date

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

This Page Intentionally Left Blank

**Albert J. Ellis Airport (OAJ)  
South GA Expansion  
Schedule of Work**

Item No. & Spec.	Description and Unit Price in Words	Quantity	Unit	Unit Price	Extended Total
<b>Base Bid</b>					
1 C-105	Mobilization @ (write in words)	1	LS		
2 C-100	Contractor Quality Control Program (CQCP) @ (write in words)	1	LS		
3 C-102-1	Temporary Diversion Ditch @ (write in words)	725	LF		
4 C-102-2	Temporary Silt Fence @ (write in words)	3,310	LF		
5 C-102-3	Temporary Silt Fence Outlet @ (write in words)	3	EA		
6 C-102-4	Temporary Sediment Basin @ (write in words)	2	EA		
7 C-102-5	Temporary Seeding and Mulching @ (write in words)	7	AC		
8 C-102-6	Temporary Construction Entrance @ (write in words)	2	EA		
9 C-102-7	Erosion Control Matting @ (write in words)	700	SY		
10 C-102-8	Riprap Apron (Class B) @ (write in words)	275	SY		
11 C-102-9	Temporary Concrete Wash Out @ (write in words)	1	EA		

This Page Intentionally Left Blank

**Albert J. Ellis Airport (OAJ)  
South GA Expansion  
Schedule of Work**

Item No. & Spec.	Description and Unit Price in Words	Quantity	Unit	Unit Price	Extended Total
12 C-102-10	Temporary Fiber Check Dams @ (write in words) _____ _____	13	EA	_____	_____
13 C-102-11	Temporary Inlet Protection @ (write in words) _____ _____	28	EA	_____	_____
14 C-102-12	Sediment Basin Removal (Includes restoring grades and ground cover, etc.) @ (write in words) _____ _____	2	EA	_____	_____
15 C-102-13	Temporary Riprap Inlet Protection @ (write in words) _____ _____	4	EA	_____	_____
16 P-101-1	Remove Existing Gate @ (write in words) _____ _____	1	EA	_____	_____
17 P-101-2	Full Depth Gravel Road Removal @ (write in words) _____ _____	2,125	SY	_____	_____
18 P-101-3	Full Depth Asphalt Road Removal @ (write in words) _____ _____	56	SY	_____	_____
19 P-101-4	Rip Rap Removal and Replacement @ (write in words) _____ _____	125	SY	_____	_____
20 P-101-5	Milling 2" Depth @ (write in words) _____ _____	380	SY	_____	_____
21 P-101-6	Remove 12" RCP @ (write in words) _____ _____	34	LF	_____	_____
22 P-101-7	Remove 18" RCP @ (write in words) _____ _____	25	LF	_____	_____

This Page Intentionally Left Blank



**Albert J. Ellis Airport (OAJ)  
South GA Expansion  
Schedule of Work**

Item No. & Spec.	Description and Unit Price in Words	Quantity	Unit	Unit Price	Extended Total
23 P-101-8	Remove 36" RCP @ (write in words)	26	LF		
24 P-101-9	Remove Dual 36" Headwall @ (write in words)	1	EA		
25 P-152-1	Subgrade Preparation @ (write in words)	14,200	SY		
26 P-152-2	Borrow Excavation (Offsite) @ (write in words)	32,900	CY		
27 P-152-3	Embankment in Place @ (write in words)	500	CY		
28 P-152-4	Unsuitable Excavation @ (write in words)	7,280	CY		
29 P-209-1	Woven Separation Geotextile Fabric @ (write in words)	10,920	SY		
30 P-209-2	Crushed Aggregate Base Course (CABC) @ (write in words)	3,650	CY		
31 P-209-3	Aggregate Base Course (Road) @ (write in words)	660	CY		
32 P-401-1	Hot Mix Asphalt (HMA) Pavements Surface Course @ (write in words)	5,460	TON		
33 P-603-1	Bituminous Tack Coat @ (write in words)	960	GAL		

This Page Intentionally Left Blank

**Albert J. Ellis Airport (OAJ)  
South GA Expansion  
Schedule of Work**

Item No. & Spec.	Description and Unit Price in Words	Quantity	Unit	Unit Price	Extended Total
34 P-610	Concrete Sidewalk @ (write in words)	275	SY		
35 P-620	Pavement Markings, Permanent, Yellow, Relfective @ (write in words)	1,550	SF		
36 F-162-1	Electric Gate and Operator (24' Opening) @ (write in words)	1	LS		
37 F-162-2	Gate Access Control System @ (write in words)	1	LS		
38 D-701-1	15" RCP Class III @ (write in words)	46	LF		
39 D-701-2	18" RCP Class III @ (write in words)	694	LF		
40 D-701-3	18" RCP Class IV @ (write in words)	226	LF		
41 D-701-4	24" RCP Class IV @ (write in words)	1,100	LF		
42 D-701-5	30" RCP Class III @ (write in words)	510	LF		
43 D-701-6	30" RCP Class IV @ (write in words)	750	LF		
44 D-701-7	36" RCP Class III @ (write in words)	65	LF		

This Page Intentionally Left Blank

**Albert J. Ellis Airport (OAJ)  
South GA Expansion  
Schedule of Work**

Item No. & Spec.	Description and Unit Price in Words	Quantity	Unit	Unit Price	Extended Total
45 D-701-8	48" RCP Class IV @ (write in words) _____ _____	107	LF	_____	_____
46 D-701-9	54" RCP Class III @ (write in words) _____ _____	24	LF	_____	_____
47 D-751-1	Pre-Cast Concrete Drop Inlet (Aircraft rated) @ (write in words) _____ _____	22	EA	_____	_____
48 D-751-2	48" Concrete Endwall @ (write in words) _____ _____	1	EA	_____	_____
49 D-751-3	54" Concrete Endwall @ (write in words) _____ _____	1	EA	_____	_____
50 D-751-4	15" RCP Flared End Section (FES) @ (write in words) _____ _____	2	EA	_____	_____
51 D-751-5	18" RCP Flared End Section (FES) @ (write in words) _____ _____	2	EA	_____	_____
52 D-751-6	24" RCP Flared End Section (FES) @ (write in words) _____ _____	1	EA	_____	_____
53 D-751-7	30" RCP Flared End Section (FES) @ (write in words) _____ _____	2	EA	_____	_____
54 D-751-8	Pre-Cast Concrete Drop Inlet (Roadway) @ (write in words) _____ _____	4	EA	_____	_____
55 D-751-9	Pre-cast Concrete 6' x 12' Junction Box @ (write in words) _____ _____	1	EA	_____	_____

This Page Intentionally Left Blank

**Albert J. Ellis Airport (OAJ)  
South GA Expansion  
Schedule of Work**

Item No. & Spec.	Description and Unit Price in Words	Quantity	Unit	Unit Price	Extended Total
56 D-751-10	Pre-cast Sewer Manhole (Aircraft Rated) @ (write in words)  	3	EA		
57 T-901-1	Permanent Seeding (Mulched) @ (write in words)  	7	AC		
58 T-905-1	Topsoil (Obtained Onsite) @ (write in words)  	3,870	CY		
59 T-905-2	Topsoil (Disposed Offsite) @ (write in words)  	6,020	CY		
60 L-104-1	Miscellaneous Temporary Airfield Lighting @ (write in words)  	1	LS		
61 L-105-1	Demolish Existing Fixture/Base Can in Turf @ (write in words)  	12	EA		
62 L-105-2	Miscellaneous Electrical Demolition @ (write in words)  	1	LS		
63 L-108-1	No. 8 AWG, 5 kV, L-824, Type C Cable @ (write in words)  	3,800	LF		
64 L-108-2	No. 6 AWG, Solid, Bare Counterpoise Wire, Installed in Trench, Above the Duct Bank or Conduit, Including Ground Rods and Ground Connectors @ (write in words)  	3,200	LF		
65 L-108-3	3/4" x 10' Copper Clad Ground Rod - Supplemental @ (write in words)  	45	EA		
66 L-110-1	1 Way 2-inch Schedule 40 PVC Conduit - Direct Earth Buried @ (write in words)  	2,800	LF		

This Page Intentionally Left Blank



**Albert J. Ellis Airport (OAJ)  
South GA Expansion  
Schedule of Work**

Item No. & Spec.	Description and Unit Price in Words	Quantity	Unit	Unit Price	Extended Total
67 L-110-2	2 Way 2-inch Schedule 40 PVC Conduit - Concrete Encased @ (write in words) _____ _____	200	LF	_____	_____
68 L-115-1	Electrical Junction Can Plaza – 2 L-867D Base Cans @ (write in words) _____ _____	2	EA	_____	_____
69 L-125-1	L-861T(L) LED Elevated Taxiway Edge Light - Installed in Turf @ (write in words) _____ _____	33	EA	_____	_____
70 L-125-2	L-858 LED Sign, 3-Module @ (write in words) _____ _____	4	EA	_____	_____
71 L-125-3	Airport Lighting Control System Modifications @ (write in words) _____ _____	1	LS	_____	_____
72 L-125-4	Spare Parts @ (write in words) _____ _____	1	LS	_____	_____
73 01 31 22-1	8 Unit T-Hangar Building with Jet Pod @ (write in words) _____ _____	2	LS	_____	_____
74 32 12 16-1	NCDOT Asphalt Surface Course, Type S 9.5C @ (write in words) _____ _____	350	TON	_____	_____
75 32 17 23-1	Pavement Marking @ (write in words) _____ _____	370	SF	_____	_____
76 32 17 23-2	Pavement Symbols @ (write in words) _____ _____	4	EA	_____	_____
77 33 05 61-1	Connection to Existing Sanitary Sewer @ (write in words) _____ _____	1	EA	_____	_____

This Page Intentionally Left Blank

**Albert J. Ellis Airport (OAJ)  
South GA Expansion  
Schedule of Work**

Item No. & Spec.	Description and Unit Price in Words	Quantity	Unit	Unit Price	Extended Total
78 33 05 61-2	Sanitary Sewer Manhole @ (write in words) _____ _____	5	EA	_____	_____
79 33 05 61-3	Sanitary Sewer Cleanout @ (write in words) _____ _____	4	EA	_____	_____
80 33 11 00-1	2" PVC Water Line @ (write in words) _____ _____	318	LF	_____	_____
81 33 11 00-2	4" DIP Water Line @ (write in words) _____ _____	67	LF	_____	_____
82 33 11 00-3	6" DIP Water Line @ (write in words) _____ _____	20	LF	_____	_____
83 33 11 00-4	8" DIP Water Line @ (write in words) _____ _____	840	LF	_____	_____
84 33 11 00-5	Fire Hydrant Assembly @ (write in words) _____ _____	3	EA	_____	_____
85 33 11 00-6	2" Water Meter & Backflow Preventor @ (write in words) _____ _____	1	EA	_____	_____
86 33 11 00-7	4" Gate Valve @ (write in words) _____ _____	2	EA	_____	_____
87 33 11 00-8	6" Gate Valve @ (write in words) _____ _____	3	EA	_____	_____
88 33 11 00-9	8" Gate Valve @ (write in words) _____ _____	3	EA	_____	_____

This Page Intentionally Left Blank

**Albert J. Ellis Airport (OAJ)  
South GA Expansion  
Schedule of Work**

Item No. & Spec.	Description and Unit Price in Words	Quantity	Unit	Unit Price	Extended Total
89 33 31 00-1	4" PVC Sanitary Sewer Line @ (write in words) _____ _____	40	LF	_____	_____
90 33 31 00-2	6" PVC Sanitary Sewer Line @ (write in words) _____ _____	80	LF	_____	_____
91 33 31 00-3	8" PVC Sanitary Sewer Line @ (write in words) _____ _____	960	LF	_____	_____
92 Plans	36" Concrete Pipe Collar @ (write in words) _____ _____	1	EA	_____	_____
93 Plans	Bollards @ (write in words) _____ _____	4	EA	_____	_____
94 Plans	Parking Lot Signage (Furnish & Install) @ (write in words) _____ _____	4	EA	_____	_____
95 Plans	Concrete Wheel Stop @ (write in words) _____ _____	36	EA	_____	_____
96 Plans	Shade Trees @ (write in words) _____ _____	3	EA	_____	_____
97 Plans	Ornamental Trees @ (write in words) _____ _____	17	EA	_____	_____
98 Plans	Ornamental Shrubs @ (write in words) _____ _____	8	EA	_____	_____
99 Plans	Electrical Equipment Connection (per Hangar) @ (write in words) _____ _____	2	LS	_____	_____

This Page Intentionally Left Blank

**Albert J. Ellis Airport (OAJ)  
South GA Expansion  
Schedule of Work**

Item No. & Spec.	Description and Unit Price in Words	Quantity	Unit	Unit Price	Extended Total
100 Plans	2" Schedule 40 PVC Communications Conduit @ (write in words) _____ _____	250	LF	_____	_____
101 Allowance	Security System Improvements (Allowance) @ (write in words) _____ _____	1	Allow	\$40,000.00	\$40,000.00
102 Allowance	Electrical Service Coordination (Allowance) @ (write in words) _____ _____	1	Allow	\$50,000.00	\$50,000.00
<b>BASE BID - TOTAL =</b>					_____

**Additive Bid No. 1**

1 Plans	Hangar Floor Drain @ (write in words) _____ _____	2	EA	_____	_____
2 Plans	Oil/Water Separator, Complete @ (write in words) _____ _____	1	LS	_____	_____
3 33 31 00-2	6" PVC Sanitary Sewer Line @ (write in words) _____ _____	554	LF	_____	_____
4 33 05 61-3	Sanitary Sewer Cleanout @ (write in words) _____ _____	3	EA	_____	_____
<b>ADDITIVE BID NO. 1 - TOTAL =</b>					_____

**TOTAL BASE BID + ADDITIVE BID NO. 1 =** \_\_\_\_\_

This Page Intentionally Left Blank



**Albert J. Ellis Airport (OAJ)  
South GA Expansion  
Schedule of Work**

Item No. & Spec.	Description and Unit Price in Words	Quantity	Unit	Unit Price	Extended Total
<b>Additive Bid No. 2</b>					
1 Plans	Roof Downspout Connections @ (write in words) _____ _____	12	EA	_____	_____
2 Plans	Drainage Cleanout @ (write in words) _____ _____	15	EA	_____	_____
3 Plans	HDPE Header Pipe @ (write in words) _____ _____	968	LF	_____	_____
4 Plans	Drainage Structure Connections @ (write in words) _____ _____	6	EA	_____	_____
<b>ADDITIVE BID NO. 2 - TOTAL =</b>					_____
<b>TOTAL BASE BID + ADDITIVE BID NO. 2 =</b>					_____
<b>TOTAL BASE BID + ADDITIVE BID NO. 1 + ADDITIVE BID NO. 2 =</b>					_____

For a bid to be considered responsive, the bidder shall provide bid prices for all bid items and the alternate items.

Contract Time:	270 Consecutive Calendar Days
Liquidated Damages (Total Project Duration):	\$2,000.00 per Calendar day overrun
Liquidated Damages (Phase 1B Taxiway Closure):	\$2,000.00 per Calendar day overrun

Contract award will be based on the Base Bid amount of the lowest responsive and responsible bidder.

Required DBE Goal: 6.9 %  
DBE Percentage used by Bidder: \_\_\_\_\_ %

This Page Intentionally Left Blank

**Bid Bond**

Date of Bond: \_\_\_\_\_, 202\_\_\_\_\_

Name and address of  
Principal (Bidder) \_\_\_\_\_

Name and address of  
Surety: \_\_\_\_\_

Name and address of  
Obligee (Owner)      Onslow County  
                                 234 NW Corridor Blvd.  
                                 Jacksonville, North Carolina 28540

Amount of Bond: \_\_\_\_\_

Project                      OAJ - South GA Expansion

KNOW ALL MEN BY THESE PRESENTS, that we, the Principal above named and the Surety above named, which is duly licensed under the laws of North Carolina to execute bid bonds, are held and firmly bound unto the Obligee above named in the penal sum of five percent (5%) of the amount bid in the bid above described in lawful money of the United States of America for the payment of which, well and truly to be made, we bind ourselves, our heirs, executors, administrators, assigns and successors, jointly and severally, firmly by these presents.

NOW THEREFORE, THE CONDITION OF THIS OBLIGATION is such, that if the Principal shall be awarded the contract for which the bid above described is submitted and shall execute the contract, give bond for the faithful performance of the contract, and give bond for the payment to all persons supplying labor and material in the prosecution of the work provided for in said contract, within ten (10) days after the award of the same to the Principal, then this obligation shall be null and void; but if the Principal fails to so execute such contract and give the performance bond and the payment bond as required by Section 129 of Chapter 44A of the North Carolina General Statutes, as amended, the Surety shall, upon demand, forthwith pay to the Obligee the amount of this bond set forth above.

Regardless of any statement to the contrary, the terms and provisions of this bond shall not be altered, amended or limited by any attachment, rider or condition.

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

Principal (Name of individual, individual and trade  
Name, partnership, joint venture, or corporation)

WITNESS:

By: \_\_\_\_\_ (SEAL)

(If a proprietorship, partnership  
or joint venture)

Title: \_\_\_\_\_  
(Owner, partner, joint venture, or  
Office held in corporation)

ATTEST: (If a corporation)

By: \_\_\_\_\_

(Corporate Seal of Principal)

Title: \_\_\_\_\_  
(Corporate Secretary or  
Assistant Secretary only)

Surety (Name of Surety)

WITNESS:

By: \_\_\_\_\_  
Attorney in Fact

\_\_\_\_\_  
(Type or Print Name of Attorney in Fact)

(Corporate Seal of Surety)

\_\_\_\_\_  
\_\_\_\_\_  
(Address of Attorney in Fact)

**EQUAL EMPLOYMENT OPPORTUNITY (EEO) REPORT STATEMENT**

(41 CFR Part 60-1.7)

The Bidder shall complete the following statement by checking the appropriate boxes. Failure to complete these blanks may be grounds for rejection of bid.

1. The Bidder (Proposer) has\_\_\_has not\_\_\_developed and has on file at each establishment affirmative action programs pursuant to 41 CFR 60-1.40 and 41 CFR 60-2.
2. The Bidder (Proposer) has\_\_\_has not\_\_\_participated in any previous contract or subcontract subject to the equal opportunity clause prescribed by Executive Order 11246, as amended.
3. The Bidder (Proposer) has\_\_\_has not\_\_\_filed with the Joint Reporting Committee the annual compliance report on Standard Form 100 (EEO-1 Report).
4. The Bidder (Proposer) does\_\_\_does not\_\_\_employ fifty (50) or more employees.

Name of Bidder:\_\_\_\_\_

By:\_\_\_\_\_

Title:\_\_\_\_\_

Date:\_\_\_\_\_

**DISADVANTAGED BUSINESS ENTERPRISE (DBE)**

Policy. The requirements of NCDOT SPIG61, apply to this contract. It is the policy of the Onslow County to practice nondiscrimination based on race, color, sex, or national origin in the award or performance of this contract. All firms qualifying under this solicitation are encouraged to submit bids/proposals. Award of this contract will be conditioned upon satisfying the requirements of this bid specification. These requirements apply to all bidders/offers, including those who qualify as a DBE. A DBE contract goal of 6.9% percent has been established for this contract. The bidder/offeror shall make good faith efforts, as defined in the Instruction to Bidders section of the specifications and Appendix A, SPIG61, to meet the contract goal by utilizing DBEs in the performance of this contract.

DBE Obligation. The contractor agrees to ensure that disadvantaged business enterprises as defined in NCDOT SPIG61 have the maximum opportunity to participate in the performance of contracts and subcontracts financed in whole or in part with federal funds provided under this agreement. In this regard, all contractors shall take all necessary and reasonable steps in accordance with 49 CFR Part 26 to ensure that disadvantaged business enterprises have the maximum opportunity to compete for and perform contracts. Contractors shall not discriminate on the basis of race, color, national origin, or sex in the performance of this subsequent subcontracts.

DBE Participation. The Bidder shall provide the following information for disadvantaged subcontractors whom it proposes to engage in carrying out and completing the work called for by this proposal. No change shall be made in any of the disadvantaged subcontractors proposed to be engaged by the bidder, should it be the successful bidder, following the opening of this proposal without the prior written consent and approval of the Onslow County.

Disadvantaged Business Enterprise Utilization. The undersigned has satisfied the requirements of the specifications in the following manner (please check the appropriate space):

**TOTAL BID:**

\_\_\_\_\_ The Bidder is committed to a minimum of **6.9%** DBE utilization on this project.

\_\_\_\_\_ The Bidder (if unable to meet the goal of \_\_\_\_ is committed to a minimum of \_\_\_\_ DBE utilization on this project and has submitted documentation showing good faith effort as listed in the section entitled "Contractor's Required Submission" in the Instruction to Bidders.

Contractor: \_\_\_\_\_

By: \_\_\_\_\_  
Signature Title

Address: \_\_\_\_\_

Zip Code: \_\_\_\_\_ Phone Number: \_\_\_\_\_

Contract Number C \_\_\_\_\_  
 \_\_\_\_\_ County (ies)

LISTING OF DBE SUBCONTRACTORS				Sheet _____ of _____	
FIRM NAME AND ADDRESS	DBE	ITEM NO.	ITEM DESCRIPTION	* AGREED UPON UNIT PRICE	** DOLLAR VOLUME OF ITEM

\* The Dollar Volume shown in this column shall be the Actual Price Agreed Upon by the Prime Contractor and the DBE subcontractor, and these prices will be used to determine the percentage of the DBE participation in the contract.

\*\* Dollar Volume of DBE Subcontractor

\$ \_\_\_\_\_

Percentage of Total Contract Bid Price

\_\_\_\_\_ %

\*\* Must have entry even if figure to be entered is zero.

**This form must be completed in order for the Bid to be considered responsive and be publicly read.  
 Bidders with no DBE participation must so indicate this on the form by entering the word or number *zero*.**

This Page Intentionally Left Blank





STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

LETTER OF INTENT TO PERFORM AS A SUBCONTRACTOR

CONTRACT:

NAME OF BIDDER:

The undersigned intends to perform work in connection with the above contract upon execution of the bid and subsequent award of contract by the Board of Transportation as:

Name of MBE/WBE/DBE Subcontractor \_\_\_\_\_ Address \_\_\_\_\_  
\_\_\_\_\_  
City \_\_\_\_\_  
State \_\_\_\_\_ Zip \_\_\_\_\_

Please check all that apply: Minority Business Enterprise (MBE) \_\_\_\_\_

Women Business Enterprise (WBE) \_\_\_\_\_

Disadvantaged Business Enterprise (DBE) \_\_\_\_\_

The MBE /WBE /DBE status of the above named subcontractor is certified by the North Carolina Department of Transportation. The above named subcontractor is prepared to perform the described work listed on the attached MBE/WBE/DBE Commitment Items sheet, in connection with the above contract upon execution of the bid and subsequent award of contract by the Board of Transportation. The above named subcontractor is prepared to perform the described work at the estimated Commitment Total for Subcontractor Price identified on the MBE/WBE/DBE Commitment Items sheet and amount indicated below.

Commitment Total based on estimated Unit Prices and Quantities on the "attached" MBE/WBE/DBE Commitment Items sheet. Amount \$

The above named bidder and subcontractor mutually accepts the Commitment Total estimated for the Unit Prices and Quantities. This commitment total is based on estimated quantities only and most likely will vary up or down as the project is completed. Final compensation will be based on actual quantities of work performed and accepted during the pursuance of work. The above listed amount represents the entire dollar amount quoted based on these estimated quantities. No conversations, verbal agreements, and/or other forms of non-written representations shall serve to add, delete, or modify the terms as stated.

This document shall not serve in any manner as an actual subcontract between the two parties. A separate subcontractor agreement will describe in detail the contractual obligations of the bidder and the MBE/WBE/DBE subcontractor.

Affirmation

The above named MBE/ WBE/ DBE subcontractor affirms that it will perform the portion(s) of the contract for the estimated dollar value as stated above.

\_\_\_\_\_  
Name of MBE/ WBE/ DBE Subcontractor

\_\_\_\_\_  
Name of Bidder

\_\_\_\_\_  
Signature / Title

\_\_\_\_\_  
Signature / Title

\_\_\_\_\_  
Date

\_\_\_\_\_  
Date



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

## AV-509/AV-510 DBE/MBE/WBE/HUB VENDOR COMMITMENTS/AWARDS/PAYMENTS

**CONTRACTOR PAY REQUEST #:**

**FINAL**

Instructions: Select the Final button if this is the last payment for this project. If any percentages are not 100%, then also submit an AV-514.  
The % column includes total payment, including the current payment to meet the goal.

[illegible]

DATE SIGNED:

DATE SIGNED:

Notes:

### **CERTIFICATE OF PROMPT PAYMENT**

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 received from the Owner. The prime contractor agrees further to return retainage payments to each subcontractor within seven (7) days after the subcontractor's work is satisfactorily completed. Any delay or postponement of payment from the above-referenced time frame may occur only for good cause following written approval of the Owner. This clause applies to both DBE and non-DBE subcontractors.

Name of Bidder: \_\_\_\_\_

By: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

## **CERTIFICATION**

The undersigned hereby certifies to the Onslow County:

## **TRADE RESTRICTION CERTIFICATION**

The contractor or subcontractor, by submission of an offer and/or execution of a contract, certifies that it:

- a. 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 published by the Office of the United States Trade Representative (USTR);
- b. 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 on said list, or is owned or controlled directly or indirectly by one or more citizens or nationals of a foreign country on said list;
- c. has not procured any product nor subcontracted for the supply of any product for use on the project that is produced in a foreign country on said list.

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 a contractor or subcontractor who is unable to certify to the above. If the contractor knowingly procures or subcontracts for the supply of any product or service of a foreign country on said list for use on the project, the Federal Aviation Administration may direct through the Sponsor cancellation of the contract at no cost to the Government.

Further, the contractor agrees that, if awarded a contract resulting from this solicitation, it will incorporate this provision for certification without modification in each contract and in all lower tier subcontracts. The contractor may rely on the certification of a prospective subcontractor unless it has knowledge that the certification is erroneous.

The contractor shall provide immediate written notice to the sponsor if the contractor learns that its certification or that of a subcontractor was erroneous when submitted or has become erroneous by reason of changed circumstances. The subcontractor agrees to provide written notice to the contractor if at any time it learns that its certification was erroneous by reason of changed circumstances.

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

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.

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, United States Code, Section 1001.

## BUY AMERICAN CERTIFICATION

The contractor agrees to comply with 49 USC § 50101, which provides that Federal funds may not be obligated unless all steel and manufactured goods used in AIP-funded projects are produced in the United States, unless the FAA has issued a waiver for the product; the product is listed as an Excepted Article, Material Or Supply in Federal Acquisition Regulation subpart 25.108; or is included in the FAA Nationwide Buy American Waivers Issued list.

A bidder or offeror must submit the appropriate Buy America certification (below) with all bids or offers on AIP funded projects. Bids or offers that are not accompanied by a completed Buy America certification must be rejected as nonresponsive.

### **Certificate of Buy American Compliance for Total Facility** (Buildings such as Terminal, SRE, ARFF, etc.)

As a matter of bid responsiveness, the bidder or offeror must complete, sign, date, and submit this certification statement with their proposal. The bidder or offeror must indicate how they intend to comply with 49 USC § 50101 by selecting one 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 by:
- Only installing steel and manufactured products produced in the United States; or
  - Installing manufactured products for which the FAA has issued a waiver as indicated by inclusion on the current FAA Nationwide Buy American Waivers Issued listing; or
  - 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:
- To provide to the Owner evidence that documents the source and origin of the steel and manufactured product.
  - To faithfully comply with providing US domestic products
  - To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.
- ☐ The bidder or offeror hereby certifies it cannot comply with the 100% Buy American Preferences of 49 USC § 50101(a) but may qualify for either a Type 3 or Type 4 waiver under 49 USC § 50101(b). By selecting this certification statement, the apparent bidder or offeror with the apparent low bid agrees:
- To submit to the Owner within 15 calendar days of the bid opening, a formal waiver request and required documentation that support the type of waiver being requested.
  - That failure to submit the required documentation within the specified timeframe is cause for a non-responsive determination may result in rejection of the proposal.

3. To faithfully comply with providing US domestic products at or above the approved US domestic content percentage as approved by the FAA.
4. To furnish US domestic product for any waiver request that the FAA rejects.
5. To refrain from seeking a waiver request after establishment of the contract, unless extenuating circumstances emerge that the FAA determines justified.

**Required Documentation**

**Type 3 Waiver** - The cost of components and subcomponents produced in the United States is more that 60% of the cost of all components and subcomponents of the “facility”. The required documentation for a type 3 waiver is:

- a) Listing of all manufactured products that are not comprised of 100% US domestic content (Excludes products listed on the FAA Nationwide Buy American Waivers Issued listing and products excluded by Federal Acquisition Regulation Subpart 25.108; products of unknown origin must be considered as non-domestic products in their entirety)
- b) Cost of non-domestic components and subcomponents, excluding labor costs associated with final assembly and installation at project location.
- c) 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** – Total cost of project using US domestic source product exceeds the total project cost using non-domestic product by 25%. The required documentation for a type 4 of waiver is:

- a) Detailed cost information for total project using US domestic product
- b) Detailed cost information for total project using non-domestic product

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

---

Date

---

Signature

---

Company Name

---

Title

## **CERTIFICATION OF NONSEGREGATED FACILITIES**

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

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

## **CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION**

The bidder/offeror certifies, by submission of this proposal or acceptance of this contract, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency. It further agrees by submitting this proposal that it will include this clause without modification in all lower tier transactions, solicitations, proposals, contracts, and subcontracts. Where the bidder/offeror/contractor or any lower tier participant is unable to certify to this statement, it shall attach an explanation to this solicitation/proposal.

Name of Bidder: \_\_\_\_\_

By: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_



**AFFIDAVIT OF NON-COLLUSION**

STATE OF \_\_\_\_\_  
COUNTY \_\_\_\_\_

Personally appeared before me \_\_\_\_\_ being  
duly sworn says that he is a member of the firm of \_\_\_\_\_  
and further says that his firm, association, or cooperation has not, either directly or indirectly, entered any  
agreement, participated in any collusion, or otherwise taken any action in resistant of for competitive  
bidding in connection with the submission of a bid on the above-named project.

Further, \_\_\_\_\_ swears and affirms that all legal  
formalities required for the proper execution of affidavits pursuant to the laws of his state have been  
complied with an further agrees on behalf of himself, his firm association, or corporation, that in any  
subsequent prosecution of perjury of him, his firm association, or corporation, it shall note a defense to  
such charge perjury that said formalities were not in fact complied with.

\_\_\_\_\_  
Typed Name and Title

\_\_\_\_\_  
Legal Signature

SWORN to me before this \_\_\_\_\_ day of \_\_\_\_\_, 202\_\_.

\_\_\_\_\_

Notary Public for \_\_\_\_\_

## Bidders List

All firms bidding or quoting on subcontracts for this DOT-assisted project are listed below.

[illegible]

E-VERIFY AFFIDAVIT OF AGREEMENT FOR NORTH CAROLINA

STATE OF \_\_\_\_\_

COUNTY OF \_\_\_\_\_

Before me, the undersigned authority, personally appeared \_\_\_\_\_ (Affiant) who, being by me first duly sworn, doth depose and say as follows:

I, in my capacity as \_\_\_\_\_ (Title) of \_\_\_\_\_ (Business Entity or Employer), having lawful authority to act in its behalf and personal knowledge of the facts set out herein, do attest to the following:

During the term or performance of any contract with Onslow County, North Carolina

1. ☐ The Business Entity or Employer will not knowingly employ, hire for employment, or continue to employ any unauthorized alien. The Business Entity or Employer is enrolled in E-Verify. The Business Entity or Employer will participate in E-Verify to verify the employment status of new hires, as well as any subcontractors' compliance with E-Verify;

\*\*\*\*\* [OR] \*\*\*\*\*

2. ☐ The Business Entity has 25 or fewer employees and do not intend to hire 26 employees or more for the purpose of supplying goods or services. Per NC House Bill 786/S.L. 2013-418, vendors with 25 or fewer employees are exempt from acquiring an E-Verify account and are required to supply a copy of their driver license if they have not registered and do not have an E-Verify User Identification Number. Should the Business Entity or Employer acquire more than 26 employees, the Business Entity or Employer will acquire an E-Verify account.

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature of Affiant

I, the undersigned Notary Public in and for \_\_\_\_\_ hereby certify that \_\_\_\_\_ whose name as \_\_\_\_\_ (Title) of \_\_\_\_\_ (Business Entity or Employer) and first being duly sworn the foregoing Affidavit and who is known to me, acknowledged before me on this day that, being informed of the contents of the said Affidavit he/she, as such officer or agent and with full authority, executed the same voluntarily as and for the act of the Business Entity or Employer.

Given under my hand and seal this \_\_\_\_\_ day of \_\_\_\_\_, 202\_\_\_\_\_.

(affix seal)

\_\_\_\_\_  
Notary Public

Print Name: \_\_\_\_\_

My Commission Expires: \_\_\_\_\_

(Attach to Bid)

**AFFIDAVIT OF COMPLIANCE WITH IRAN DIVESTMENT ACT**  
**(In Accordance with N.C.G.S. 143C-6A-1 to 6A-9 effective February 26, 2016)**

Vendor or Service Provider: \_\_\_\_\_  
\_\_\_\_\_

IRAN DIVESTMENT ACT CERTIFICATION  
REQUIRED BY N.C.G.S. 143C-6A-5(a)

---

As of the date listed below, the entity listed above is not listed on the Final Divestment List or the Iran Parent & Subsidiary List created by the State Treasurer pursuant to N.C.G.S. 143-6A-4. Entity also certifies that they will not engage subcontractors or vendors that are on either list. These lists can be found by going to [www.nctreasurer.com/Iran](http://www.nctreasurer.com/Iran)

The undersigned hereby certifies that he or she is authorized by the entity listed above to make the foregoing statement.

\_\_\_\_\_

\_\_\_\_\_  
Signature Date

\_\_\_\_\_  
Printed Name Title

The Iran Divestment Act's requirements applicable to Local Government Units\*\* will become effective on February 26, 2016, at the time the State Treasurer publishes the first list of prohibited companies and individuals (a "Final Divestment List") under the Act.

### **Final Divestment List**

The Department of State Treasurer develops the Final Divestment List using data from a research vendor, U.S. federal sanctions lists, and other credible information available to the public. It consists of any individual or company, including parent entities and majority owned subsidiaries, that:

- Provided goods or services of \$20,000,000 or more within any 12-month period in the energy sector of Iran during the preceding five years;
- Extended \$20,000,000 or more in credit, under certain circumstances, to another individual or company that will use the credit to provide goods or services in the energy sector in Iran. (G.S. 143C-6A-3(4).)

The Department of State Treasurer will update the Final Divestment List at least every 180 days. The list will be published on the State Treasurer's website at [www.nctreasurer.com/Iran](http://www.nctreasurer.com/Iran) and periodically circulated to Local Government Units.

### **Requirement 1: Contract Certification**

For new procurements and new, renewed, or assigned contracts on or after February 26, 2016, each Local Government Unit must obtain a simple certification from each bidder or vendor. The bidder or vendor must affirm that it is not listed on the State Treasurer's Final Divestment List found at [www.nctreasurer.com/Iran](http://www.nctreasurer.com/Iran) as of the date of signature. The certification is due at the time a bid is submitted or the time a contract is entered into, renewed, or assigned. (G.S. 143C-6A- 5(a).)

We have attached on the preceding page a short form that can be used for this certification, but Local Government Units are free to instead use their own form or put the required certification in the text of a contract or purchase order. Each Local Government Unit shall maintain its own records demonstrating these certifications.

### **Requirement 2: Restriction on Contracting**

Individuals or companies on the Final Divestment List are ineligible to contract or subcontract with Local Government Units. (G.S. 143C-6A-6(a).) Any existing contracts with these Iran-linked persons will be allowed to expire in accordance with the contract's terms. (G.S. 143C-6A-6(c).)

Contracts valued at less than \$1,000.00 are exempt from this restriction. (G.S. 143C-6A-7(a).) In addition, a Local Government Unit may contract with a listed individual or company if it makes a good-faith determination that (1) the commodities or services are necessary to perform its functions and (2) that, absent such an exemption, it would be unable to obtain those commodities or services. (G.S. 143C-6A-7(c).) Local Government Units shall enter such exemptions into the procurement record.

The Department of State Treasurer anticipates distributing the first Final Divestment List on February 26, 2016. Once the List has been distributed, all Local Government Units should meet the contract certification requirements.

If you have questions about the Department of State Treasurer's Iran Divestment Policy, please contact Sharon Edmundson at [Sharon.Edmundson@nctreasurer.com](mailto:Sharon.Edmundson@nctreasurer.com) or 919-814-4289.

## CERTIFICATION OF OFFERER/BIDDER REGARDING TAX DELINQUENCY AND FELONY CONVICTIONS

The Bidder must complete the following two certification statements. The Bidder 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 Bidder 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 Bidder 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 Bidder represents that it is ( ) is not ( ) is not a corporation that was convicted of a criminal violation under any Federal law within the preceding 24 months.

### Note

If an Bidder responds in the affirmative to either of the above representations, the Bidder 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 Bidder therefore must provide information to the owner about its tax liability or conviction to the Owner, who will then notify the required considerations before award decisions are made.

### Term Definitions

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

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

Name of Bidder: \_\_\_\_\_

By: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

## CONTRACT

THIS CONTRACT, made and entered into this \_\_\_\_ day of \_\_\_\_\_, 2025, by and between Onslow County, North Carolina hereinafter called the Owner and \_\_\_\_\_ hereinafter called the Contractor.

WITNESSETH: That the Contractor, for the consideration hereinafter fully set out, and the Owner, for the construction of work performed, agree that:

1. Scope of Work: The Contractor shall furnish and deliver all the materials and perform all the work in the manner and form as provided in the following enumerated plans, specifications and contract documents which are attached hereto and made a part thereof as if fully contained herein: South GA Expansion.

### SPECIFICATIONS AND CONTRACT DOCUMENTS:

- (a) Notice to Bidders
- (b) Instructions to Bidders
- (c) Proposal (as Accepted)
- (d) Performance Bond and Labor and Materials Payment Bond
- (e) General Provisions
- (f) Special Provisions
- (g) Technical Specifications
- [(h) Addendum No. 1 dated \_\_\_\_\_]
- [(i) Addendum No. 2 dated \_\_\_\_\_]
- (j) Drawings prepared by W.K. Dickson & Co., LLC, 720 Corporate Center Drive, Raleigh, NC 27607

Contract Amount \$ \_\_\_\_\_

Contract Time: 270 Calendar Days

Liquidated Damages for Contract Time Overrun: \$2,000 Per Calendar Day

2. The Contractor shall commence the work to be performed under this contract not later than the date set by the Engineer in written notice to proceed, said date to be not less than ten (10) days after issuance of notice to proceed.

3. The Owner hereby agrees to pay to the Contractor for the faithful performance of this contract, subject to additions and deductions as provided in the specifications or proposal, in lawful money of the United States, such unit/or lump sum prices as are set forth in the accepted Proposal for quantities of each item actually accomplished. The Contractor shall repair or replace all defective work promptly and at no cost, charge or expense to the Owner. The warranty and guaranty, as provided for in this paragraph, are in addition to and not in limitation of any other bond, warranty or guaranty provided to the Owner by the Contractor or by a manufacturer, supplier or otherwise, or any other cause of action, right or remedy.

4. The Owner shall make partial payments to the Contractor on the basis of a duly certified and approved estimate of work performed during the preceding calendar month by the Contractor, less the specified retainage. All work must be performed strictly in accordance with this Contract and all work is subject to acceptance by the Owner.

5. Upon submission by the Contractor of evidence satisfactory to the Owner that all payrolls, materials, bills and other cost incurred by the Contractor in connection with the construction of the work have been paid in full, final payment on account of this Contract shall be made within thirty (30) days after the completion by the Contractor of all work covered by this Contract and the acceptance of such work by the Owner.

6. If at any time after the execution of this Contract and the bonds hereto attached; the Owner shall deem the surety or sureties upon such bond or bonds to be unsatisfactory, or if for any reason any such bond ceases to be adequate to cover the performance of the work or the payment for labor or materials, the Contractor shall, at his expense and within five (5) days after the receipt of notice from the Owner to do so, furnish an 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 further payment to the Contractor shall be deemed to be due under this Contract until such new or additional bonds shall have been furnished in a manner and form satisfactory to the Owner.

7. In respect to each phase of the work and for one (1) year from and after the date on which such phase is accepted for use by the Owner, or for such longer period as may be provided for in any written warranty or guaranty, the Contractor warrants and guarantees the work (including but not limited to all labor and materials in respect thereto); and the Contractor shall repair or replace all defective work promptly and at no cost, charge or expense to the Owner. The warranty and guaranty, as provided for in this paragraph, are in addition to and not in limitation of any other bond, warranty or guaranty provided to the Owner by the Contractor or by a manufacturer, supplier or otherwise, or any other cause of action, right or remedy.

8. The Owner may in its sole discretion suspend this Contract for ninety (90) days or terminate this Contract at any time, whereupon the Contractor shall be paid only for the work actually performed, the materials actually delivered to the job site, and the materials specifically ordered by the Contractor for this project if such specifically ordered materials cannot be returned to the manufacturer or supplier by the Contractor at no cost or expense to the Contractor. (It is understood, however, that the Contractor shall return all specifically ordered materials if the Owner agrees in writing to reimburse the Contractor for all of the latter's costs and expenses incurred in so returning the materials.) The Contractor shall not be entitled to recover any anticipated profits. This paragraph applies only to those situations where the Owner suspends or terminates this Contract for reasons other than the Contractor's performance or breach of or default under this Contract.

9. This Contract is made and entered into in, Richlands, Onslow County, North Carolina, and North Carolina law shall govern and apply to this Contract. In the event of a dispute or disputes between the parties hereto, and in the event litigation is instituted, such litigation shall be commenced only in a state superior or district court in Richlands, Onslow County, North Carolina, and each party hereby waives any right or claim for a change of venue from Richlands, Onslow County, North Carolina.

10. Regardless of which party hereto is responsible for the preparation and drafting of this Contract, it shall not be construed more strictly against either party.

11. Whenever the context permits, words herein in any gender shall include the masculine, feminine and neuter.



12. This Contract may not be assigned by the Contractor unless the Owner has consented in writing to the assignment.

13. The parties hereto acknowledge, represent, state and warrant that they have signed and executed this Contract under seal, that they have adopted their respective seals as affixed to this Contract, and that they are executing this Contract with the intent that it shall be a sealed instrument.

IN WITNESS WHEREOF, the Owner and Contractor hereto have executed this contract on the date first above written in six counterparts, each of which shall be deemed an original contract.

WITNESS:

\_\_\_\_\_  
(As to Contractor)

\_\_\_\_\_  
(Contractor) (Seal)

WITNESS:

By\_\_\_\_\_

\_\_\_\_\_  
(Secretary – Treasurer)

Onslow County  
\_\_\_\_\_  
(Owner) (Seal)

By\_\_\_\_\_

This instrument has been pre-audited in the manner required by the Local Government Budget and Fiscal Control Act.

\_\_\_\_\_  
Finance Officer

**This Page Intentionally Left Blank**

## **PERFORMANCE BOND**

**KNOW ALL MEN BY THESE PRESENTS:** That \_\_\_\_\_ as Principal, hereinafter called Contractor, and \_\_\_\_\_ as Surety, hereinafter called Surety, are held and firmly bound unto Onslow County, as Obligee, hereinafter called Owner, in the amount of \_\_\_\_\_ Dollars (\$\_\_\_\_\_), for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

**WHEREAS,** Contractor has by written agreement dated \_\_\_\_\_, 2025, entered into a contract with the Owner for the South GA Expansion in accordance with Drawings and Specifications prepared by W.K. Dickson & Co., LLC, which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

**NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION** is such that, if Contractor shall promptly and faithfully perform said Contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

The Surety hereby waives notice of any alteration or extension of time made by the Owner.

Whenever Contractor shall be, and declared by Owner to be in default under the Contract, the Owner having performed Owner's obligations thereunder, the Surety may promptly remedy the default, or shall promptly:

(1) Complete the Contract in accordance with its terms and conditions, or

(2) Obtain a bid or bids for completing the Contract in accordance with its terms and conditions, upon determination by Surety of the lowest responsible bidder, or, if the Owner elects, upon determination by the Owner and the Surety jointly of the lowest responsible bidder, arrange for a contract between such bidder and Owner, and make available as Work progresses (even though there should be a default or a succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the contract price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term "balance of the contract price," as used in this paragraph, shall mean the total amount payable by Owner to Contractor under the Contract and any amendments thereto, less the amount properly paid by Owner to Contractor.

Any suit under this bond must be instituted before the expiration of (2) two years from the date on which final payment under the Contract falls due.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the Owner named herein or the heirs, executors, administrators or successors of the Owner.

Signed and sealed this \_\_\_\_\_ day of \_\_\_\_\_, 2025.

\_\_\_\_\_  
(Witness)

\_\_\_\_\_  
(Principal) (Seal)

\_\_\_\_\_  
(Title)

\_\_\_\_\_  
(Witness)

\_\_\_\_\_  
(Surety) (Seal)

\_\_\_\_\_  
(Title)

## **LABOR AND MATERIAL PAYMENT BOND**

**KNOW ALL MEN BY THESE PRESENTS:** That \_\_\_\_\_ as Principal, hereinafter called Principal, and \_\_\_\_\_ as Surety, hereinafter called Surety, are held and firmly bound unto Onslow County, as Obligee, hereinafter called Owner, for the use and benefit of claimants as herein below defined, in the amount of \_\_\_\_\_ dollars (\$\_\_\_\_\_), for the payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

**WHEREAS,** Principal has by written agreement dated \_\_\_\_\_, 2025, entered into a contract with the Owner for the South GA Expansion in accordance with Drawings and Specifications prepared by W.K. Dickson & Co., LLC, which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

**NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION** is such that, if Principal shall promptly make payment to all claimants as hereinafter defined, for all labor and material used or reasonably required for use in the performance of the Contract, then this obligation shall be void; otherwise it shall remain in full force and effect, subject, however, to the following conditions:

1. A claimant is defined as one having a direct contract with the Principal or with a Subcontractor of the Principal for labor, material, or both, used or reasonably required for use in the performance of the Contract, labor and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental or equipment directly applicable to the Contract.

2. The above-named Principal and Surety hereby jointly and severally agree with the Owner that every Claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished by such claimant, may sue on this bond for the use of such claimant, prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon. The Owner shall not be liable for the payment of any costs or expenses of any such suit.

3. No suit or action shall be commenced hereunder by any claimant.

a. Unless claimant, other than one having a direct contract with the Principal, shall have given written notice to any two of the following: the Principal, the Owner, or the Surety above-named, within ninety (90) days after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the Principal, Owner, or Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the state in which the aforesaid project is located, save that such service need not be made by a public officer.

b. After the expiration of two (2) years following the date on which Principal ceased work on said Contract, it being understood, however, that if any limitation embodied in this bond is prohibited by

any law controlling the construction hereof, such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

c. Other than in a state court of competent jurisdiction in and for the county or other political subdivision of the state in which the Project, or any part thereof, is situated, or in the United States District Court for the district in which the Project, or any part thereof, is situated, and not elsewhere.

4. The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics' liens which may be filed of record against said improvement, whether or not claim for the amount of such lien be presented under and against this bond.

Signed and sealed this \_\_\_\_\_ day of \_\_\_\_\_, 2025.

\_\_\_\_\_  
(Witness)

\_\_\_\_\_  
(Principal) (Seal)

\_\_\_\_\_  
(Title)

\_\_\_\_\_  
(Witness)

\_\_\_\_\_  
(Surety) (Seal)

\_\_\_\_\_  
(Title)

# **DIVISION II**

## **GENERAL PROVISIONS**

THIS PAGE INTENTIONALLY LEFT BLANK



## 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:

<b>Paragraph Number</b>	<b>Term</b>	<b>Definition</b>
<b>10-01</b>	<b>AASHTO</b>	The American Association of State Highway and Transportation Officials.
<b>10-02</b>	<b>Access Road</b>	The right-of-way, the roadway and all improvements constructed thereon connecting the airport to a public roadway.
<b>10-03</b>	<b>Advertisement</b>	A public announcement, as required by local law, inviting bids for work to be performed and materials to be furnished.
<b>10-04</b>	<b>Airport</b>	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.
<b>10-05</b>	<b>Airport Improvement Program (AIP)</b>	A grant-in-aid program, administered by the Federal Aviation Administration (FAA).
<b>10-06</b>	<b>Air Operations Area (AOA)</b>	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.
<b>10-07</b>	<b>Apron</b>	Area where aircraft are parked, unloaded or loaded, fueled and/or serviced.
<b>10-08</b>	<b>ASTM International (ASTM)</b>	Formerly known as the American Society for Testing and Materials (ASTM).
<b>10-09</b>	<b>Award</b>	The Owner's notice to the successful bidder of the acceptance of the submitted bid.

<b>Paragraph Number</b>	<b>Term</b>	<b>Definition</b>
<b>10-10</b>	<b>Bidder</b>	Any individual, partnership, firm, or corporation, acting directly or through a duly authorized representative, who submits a proposal for the work contemplated.
<b>10-11</b>	<b>Building Area</b>	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.
<b>10-12</b>	<b>Calendar Day</b>	Every day shown on the calendar.
<b>10-13</b>	<b>Certificate of Analysis (COA)</b>	The COA is the manufacturer's Certificate of Compliance (COC) including all applicable test results required by the specifications.
<b>10-14</b>	<b>Certificate of Compliance (COC)</b>	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.
<b>10-15</b>	<b>Change Order</b>	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.
<b>10-16</b>	<b>Contract</b>	<p>A written agreement between the Owner and the Contractor that establishes the obligations of the parties including but not limited to performance of work, furnishing of labor, equipment and materials and the basis of payment.</p> <p>The awarded contract includes but may not be limited to: Advertisement, Contract form, Proposal, Performance bond, payment bond, General provisions, certifications and representations, Technical Specifications, Plans, Supplemental Provisions, standards incorporated by reference and issued addenda.</p>
<b>10-17</b>	<b>Contract Item (Pay Item)</b>	A specific unit of work for which a price is provided in the contract.
<b>10-18</b>	<b>Contract Time</b>	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

<b>Paragraph Number</b>	<b>Term</b>	<b>Definition</b>
		calendar or working days, the contract shall be completed by that date.
<b>10-19</b>	<b>Contractor</b>	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.
<b>10-20</b>	<b>Contractors Quality Control (QC) Facilities</b>	The Contractor's QC facilities in accordance with the Contractor Quality Control Program (CQCP).
<b>10-21</b>	<b>Contractor Quality Control Program (CQCP)</b>	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.
<b>10-22</b>	<b>Control Strip</b>	A demonstration by the Contractor that the materials, equipment, and construction processes results in a product meeting the requirements of the specification.
<b>10-23</b>	<b>Construction Safety and Phasing Plan (CSPP)</b>	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.
<b>10-24</b>	<b>Drainage System</b>	The system of pipes, ditches, and structures by which surface or subsurface waters are collected and conducted from the airport area.
<b>10-25</b>	<b>Engineer</b>	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.
<b>10-26</b>	<b>Equipment</b>	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.
<b>10-27</b>	<b>Extra Work</b>	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 to

<b>Paragraph Number</b>	<b>Term</b>	<b>Definition</b>
		be necessary to complete the work within the intended scope of the contract as previously modified.
<b>10-28</b>	<b>FAA</b>	The Federal Aviation Administration. When used to designate a person, FAA shall mean the Administrator or their duly authorized representative.
<b>10-29</b>	<b>Federal Specifications</b>	The federal specifications and standards, commercial item descriptions, and supplements, amendments, and indices prepared and issued by the General Services Administration.
<b>10-30</b>	<b>Force Account</b>	<p><b>a.</b> Contract Force Account - A method of payment that addresses extra work performed by the Contractor on a time and material basis.</p> <p><b>b.</b> Owner Force Account - Work performed for the project by the Owner's employees.</p>
<b>10-31</b>	<b>Intention of Terms</b>	<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>
<b>10-32</b>	<b>Lighting</b>	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.
<b>10-33</b>	<b>Major and Minor Contract Items</b>	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.

<b>Paragraph Number</b>	<b>Term</b>	<b>Definition</b>
<b>10-34</b>	<b>Materials</b>	Any substance specified for use in the construction of the contract work.
<b>10-35</b>	<b>Modification of Standards (MOS)</b>	Any deviation from standard specifications applicable to material and construction methods in accordance with FAA Order 5300.1.
<b>10-36</b>	<b>Notice to Proceed (NTP)</b>	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.
<b>10-37</b>	<b>Owner</b>	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 Onslow County.
<b>10-38</b>	<b>Passenger Facility Charge (PFC)</b>	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.
<b>10-39</b>	<b>Pavement Structure</b>	The combined surface course, base course(s), and subbase course(s), if any, considered as a single unit.
<b>10-40</b>	<b>Payment bond</b>	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.
<b>10-41</b>	<b>Performance bond</b>	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.
<b>10-42</b>	<b>Plans</b>	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.'
<b>10-43</b>	<b>Project</b>	The agreed scope of work for accomplishing specific airport development with respect to a particular airport.

<b>Paragraph Number</b>	<b>Term</b>	<b>Definition</b>
<b>10-44</b>	<b>Proposal</b>	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.
<b>10-45</b>	<b>Proposal guaranty</b>	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.
<b>10-46</b>	<b>Quality Assurance (QA)</b>	Owner's responsibility to assure that construction work completed complies with specifications for payment.
<b>10-47</b>	<b>Quality Control (QC)</b>	Contractor's responsibility to control material(s) and construction processes to complete construction in accordance with project specifications.
<b>10-48</b>	<b>Quality Assurance (QA) Inspector</b>	An authorized representative of the Engineer 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.
<b>10-49</b>	<b>Quality Assurance (QA) Laboratory</b>	The official quality assurance testing laboratories of the Owner or such other laboratories as may be designated by the Engineer. May also be referred to as Engineer's, Owner's, or QA Laboratory.
<b>10-50</b>	<b>Resident Project Representative (RPR)</b>	The individual, partnership, firm, or corporation duly authorized by the Owner to be responsible for all field observations, 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.
<b>10-51</b>	<b>Runway</b>	The area on the airport prepared for the landing and takeoff of aircraft.
<b>10-52</b>	<b>Runway Safety Area (RSA)</b>	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.
<b>10-53</b>	<b>Safety Plan Compliance Document (SPCD)</b>	Details how the Contractor will comply with the CSPP.
<b>10-54</b>	<b>Specifications</b>	A part of the contract containing the written directions and requirements for completing the contract work. Standards

<b>Paragraph Number</b>	<b>Term</b>	<b>Definition</b>
		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.
<b>10-55</b>	<b>Sponsor</b>	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.
<b>10-56</b>	<b>Structures</b>	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.
<b>10-57</b>	<b>Subgrade</b>	The soil that forms the pavement foundation.
<b>10-58</b>	<b>Superintendent</b>	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.
<b>10-59</b>	<b>Supplemental Agreement</b>	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.
<b>10-60</b>	<b>Surety</b>	The corporation, partnership, or individual, other than the Contractor, executing payment or performance bonds that are furnished to the Owner by the Contractor.
<b>10-61</b>	<b>Taxilane</b>	A taxiway designed for low speed movement of aircraft between aircraft parking areas and terminal areas.
<b>10-62</b>	<b>Taxiway</b>	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.

<b>Paragraph Number</b>	<b>Term</b>	<b>Definition</b>
<b>10-63</b>	<b>Taxiway/Taxilane Safety Area (TSA)</b>	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.
<b>10-64</b>	<b>Work</b>	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.
<b>10-65</b>	<b>Working day</b>	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.
<b>10-66</b>	<b>Owner Defined terms</b>	None

**END OF SECTION 10**



## SECTION 20

### PROPOSAL REQUIREMENTS AND CONDITIONS

**20-01 Advertisement (Notice to Bidders).** A copy of the advertisement is included elsewhere in the bid package.

**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.

A bidder may also submit evidence that they are prequalified with the State Highway Department and are on the current "bidder's list" of the state in which the proposed work is located. Evidence of State Highway Department prequalification may be submitted as evidence of financial responsibility in lieu of the certified statements or reports specified above.

**20-03 Contents of proposal forms.** The Owner's proposal forms state the location and description of the proposed construction; the place, date, and time of opening of the proposals; and the estimated quantities of the various items of work to be performed and materials to be furnished for which unit bid prices are asked. The proposal form states the time in which the work must be completed, and the amount of the proposal guaranty that must accompany the proposal. The Owner will accept only those Proposals properly executed on physical forms or electronic forms provided by the Owner. Bidder actions that may cause the Owner to deem a proposal irregular are given in paragraph 20-09 *Irregular proposals*.

A pre-bid conference will be conducted 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. The pre-bid conference will be held at the date, time, and location indicated in the Notice to Bidders.

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

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

**20-07 Preparation of proposal.** The bidder shall submit their proposal on the forms furnished by the Owner. All blank spaces in the proposal forms, unless explicitly stated otherwise, must be correctly filled in where indicated for each and every item for which a quantity is given. The bidder shall state the price (written in ink or typed) both in words and numerals which they propose for each pay item furnished in the proposal. In case of conflict between words and numerals, the words, unless obviously incorrect, shall govern.

The bidder shall correctly sign the proposal in ink. If the proposal is made by an individual, their name and post office address must be shown. If made by a partnership, the name and post office address of each member of the partnership must be shown. If made by a corporation, the person signing the proposal shall give the name of the state where the corporation was chartered and the name, titles, and business address of the president, secretary, and the treasurer. Anyone signing a proposal as an agent shall file evidence of their authority to do so and that the signature is binding upon the firm or corporation.

**20-08 Responsive and responsible bidder.** A responsive bid conforms to all significant terms and conditions contained in the Owner's invitation for bid. It is the Owner's responsibility to decide if the exceptions taken by a bidder to the solicitation are material or not and the extent of deviation it is willing to accept.

A responsible bidder has the ability to perform successfully under the terms and conditions of a proposed procurement, as defined in 2 CFR § 200.318(h). This includes such matters as Contractor integrity, compliance with public policy, record of past performance, and financial and technical resources.

**20-09 Irregular proposals.** Proposals shall be considered irregular for the following reasons:

**a.** If the proposal is on a form other than that furnished by the Owner, or if the Owner's form is altered, or if any part of the proposal form is detached.

**b.** If there are unauthorized additions, conditional or alternate pay items, or irregularities of any kind that make the proposal incomplete, indefinite, or otherwise ambiguous.

- c. If the proposal does not contain a unit price for each pay item listed in the proposal, except in the case of authorized alternate pay items, for which the bidder is not required to furnish a unit price.
- d. If the proposal contains unit prices that are obviously unbalanced.
- e. If the proposal is not accompanied by the proposal guaranty specified by the Owner.
- f. If the applicable Disadvantaged Business Enterprise information is incomplete.

The Owner reserves the right to reject any irregular proposal and the right to waive technicalities if such waiver is in the best interest of the Owner and conforms to local laws and ordinances pertaining to the letting of construction contracts.

**20-10 Bid guaranty.** Each separate proposal shall be accompanied by a bid bond, certified check, or other specified acceptable collateral, in the amount specified in the proposal form. Such bond, check, or collateral, shall be made payable to the Owner.

**20-11 Delivery of proposal.** Each proposal submitted shall be placed in a sealed envelope plainly marked with the project number, location of airport, and name, business address and state contractor's license of the bidder on the outside. When sent by mail, preferably registered, the sealed proposal, marked as indicated above, should be enclosed in an additional envelope. No proposal will be considered unless received at the place specified in the advertisement or as modified by Addendum before the time specified for opening all bids. Proposals received after the bid opening time shall be returned to the bidder unopened.

**20-12 Withdrawal or revision of proposals.** A bidder may withdraw or revise (by withdrawal of one proposal and submission of another) a proposal provided that the bidder's request for withdrawal is received by the Owner in writing or by email before the time specified for opening bids. Revised proposals must be received at the place specified in the advertisement before the time specified for opening all bids.

**20-13 Public opening of proposals.** Proposals shall be opened, and read, publicly at the time and place specified in the advertisement. Bidders, their authorized agents, and other interested persons are invited to attend. Proposals that have been withdrawn (by written or telegraphic request) or received after the time specified for opening bids shall be returned to the bidder unopened.

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

- a. Submitting more than one proposal from the same partnership, firm, or corporation under the same or different name.

- b. Evidence of collusion among bidders. Bidders participating in such collusion shall be disqualified as bidders for any future work of the Owner until any such participating bidder has been reinstated by the Owner as a qualified bidder.

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

**20-15 Discrepancies and Omissions.** A Bidder who discovers discrepancies or omissions with the project bid documents shall immediately notify the Owner's Engineer of the matter. A bidder that has doubt as to the true meaning of a project requirement may submit to the Owner's Engineer a written request for interpretation no later than 7 days prior to bid opening.

Any interpretation of the project bid documents by the Owner's Engineer will be by written addendum issued by the Owner. The Owner will not consider any instructions, clarifications or interpretations of the bidding documents in any manner other than written addendum.

## END OF SECTION 20

GP-11

## SECTION 30

### AWARD AND EXECUTION OF CONTRACT

**30-01 Consideration of proposals.** After the proposals are publicly opened and read, they will be compared on the basis of the summation of the products obtained by multiplying the estimated quantities shown in the proposal by the unit bid prices. If a bidder's proposal contains a discrepancy between unit bid prices written in words and unit bid prices written in numbers, the unit bid price written in words shall govern.

Until the award of a contract is made, the Owner reserves the right to reject a bidder's proposal for any of the following reasons:

a. If the proposal is irregular as specified in Section 20, paragraph 20-09, *Irregular Proposals*.

b. If the bidder is disqualified for any of the reasons specified Section 20, paragraph 20-14, *Disqualification of Bidders*.

In addition, until the award of a contract is made, the Owner reserves the right to reject any or all proposals, waive technicalities, if such waiver is in the best interest of the Owner and is in conformance with applicable state and local laws or regulations pertaining to the letting of construction contracts; advertise for new proposals; or proceed with the work otherwise. All such actions shall promote the Owner's best interests.

**30-02 Award of contract.** The award of a contract, if it is to be awarded, shall be made within 90 calendar days of the date specified for publicly opening proposals, unless otherwise specified herein.

If the Owner elects to proceed with an award of contract, the Owner will make award to the lowest responsible bidder for the Base Bid whose bid, conforming with all the material terms and conditions of the bid documents, is the lowest in price.

**30-03 Cancellation of award.** The Owner reserves the right to cancel the award without liability to the bidder, except return of proposal guaranty, at any time before a contract has been fully executed by all parties and is approved by the Owner in accordance with paragraph 30-07 *Approval of Contract*.

**30-04 Return of proposal guaranty.** All proposal guaranties, except those of the two lowest bidders, will be returned immediately after the Owner has made a comparison of bids as specified in the paragraph 30-01, *Consideration of Proposals*. Proposal guaranties of the two lowest bidders will be retained by the Owner until such time as an award is made, at which time, the unsuccessful bidder's proposal guaranty will be returned. The successful bidder's proposal guaranty will be returned as soon as the Owner receives the contract bonds as specified in paragraph 30-05, *Requirements of Contract Bonds*.

**30-05 Requirements of contract bonds.** At the time of the execution of the contract, the successful bidder shall furnish the Owner a surety bond or bonds that have been fully executed by the bidder and the surety guaranteeing the performance of the work and the payment of all legal debts that may be incurred by reason of the Contractor's performance of the work. The surety and the form of the bond or bonds shall be acceptable to the Owner. Unless otherwise specified in this subsection, the surety bond or bonds shall be in a sum equal to the full amount of the contract.

**30-06 Execution of contract.** The successful bidder shall sign (execute) the necessary agreements for entering into the contract and return the signed contract to the Owner, along with the fully executed surety bond or bonds specified in paragraph 30-05, *Requirements of Contract Bonds*, of this section, within 15 calendar days from the date mailed or otherwise delivered to the successful bidder.

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

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

**END OF SECTION 30**

## SECTION 40

### SCOPE OF WORK

**40-01 Intent of contract.** The intent of the contract is to provide for construction and completion, in every detail, of the work described. It is further intended that the Contractor shall furnish all labor, materials, equipment, tools, transportation, and supplies required to complete the work in accordance with the plans, specifications, and terms of the contract.

**40-02 Alteration of work and quantities.** The Owner reserves the right to make such changes in quantities and work as may be necessary or desirable to complete, in a satisfactory manner, the original intended work. Unless otherwise specified in the Contract, the Owner's Engineer 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**



## 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.

All change orders, supplemental agreements, and contract modifications must eventually be reviewed by the FAA. Unless specifically requested by the FAA, the Owner does not have to obtain prior FAA approval for contract changes except for the Buy American review, if required. However, if an Owner proceeds with contract changes without FAA approval, it is at the Owner's risk.

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.

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

The Contractor shall give constant attention to the work to facilitate the progress thereof, and shall cooperate with the 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.** The Owner reserves the right to contract for and perform other or additional work on or near the work covered by this contract.

When separate contracts are let within the limits of any one project, each Contractor shall conduct the work not to interfere with or hinder the progress of completion of the work being performed by other Contractors. Contractors working on the same project shall cooperate with each other as directed.

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

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

**50-07 Construction layout and stakes.** The Engineer 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. The Contractor is responsible for preserving integrity of horizontal and vertical controls established by 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 AutoCAD Civil 3D and an XML file, or in a format acceptable to the Engineer.

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.** All work that does not conform to the requirements of the contract, plans, and specifications will be considered unacceptable, unless otherwise determined acceptable by the Engineer as provided in paragraph 50-02, *Conformity with Plans and Specifications*.

Unacceptable work, whether the result of poor workmanship, use of defective materials, damage through carelessness, or any other cause found to exist prior to the final acceptance of the work, shall be removed immediately and replaced in an acceptable manner in accordance with the provisions of Section 70, paragraph 70-14, *Contractor's Responsibility for Work*.

No removal work made under provision of this paragraph shall be done without lines and grades having been established by the Engineer. Work done contrary to the instructions of the Engineer, work done beyond the lines shown on the plans or as established by the Engineer, except as herein specified, or any extra work done without authority, will be considered as unauthorized and will not be paid for under the provisions of the contract. Work so done may be ordered removed or replaced at the Contractor's expense.

Upon failure on the part of the Contractor to comply with any order of the Engineer made under the provisions of this subsection, the Engineer will have authority to cause unacceptable work to be remedied or removed and replaced; and unauthorized work to be removed and recover the resulting costs as a liquidated damage against the Contractor.

**50-11 Load restrictions.** The Contractor shall comply with all legal load restrictions in the hauling of materials on public roads beyond the limits of the work. A special permit will not relieve the Contractor of liability for damage that may result from the moving of material or equipment.

The operation of equipment of such weight or so loaded as to cause damage to structures or to any other type of construction will not be permitted. Hauling of materials over the base course or surface course under construction shall be limited as directed. No loads will be permitted on a concrete pavement, base, or structure before the expiration of the curing period. The Contractor, at their own expense, shall be responsible for the repair to equal or better than preconstruction conditions of any damage caused by the Contractor's equipment and personnel.

**50-12 Maintenance during construction.** The Contractor shall maintain the work during construction and until the work is accepted. Maintenance shall constitute continuous and effective work prosecuted day by day, with adequate equipment and forces so that the work is maintained in satisfactory condition at all times.

In the case of a contract for the placing of a course upon a course or subgrade previously constructed, the Contractor shall maintain the previous course or subgrade during all construction operations.

All costs of maintenance work during construction and before the project is accepted shall be included in the unit prices bid on the various contract items, and the Contractor will not be paid an additional amount for such work.

**50-13 Failure to maintain the work.** Should the Contractor at any time fail to maintain the work as provided in paragraph 50-12, *Maintenance during Construction*, the 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.** If at any time during the execution of the project the Contractor substantially completes a usable unit or portion of the work, the occupancy of which will benefit the Owner, the Contractor may request the Engineer to make final inspection of that unit. If the Engineer finds upon inspection that the unit has been satisfactorily completed in compliance with the contract, the Engineer may accept it as being complete, and the Contractor may be relieved of further responsibility for that unit. Such

partial acceptance and beneficial occupancy by the Owner shall not void or alter any provision of the contract.

**50-15 Final acceptance.** Upon due notice from the Contractor of presumptive completion of the entire project, the Engineer and Owner will make an inspection. If all construction provided for and contemplated by the contract is found to be complete in accordance with the contract, plans, and specifications, such inspection shall constitute the final inspection. The Engineer 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 Engineer will notify the Contractor and the Contractor shall correct the unsatisfactory work. Upon correction of the work, another inspection will be made which shall constitute the final inspection, provided the work has been satisfactorily completed. In such event, the Engineer will make the final acceptance and notify the Contractor in writing of this acceptance as of the date of final inspection.

**50-16 Claims for adjustment and disputes.** If for any reason the Contractor deems that additional compensation is due for work or materials not clearly provided for in the contract, plans, or specifications or previously authorized as extra work, the Contractor shall notify the 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.** Engineer/RPR field office is not required.

**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**



## 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) is indicated on the plans.

Except as listed above, the Contractor shall not permit any individual, firm, or corporation to excavate or otherwise disturb such utility services or facilities located within the limits of the work without the written permission of the 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.

GP-25

**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 located in the appendix to the project specifications.

**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 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 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.

- Phase 1 work to be completed within 180 calendar days.

Upon completion of any portion of work listed above, such portion shall be accepted by the Owner in accordance with Section 50, paragraph 50-14, *Partial Acceptance*.

No portion of the work may be opened by the Contractor until directed by the Owner in writing. Should it become necessary to open a portion of the work to traffic on a temporary or intermittent basis, such openings shall be made when, in the opinion of the 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 150/5370-2G 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.

The plans shall show the approximate location of the utilities or facilities known to exist within the limits of the contract work. The proposed contract plans and specifications shall be coordinated with the various Owners at the earliest possible time to avoid overlooking utility conflicts in the design and to obtain the best possible information needed to protect such utility services or facilities from damage resulting from the Contractor's operations. Where conflicts are indicated during the coordination, they shall be resolved by the airport Owner and the utility owner, in accordance with existing legal agreements, by providing for work in the proposed contract or by the utility owner. In such cases of conflict, regardless of how the conflict is resolved, the airport Owner and utility owner should also be advised of the need to furnish the best information possible as to location of the utility service or facility to ensure protection during the proposed contract work.

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.

**70-16 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, Engineer, 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.** Refer to the Special Provision section included herein which includes information related to insurance requirements.

**END OF SECTION 70**

GP-30

AC 150/5370-10H, Issued 12/21/18  
Updated per Errata 11/12/19, 4/30/20 and 6/26/20

Albert J. Ellis Airport  
South GA Expansion  
Bid No. 101-25C  
WK Dickson Project Number:20240074.00.WK

## 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 twenty-five percent (25%) 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).** The Owners notice to proceed will state the date on which contract time commences. The Contractor is expected to commence project operations within ten (10) days of the NTP date. The Contractor shall notify the Engineer at least 24 hours in advance of the time contract operations begins. The Contractor shall not commence any actual operations prior to the date on which the notice to proceed is issued by the Owner.

**80-03 Execution and progress.** Unless otherwise specified, the Contractor shall submit their coordinated construction schedule showing all work activities for the Engineer's review and acceptance at least ten (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 24 hours in advance of resuming operations.

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

The project schedule shall be prepared as a network diagram in Critical Path Method (CPM), Program Evaluation and Review Technique (PERT), or other format, or as otherwise specified. It shall include information on the sequence of work activities, milestone dates, and activity duration. The schedule shall show all work items identified in the project proposal for each work area and shall include the project start date and end date.

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 follows:

- No work shall be performed within an active Taxiway Safety Area (TSA) at any time during the project.

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 150/5370-2G, 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
Phase 1A	\$2,000 / Day	40 Calendar Days
Overall Project	\$2,000 / Day	270 Calendar Days

The maximum construction time allowed for the overall project will be 270 calendar days. Permitting the Contractor to continue and finish the work or any part of it after the time fixed for its completion, or after the date to which the time for completion may have been extended, will in no way operate as a waiver on the part of the Owner of any of its rights under the contract.

**80-09 Default and termination of contract.** The Contractor shall be considered in default of their contract and such default will be considered as cause for the Owner to terminate the contract for any of the following reasons, if the Contractor:

- a. Fails to begin the work under the contract within the time specified in the Notice to Proceed, or
- b. Fails to perform the work or fails to provide sufficient workers, equipment and/or materials to assure completion of work in accordance with the terms of the contract, or
- c. Performs the work unsuitably or neglects or refuses to remove materials or to perform anew such work as may be rejected as unacceptable and unsuitable, or
- d. Discontinues the execution of the work, or
- e. Fails to resume work which has been discontinued within a reasonable time after notice to do so, or
- f. Becomes insolvent or is declared bankrupt, or commits any act of bankruptcy or insolvency, or
- g. Allows any final judgment to stand against the Contractor unsatisfied for a period of 10 days, or
- h. Makes an assignment for the benefit of creditors, or
- i. For any other cause whatsoever, fails to carry on the work in an acceptable manner.

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

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

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

**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**

## 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 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 may be weighed, and such weights will be converted to cubic yards 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
<b>Excavation and Embankment Volume</b>	In computing volumes of excavation, the average end area method will be used unless otherwise specified.
<b>Measurement and Proportion by Weight</b>	The term “ton” will mean the short ton consisting of 2,000 pounds 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.
<b>Measurement by Volume</b>	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

GP-37

<b>Term</b>	<b>Description</b>
	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.
<b>Asphalt Material</b>	Asphalt materials will be measured by the gallon or ton. When measured by volume, such volumes will be measured at 60°F or will be corrected to the volume at 60°F 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.
<b>Cement</b>	Cement will be measured by the ton or hundredweight
<b>Structure</b>	Structures will be measured according to neat lines shown on the plans or as altered to fit field conditions.
<b>Timber</b>	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.
<b>Plates and Sheets</b>	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.
<b>Miscellaneous Items</b>	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.
<b>Scales</b>	<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. The use of spring balances will not be permitted.</p>

Term	Description
	<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 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>
<b>Rental Equipment</b>	<p>Rental of equipment will be measured by time in hours of actual working time and necessary traveling time of the equipment within the limits of the work. Special equipment ordered in connection with extra work will be measured as agreed in the change order or supplemental agreement authorizing such work as provided in paragraph 90-05 <i>Payment for Extra Work</i>.</p>
<b>Pay Quantities</b>	<p>When the estimated quantities for a specific portion of the work are designated as the pay quantities in the contract, they shall be the final quantities for which payment for such specific portion of the work will be made, unless the dimensions of said portions of the work shown on the plans are revised by the 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.</p>

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

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

**90-03 Compensation for altered quantities.** When the accepted quantities of work vary from the quantities in the proposal, the Contractor shall accept as payment in full, so far as contract items are

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

**90-04 Payment for omitted items.** As specified in Section 40, paragraph 40-03, *Omitted Items*, the 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 percent (5%) 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. The Contractor is required to pay all subcontractors for satisfactory performance of their contracts no later than 30 days after the Contractor has received a partial payment. Contractor must provide the Owner evidence of prompt and full payment of retainage held by the prime Contractor to the subcontractor within 30 days after the subcontractor's work is satisfactorily completed. A subcontractor's work is satisfactorily completed when all the tasks called for in the subcontract have been



accomplished and documented as required by the Owner. When the Owner has made an incremental acceptance of a portion of a prime contract, the work of a subcontractor covered by that acceptance is deemed to be satisfactorily completed.

c. When at least 95% of the work has been completed to the satisfaction of the 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.

- (1) 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.

g. 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.
- m.** DBE Payment Shortfall Form (if applicable)
- n.** Contractor Warranty Statement
- o.** Consent of Surety to Final Payment
- p.** Final Waiver of Lien for Prime and Sub-contractors
- q.** Final Statement Letter

**END OF SECTION 90**

GP-44

## **SPECIAL PROVISIONS**

**THIS PAGE INTENTIONALLY LEFT BLANK**

## **SPECIAL PROVISIONS**

### **1. GENERAL**

- 1.1. These Special Provisions are supplemental to the General Provisions and shall be considered as a part of the Contract Documents.

### **2. SHOP DRAWINGS**

- 2.1. The Contractor shall submit to the Engineer all shop drawings required for the work. The Contractor shall carefully review all shop drawings for accuracy and conformance to the Contract Documents. The Contractor shall clearly indicate:
  - 2.1.1. the products and materials being submitted for review
  - 2.1.2. reference specification and
  - 2.1.3. the Contractor's stamp of approval before being forwarded to the Engineer
- 2.2. Six copies of all shop drawings shall be submitted to the Engineer in a timely manner so as to cause no delay to any part of the work. The Engineer shall review all shop drawings with reasonable promptness, and shall approve or note thereon any desired corrections. The Engineer shall retain two (2) copies of the shop drawings and shall return the remaining four (4) copies to the Contractor.
  - 2.2.1. If the shop drawings are returned without approval, the Contractor shall then make the required corrections and shall re-submit another six (6) copies of the corrected drawings to the Engineer. The Engineer shall retain two (2) copies of the corrected drawings. If additional corrections are required, then the Contractor shall resubmit as above.
- 2.3. Review of shop drawings by the Engineer shall not relieve the Contractor from responsibility for compliance with terms or designs of the Contract Documents nor from responsibility for errors of any sort in the shop drawings. The contractor is solely responsible for meeting the construction/installation requirements of the project.

### **3. COORDINATION, INTERPRETATION AND INTENT OF CONTRACT DOCUMENTS**

- 3.1. It is the intent of the Specifications and the Plans to describe a complete project in accordance with the Contract Documents. The Contract Documents comprise the entire Contract between the Owner and the Contractor. They may be altered only by a written change order or Supplemental Agreement.
- 3.2. See section **50-03 COORDINATION OF CONTRACT, PLANS, AND SPECIFICATIONS in the General Provisions.**
- 3.3. Dimensions on plans shall govern over general drawings, and detailed drawings shall govern over general drawings.

#### 4. INSURANCE

- 4.1. The Contract shall not be executed by the Contractor and Owner until the Contractor has obtained, at his sole expense, all required insurance policies and certificates and such policies and certificates have been approved by the Engineer. Contractor shall not allow any Subcontractor to commence work on his subcontract until all insurance required to be procured by the Subcontractor hereunder has been so obtained by or for the Subcontractor. If a Subcontractor does not take out insurance in his own name and the Contractor wishes to provide insurance protection for such Subcontractor and such Subcontractor's employees, the Contractor must either
- 4.1.1. Procure appropriate policies in the name of the Subcontractor, or
- 4.1.2. Cause a rider to be attached to the Contractor's policies which must identify the Subcontractor as an "additional insured". Such rider need not be attached to the Contractor's workers compensation policy if that policy is sufficiently broad to cover all employees of all Subcontractors performing work under the contract. All required insurance shall be procured from insurance companies licensed to do business in North Carolina and shall be maintained continuously during the life of the contract.
- 4.2. **Worker's Compensation Insurance** - The Contractor shall take out and maintain during the life of this contract, worker's compensation insurance for all of his employees employed at the site of the project. In case any class of persons engaged in work under this Contract is not protected under the worker's compensation laws, the Contractor shall provide all adequate coverage for the protection of his employees not otherwise protected.
- 4.3. **Comprehensive General Liability and Property Damage Insurance** - The Contractor shall take out and maintain during the life of this Contract such public liability and property damage insurance as shall protect him and the Owner from claims for damages for personal injury, including death, as well as from claims for property damages which may arise from operations under this contract, whether such operations be by himself or by any Subcontractor or by anyone directly or indirectly employed by either of them, and the amounts of such insurance shall be as follows:
- 4.3.1. comprehensive General Liability Insurance not less than \$1,000,000 for accidental injury or death on account of any one occurrence, and
- 4.3.2. Property Damage Insurance of not less than \$1,000,000 for each occurrence.
- 4.3.3. The Owner and the Engineer shall be named as additional insureds.
- 4.4. **Comprehensive Automobile Liability Insurance** - The Contractor shall procure and maintain during the life of the Contract complete comprehensive automobile liability insurance in the amounts of \$300,000 each occurrence for bodily injury or death, and \$300,000 each occurrence for property damage.
- 4.4.1. The Owner and the Engineer shall be named as additional insureds.
- 4.5. **Umbrella Excess Liability Insurance** - In addition to the requirements of the above paragraphs, the Contractor will be responsible for procuring and maintaining during the life of the Contract an umbrella excess liability policy in the amount of \$5,000,000, providing excess coverage on insurance required in Paragraphs 4.3 and 4.4 above.



- 4.5.1. The Owner and the Engineer shall be named as additional insureds.
- 4.6. Unless provided otherwise, Each and every Subcontractor performing work covered by this Contract shall procure and maintain insurance of the types and in the amounts specified and prescribed above. It shall be the Contractor's responsibility to ensure that each Subcontractor procures and maintains the required insurance. If for any reason, such insurance is not provided and maintained in full force, the Contractor shall indemnify and save harmless the Owner and the Engineer from any damages resulting therefrom.
- 4.7. The Contractor shall require each Subcontractor to submit certificates of insurance coverage to the Contractor as evidence required coverage before such Subcontractor commences work on the project. The Contractor shall submit to the Engineer before the Contract is executed certificates of insurance evidencing coverage required to be procured by the Contractor hereunder. The Contractor shall submit evidence of Subcontractor coverage for each Subcontractor before that Subcontractor commences work on the project.
- 4.8. Each certificate of Insurance and each insurance policy (except worker's compensation) shall bear the provision that
- 4.8.1. *"The policy cannot be canceled, reduced in amount or coverage eliminated in less than 30 days after written notice is mailed (via certified mail) to the Owner, the insured, the Contractor (unless the Contractor is the insured) and the Engineer of such alteration, cancellation, or elimination."*
- 4.8.2. This provision is to be enforced at all times.
- 4.9. A provision regarding cancellations, reductions in amount or elimination of coverage to the effect that the insurer's failure to mail notice will impose no liability upon the insurer will not be acceptable. If an insurance policy is canceled, it will be the Contractor's obligation to procure a replacement policy at the Contractor's expense.

## **5. CONTRACTOR**

- 5.1. The Contractor shall supervise and direct the work efficiently and with his best skill and attention. He is solely responsible for the means, methods, techniques, sequences, and procedures of construction. The Contractor will be responsible to see that the finished work complies accurately with the Contract Documents.
- 5.2. The Contractor will employ on the project at all times during its progress, a competent resident superintendent whose name and qualifications will be furnished to the Engineer at the preconstruction 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 good communication skills and 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 will provide competent and suitable qualified personnel, equipment and supplies to perform the work required by the Contract Documents and will at all times maintain good discipline and order at the site.

- 5.3. The Contractor will provide competent, suitably qualified personnel, equipment and supplies to survey and layout the work as required by the Contract Documents.
- 5.4. The Contractor shall attend job site progress conferences as called by the Engineer. The Contractor shall be represented at these job progress conferences by an authorized representative of the home office of the Contractor as well as by the resident superintendent. These meetings shall be open to Subcontractors, material suppliers and any others who can contribute beneficially toward maintaining required job progress, and such personnel shall be encouraged by the Contractor to attend. It shall be the principal purpose of these meetings or conferences to effect coordination, cooperation and assistance in every practical way to facilitate maintaining progress of the project on schedule and to complete the project within the approved schedule. The Contractor shall be prepared to assess progress of the work as required in the Contract and to recommend remedial measures for correction of progress as may be appropriate. The Engineer shall be the coordinator of the conferences and shall preside as chairperson.
- 5.5. It shall be the responsibility of the Contractor to schedule the work of all Subcontractors and suppliers to conform to the Construction Schedule submitted by the Contractor at the preconstruction meeting and approved by the Engineer and Owner; to maintain such construction schedule; and to notify the Engineer of any changes in the Construction Schedule. If the Contractor falls significantly behind the Construction Schedule, he shall, upon the Engineer's request, submit the following:
- 5.5.1. a revised schedule for completion of work within the Contract time, such revised schedule shall be subject to approval by the Engineer and Owner, and,
- 5.5.2. any other supporting data the Engineer and/or Owner may require.
- 5.5.3. The Contractor shall modify his operations to provide such additional materials, equipment and labor necessary to meet such approved revised schedule. He shall be responsible for providing adequate notice to all Subcontractors to ensure efficient continuity of all phases of the project work.
- 5.6. In the event that the prosecution of the work is discontinued for any reason, the Contractor shall notify the Engineer at least forty-eight (48) hours in advance of resuming operations.
- 5.7. If in the opinion of the Engineer, any Subcontractor on the project proves to be incompetent or otherwise unsatisfactory, he shall be replaced by the Contractor if and when so directed by the Engineer in writing.
- 5.8. The Contractor will maintain one record copy of all Specifications, plans, addenda, modifications, and shop drawings at the site in good order and annotated to show all changes made during the construction process. These shall be available to the Engineer and shall be delivered to him/her for the Owner's purposes upon completion of the project. They shall be used for this purpose only.
- 5.9. The Contractor shall be responsible for the entire site and the necessary protections, as required by the Engineer and by laws or ordinances governing such conditions. He shall be responsible for any damage to the Owner's property, or that of others, by the Contractor, his employees, Subcontractors or their employees, and shall make good such damages. He shall hold harmless the Owner and Engineer for any such claims.

- 5.10. The Contractor shall provide cover and/or protect all portions of the work and provide all materials necessary to protect the work whether performed by him/her or any of the Subcontractors. Any work damaged through the lack of proper protection, or from any other cause, shall be repaired or replaced without extra cost to the Owner.
- 5.11. 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 the 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.
- 5.12. Should the Contractor at any time fail to maintain the work as provided herein, 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 Engineer may suspend any work necessary for the Owner to correct such unsatisfactory 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.
- 5.13. Burning will not be allowed.
- 5.14. The Contractor shall designate a responsible member of his organization as safety inspector, whose duties shall include accident prevention on the project. The name of the safety inspector shall be made known to the Engineer at the pre-construction conference. Safety requirements outlined in the General Provisions must be strictly enforced.
- 5.15. In emergencies affecting the safety of persons or the work or property at the site or adjacent thereto, the Contractor, without special instructions or authorization from the Engineer or Owner, is obligated to act at his discretion to prevent threatened damage, injury or loss. As soon as practicable, he will notify the Engineer of such emergency and he will thereafter act at the Engineer's instruction. The Contractor will give the Engineer prompt written notice of any significant changes in the work or deviations from the Contract Documents caused by such emergency, and a change order, if found by the Engineer to be justified, shall thereupon be issued covering the changes and deviations involved. If the Contractor believes that additional work completed during an emergency entitles him/her to an increase in the Contract price or an extension of the Contract time, he may make a claim therefore as provided in the General Provisions.
- 5.16. The Contractor shall keep the premises free from accumulation of waste materials or rubbish caused by the work at all times. At the completion of the work, he shall remove any residual waste materials and rubbish from and about the project as well as all tools, construction equipment, machinery and surplus materials. If the Contractor fails to clean up at the completion of the work, the Owner may do so and the cost thereof shall be charged to the Contractor. The Contractor shall leave the work in condition for occupancy by the Owner such that no cleaning or other operations are required. Material cleared from the site and deposited on adjacent property will not be considered as having been disposed of satisfactorily.
- 5.17. Utilities, Structures and Signs shall be provided as follows:

5.17.1. Temporary Structures

5.17.1.1. The Contractor shall provide all necessary storage sheds, shanties, and other similar structures required for his own use. Temporary structures shall be placed as directed by the Engineer and shall be built in a sound waterproof manner and shall remain on the premises until the Engineer directs their removal. Requirements of applicable local codes and ordinances shall apply.

5.17.2. Water

5.17.2.1. The Contractor shall consult with the Engineer in regard to water supply. A source and manner for obtaining water shall be approved by the Engineer before any water is secured. Any expenses of securing water shall be borne by the Contractor. Requirements of applicable local codes and ordinances shall apply.

5.17.3. Electricity

5.17.3.1. The Contractor shall consult with the Engineer in regard to electrical service. Any expenses of securing construction electrical service from the source of supply shall be borne by the Contractor. The Engineer shall approve the source of supply. If the Contractor constructs any temporary structures and/or field office(s) that require the installation of electrical service, the Contractor shall pay for electrical energy used in such facility at the rates of the utility company furnishing power. Requirements of applicable local codes and ordinances shall apply.

5.18. Signs

5.18.1. Directional signs may be erected on the Owner's property subject to the approval of the Engineer with respect to size, type, and location of such directional signs. Such signs may bear the name of the Contractor and a directional symbol.

5.18.2. A project bulletin board shall be erected and maintained by the Contractor that is waterproof and of sufficient size to post bulletins, wage and labor requirements, DBE requirements and other related information. The size, style and location of this bulletin board must be approved by the Engineer prior to its installation.

5.18.3. No other signs will be permitted unless approved by the Engineer.

5.18.4. Requirements of applicable local codes and ordinances shall apply to any posted signs.

5.19. Use of the terminal buildings and facilities located in and around said terminal area by employees of the Contractor and his Subcontractors and material and equipment suppliers shall be prohibited, except upon written permission from the Engineer.

5.20. 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 constriction shall be limited as directed by the Engineer. No loads will be permitted on

a concrete pavement, base, or structure before the expiration of the curing period. The Contractor shall be responsible for all damage done by his hauling equipment on or off the airport and shall correct such damage at his own expense.

## **6. OWNER**

- 6.1. The Owner will issue all communications to the Contractor through the Engineer.
- 6.2. In case of termination of the employment of the Engineer, the Owner will appoint another Engineer who will have and assume all rights and duties held by the original Engineer named herein.
- 6.3. The Owner shall have the right to take possession of and use any portion of the work notwithstanding the fact that the time for completion of such portion of the work may not have expired but such taking possession and use shall not be deemed an acceptance of any work not completed in accordance with the Contract Documents. Should the Owner take possession of and use any portion of the work for which the time for completion has not yet expired and should the Contractor believe that such prior use increases the cost or delays in the work, he may make a claim for an increase in the Contract price and/or for an extension of time as provided the General Provisions.
- 6.4. A waiver on the part of the Owner for any breach of any part of the Contract shall not be held to be a waiver of any other or subsequent breach.

## **7. TESTING AND SURVEYING**

- 7.1. Field surveys shall be made by the Contractor to determine compliance of construction with the Plans and Specifications and for quantity measurements. The Contractor will incur the costs of routine compliance and measurement surveys performed during the ordinary course of construction, as well as all costs of additional field surveys required due to inconsistent or inaccurate construction techniques, or performance of unacceptable or unauthorized work, or any other reason determined by the Engineer to be principally the cause of the Contractor. Said additional surveys are not considered to be routine. Work found to be unacceptable or unauthorized shall not be paid for and, if directed by the Engineer, shall be removed at the Contractor's expense.
- 7.2. The Contractor will be provided horizontal and vertical control points by the Engineer. The Contractor must furnish, at his expense, all additional stakes and materials for layout and construction of the work.
- 7.3. The Contractor shall provide Quality Control Testing as required to record that the project materials have been constructed per the requirements of the plans and specifications.
- 7.4. Owner will provide quality assurance testing as required by the specifications. Quality assurance testing will be completed when Contractor notifies the Engineer that materials have been constructed per the requirements of the plans and specifications and items are ready for testing. Re-testing or re-inspection required because of non-conformance to specified requirements shall be performed by the Engineer. Payment for re-testing or re-inspection will be charged to the Contractor by deducting testing charges from the contract price.

## **8. CHANGE OF THE CONTRACT PRICE**

- 8.1. The Contract Price constitutes the total compensation payable to the Contractor for performing the work subject to additions and deductions as provided in the Contract Documents. All duties, responsibilities and obligations assigned to or undertaken by the Contractor shall be at his expense without change in the Contract Price. Except as otherwise specified, the Contract Price may only be changed by a Change Order, or Supplemental Agreement.
- 8.2. The Contractor shall not act on instructions received by him from persons other than the Engineer, and any claims for extra compensation on account of such instructions will not be honored.
- 8.3. In determining the amount of Contract Price adjustment, the parties shall apply the following methods, as appropriate:
  - 8.3.1. Emergency Work: In the event of emergency endangering life or property, the Contractor may be directed by the Engineer to proceed on a time and material basis whereupon the Contractor shall so proceed and keep accurately in such form as may be required, a correct account of costs together with all proper invoices, payrolls, and supporting data therefore.
  - 8.3.2. Claims for Increase: Where the Engineer and Owner, upon receipt of a proper claim for increase in Contract Price determine that an increase is warranted and where none of the above methods of Contract Price adjustment are applicable, the amount of increase shall be determined by negotiation between the Contractor and the Engineer, subject to final approval by the Owner.

## **9. CORRECTION OF WORK BEFORE FINAL PAYMENT**

- 9.1. Any work, materials, fabricated items, or other parts of the work which have been found by the Engineer to be faulty or not in accordance with the Contract Documents shall be removed from the work site by the Contractor, and immediately replaced by new work in accordance with the Contract at no additional cost to the Owner. Work or property of the Owner or others damaged or destroyed by virtue of such condemned work shall be made good at the expense of the Contractor.
- 9.2. Correction of condemned work described above shall commence by the Contractor immediately after notice from the Engineer and shall be pursued to completion.
- 9.3. Final payment will not be made until the Engineer has approved such corrections.
- 9.4. Should the Contractor fail to proceed reasonably with the above-mentioned corrections within 24 hours of receiving notice from the Engineer, the Owner may proceed with corrections, paying the cost of same from amounts due or to become due to the Contractor. Condemned work so removed shall be the property of the Contractor, and shall be removed from the site of the work by him within five (5) days after notice to remove it, or thereafter may be disposed of by the Owner without compensation to the Contractor. The cost of such disposal shall be deducted from amounts due or to become due to the Contractor.
- 9.5. Should the cost of correction of the work and, if applicable, disposal of the condemned work by Owner exceed amounts due or to become due the Contractor, then the Contractor and his surety shall be liable for and shall pay to the Owner the amount of said excess.

## **10. CORRECTION OF WORK AFTER FINAL PAYMENT**

- 10.1. Neither the final certificate, final payment, occupation of the premises by the Owner, nor any provision of the Contract, nor any other act or instrument of the Owner or the Engineer shall relieve the Contractor from responsibility for negligence, or faulty material or workmanship, or failure to comply with the Plans and Specifications. He shall correct or make good any defects due thereto and repair any damage resulting therefrom which may appear during a period of twelve (12) months following final acceptance of the work except as stated otherwise under the provisions of the Contract Documents. The Owner will report any defects as they may appear to the Engineer, who will give instructions and a time limit for completion of corrections to the Contractor, which instructions shall be binding upon the Contractor. The Engineer will be the judge as to the responsibility for correction of defects.

## **11. OWNER'S RIGHT TO DO WORK**

- 11.1. If, during the progress of the work or during the period of guarantee, the Contractor fails to prosecute the work properly or to perform any provision of the contract, the Owner, after written notice to the Contractor from the Engineer or Owner, may perform or have performed that portion of the work and may deduct the cost thereof from any amounts due or to become due the Contractor.
- 11.2. Should the cost of such action of the Owner exceed the amount due or to become due the Contractor, then the Contractor and his surety shall be liable for and shall pay to the Owner the amount of said excess.

## **12. CONTRACTOR, SUBCONTRACTOR & SUPPLIER AFFIDAVIT**

- 12.1. The final payment of retained amounts due the Contractor under this Contract shall not become due until the Contractor has furnished to the Owner through the Engineer:
- 12.1.1. an affidavit, signed, sworn, and notarized by the Contractor to the effect that all payments for materials, services, or for any other reason in connection with this Contract have been satisfied and that no claims or liens exist against the Contractor in connection with this contract; and
- 12.1.2. affidavits from each Subcontractor, of any tier, and supplier signed, sworn and notarized to the effect that:
- 12.1.2.1. each such Subcontractor or supplier has been paid in full by the Contractor for all work performed and/or materials supplied by him/her in connection with the project, and
- 12.1.2.2. that all payments for materials, services, and for any other reason in connection with his subcontract or supply contract have been satisfied and that no claims or liens exist against the Subcontractor or supplier in connection therewith.
- 12.2. In the event that the Contractor cannot obtain similar affidavits from Subcontractors or suppliers to protect the Contractor and the Owner from possible liens or claims against the Subcontractors or suppliers, the Contractor shall state in his affidavit that no claims or liens exist against any Subcontractor or supplier to the best of the Contractor's knowledge, and that if any appear afterwards, the Contractor shall save the Owner harmless on account thereof.

### **13. USE OF PREMISES**

- 13.1. The Contractor shall confine his apparatus, the storage of materials and the operations of his workers to limits indicated by law, ordinances, permits and directions of the Engineer and shall not exceed those established limits in his operation.
- 13.2. The Contractor shall not load or permit any part of any structure to be loaded with a weight that will endanger its safety.
- 13.3. The Contractor shall enforce all of the Engineer's instructions, including, but not limited to, those regarding signs, advertisements, fires and smoking.

### **14. LIMITATIONS OF WORK AREA**

- 14.1. Limited parking areas, for employees of the Contractor and the Subcontractors, shall be designated in the vicinity of the project, and it shall be the responsibility of the Contractor to require such employees to park in this designated area and not any area which may interfere with the operations in and around the construction site or the airport.
- 14.2. The Contractor and his employees and all Subcontractors and their employees shall be aware of the security procedures in effect in the work area. Full responsibilities will be explained at the preconstruction meeting.

### **15. CUTTING, PATCHING AND FITTING**

- 15.1. The Contractor shall do all cutting, fitting and patching of his work that may be required to make its several parts come together properly and fit it to receive or to be received by work shown upon or which can be reasonably implied from the Plans and Specifications for the completed project and to fit the project to existing facilities surrounding the work area.



## 16. DISPUTE RESOLUTION

- 16.1. In the event of any dispute, claim, question or disagreement arising out of or relating to this Agreement or breach thereof, the parties hereto shall use their best effort to settle such matter by mutual agreement. To this effect, responsible, authorized representatives of the parties shall meet, consult, and negotiate with each other in good faith, and, recognizing their mutual interests, attempt to reach a joint and equitable solution satisfactory to both parties. If they do not reach such solution within a period of thirty (30) days after the first notice by either party to the other of the existence of the dispute, and upon the notice of either party to the other, the dispute shall be resolved by proceeding with the dispute resolution procedures set forth herein below.
- 16.2. If the parties fail to agree on the resolution of any dispute through the negotiation process above, the parties shall proceed in good faith to attempt to settle the dispute through mediation under the Construction Industry Mediation Rules of the American Arbitration Association ("AAA"), subject to and in accordance with its rules governing the mediation of such disputes. Any party who chooses to first refer the dispute to mediation may, in its notice to the other, elect to refer the matter to either the AAA or to the CIDRS for mediation. Mediation is a precondition to further dispute resolution by the parties, and the dispute resolution procedure set forth herein below shall only be available following a declaration of "impasse" by a mediator or by the mutual agreement of the parties.
- 16.3. If "impasse" is declared in any mediated dispute, the matter shall be submitted to arbitration with the AAA or Construction Industry Rules of the CIDRS. Notice of intent to seek arbitration of any unresolved dispute shall be given by the claiming party within ten (10) days of the declaration of impasse. The responding party shall select either AAA or CIDRS within seven (7) days of the receipt of the notice of intent to arbitrate.
- 16.4. The following additional rules and procedures shall apply to all disputes arising under this Agreement and shall be in addition to or, in the case of any conflict with, shall be in lieu of the applicable rules of the AAA or CIDRS:
  - 16.4.1. The parties acknowledge that this Agreement may evidence a transaction involving interstate commerce. Nonetheless, in rendering the award, the arbitrator(s) shall determine the rights and obligations of the parties according to substantive and procedural laws of North Carolina.
  - 16.4.2. All negotiations and mediation sessions and all arbitration hearings shall take place in the offices of the Airport, or such other place as the parties may agree upon.
  - 16.4.3. In the arbitration of any dispute less than \$100,000, the sole arbitrator shall be a retired North Carolina or Federal Judge residing in North Carolina. In disputes of \$100,000 or more, an arbitration panel of three (3) experienced construction industry professionals shall be appointed and shall include
    - 16.4.3.1. one architect or Engineer,
    - 16.4.3.2. one construction attorney or retired State or Federal Judge residing in North Carolina, and

- 16.4.3.3. either one construction industry executive or a senior staff representative of a public or private Owner of a facility of the kind described in this Agreement.
- 16.5. The Owner, the Contractor, all Subcontractors, material suppliers, engineers, designers, architects, and their respective bonding companies and insurers and all other parties concerned with the construction of the improvements described in this Agreement are bound by this Dispute Resolution Clause to the greatest extent permitted by law, and all such parties consent and agree to the consolidation of all phases of the dispute resolution process hereunder with the dispute resolution proceedings pending among other parties whenever such proceeding arises out of the same transaction or are related to the same subject matter. The motion to consolidate may be made by any interested party and will be by an order of the arbitrator(s)' petitioned If such arbitrator(s) fail to make such order, parties may apply to the local Superior Court for such order.
- 16.6. At any time in the dispute resolution proceeding, the parties may agree to a high/low limitation which shall be binding upon all further proceedings.
- 16.7. Discovery procedures may not be undertaken during negotiations or mediation phases. However, the parties shall proceed in good faith to make disclosures to the other party of all facts, documents, records and other evidence upon which each party bases its claim or defense.
- 16.8. Prior to any arbitration hearing, limited discovery shall be permitted for the purpose of obtaining production of documents and taking depositions. The Rules of Civil Procedure imposed by North Carolina shall govern all discovery. The arbitrator(s) shall decide all issues regarding conformation with discovery requests. Request for discovery shall be initiated within thirty (30) days after the notice of intent to arbitrate is given and shall be fully responded to within thirty (30) days after receipt. All discovery, including depositions, shall be completed within seventy-five (75) days of the notice of intent to arbitrate or the arbitrator(s) or either party shall extend or reduce the time for discovery.
- 16.9. Upon request of either party made prior to the initial hearing the arbitrators' award shall be in writing and shall include findings of fact and conclusions of law, which support the award.
- 16.10. Either party may appeal the arbitration award to appellate arbitration by filing with the AAA, within twenty (20) days after transmittal of the award, a written brief; not to exceed twenty (20) pages, stating the reason why the arbitrator(s)' decision should be reversed or modified. The opposing party shall have twenty (20) days to file a responsive brief; not to exceed twenty (20) pages. An appellate arbitrator shall be appointed by the AAA and shall be a retired North Carolina Superior Court or Appellate Judge. Either party may request oral argument which must be concluded within fourteen (14) days following submission of the final brief. No additional evidentiary material may be introduced in the appellate arbitration. The appellate arbitrator shall render a written decision affirming, reversing modifying or remanding the arbitrator(s)' decision within twenty (20) days after receiving the final appellate submission. The appellate arbitrator may base its decision only on one or more of the following grounds:
- 16.10.1. Any ground specified in 9 U.S.C. Sections 10 or 11;
- 16.10.2. A material error of applicable law by the arbitrator;
- 16.10.3. A determination that the award was partially or wholly arbitrary or capricious.

- 16.10.4. The appellate arbitrator may render a final decision on appeal or may remand the matter for further proceeding by the arbitrator(s).
- 16.11. All fees and expenses of the mediation and of the arbitration procedures shall be borne by the parties equally. However, each party shall bear the expense of its own counsel, experts, witnesses, and preparation and presentation of proofs. Only in the case of extreme abuse of the procedure may the arbitrator(s) reallocate such costs and expenses among the parties.
- 16.12. The dispute resolution procedures set forth hereinabove shall be the exclusive remedies available to the parties to the Agreement to settle or resolve any and all disputes arising hereunder and any settlement or arbitral award may be enforced by an action in the Superior Court of the county in which the project resides.

## **17. TAXES**

- 17.1. The Contractor shall include in the bid and shall pay all taxes (including sales or use taxes) assessed by any authority on the work or the labor and materials used therein. The Contractor understands and agrees that the Contractor is responsible for payment of any such taxes owed, and further agrees that in the case of the joint liability of the Contractor and the Owner for any such tax, the Contractor is responsible for paying the tax. The Contractor agrees to indemnify and hold harmless the Owner against any such tax liabilities. In the event the Contractor fails to pay any such tax when due and the Owner is required to pay such tax, the Contractor agrees to reimburse Owner for same and further agrees that the Owner shall have the right to set off the amount of such tax against any sum owed the Contractor. It is understood by the parties that the above section of this Contract shall apply to and be fully enforceable against the Contractor, regardless of whether it is "engaged in business" in North Carolina, is an out-of-state Contractor, or is legally domiciled and qualified to do business in this state.
- 17.2. The Contractor shall maintain all tax records during the life of the project and furnish the Engineer with a complete listing of all taxes paid by county, material purchased, invoice number, date, amount, etc. for all material purchased that qualifies for reimbursement of such taxes to the Owner pursuant to State and Local tax codes. The Contractor shall use the form bound in these Contract Documents for its monthly submittals. The Contractor is required to maintain a file showing taxes paid on the project for one year or turn said documents over to the Owner.
- 17.3. The following is a list of requirements to be followed by the Contractor in maintaining proper records and reporting North Carolina Sales and Use Tax and Local Sales and Use Tax. The Contractor shall comply fully with the requirements outlined below, in order that the Owner may recover the amount of the tax permitted under the law.
- 17.3.1. It shall be the Contractor's responsibility to furnish the Engineer documentary evidence showing the materials used and Sales and Use Tax paid by the Contractor and each of his Subcontractors. Such evidence shall be transmitted to the Engineer monthly with the following month's request for payment.
- 17.3.2. The documentary evidence shall consist of a certified statement by the Contractor and each of his Subcontractors individually showing total purchases of materials from each separate vendor and total Sales and Use Taxes paid each vendor. Certified

statements must show the material purchased, invoice number (or numbers) covered and inclusive dates of such invoices.

- 17.3.3. Materials used from Contractor's or Subcontractor's warehouse stock shall be shown in a certified statement at warehouse stock prices.
- 17.3.4. The Contractor shall not be required to certify the Subcontractor's statements.
- 17.3.5. NOT USED.
- 17.3.6. NOT USED.

**18 CONTRACTOR'S SALES TAX REPORT  
STATE AND LOCAL TAXES PAID**

CONTRACTOR: \_\_\_\_\_  
ADDRESS: \_\_\_\_\_  
\_\_\_\_\_

OWNER: \_\_\_\_\_  
PROJECT: \_\_\_\_\_  
FOR PERIOD: \_\_\_\_\_ To: \_\_\_\_\_

\* County is the county of delivery or county in which the contractor directly picked up the merchandise.

VENDOR	ADDRESS	SUMMARY OF ITEMS PURCHASED	INVOICE NUMBER	INVOICE DATE	INVOICE AMOUNT	STATE TAXES	COUNTY TAXES	TOTAL TAXES	*NAME OF COUNTY

TOTAL: \_\_\_\_\_

**NOTE: ATTACH COPIES OF INVOICES AS DESCRIBED ABOVE**

I, \_\_\_\_\_, certify that the foregoing statement of applicable sales taxes paid in connection with the referenced contract is true to the best of my knowledge and belief.

Signed: \_\_\_\_\_ Title: \_\_\_\_\_

I, \_\_\_\_\_, Notary Public for \_\_\_\_\_ County, State of \_\_\_\_\_, do hereby certify that \_\_\_\_\_ personally appeared before me this day and acknowledged the due execution of the foregoing instrument.

Witness my hand and official seal, this the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
Notary Public (Official Seal)

Printed Name \_\_\_\_\_

My commission expires \_\_\_\_\_, 20\_\_\_\_

SP-15

Albert J. Ellis Airport  
South GA Expansion  
Bid No. 101-25C  
WKD Project No.:20240074.00.WK

THIS PAGE IS LEFT BLANK INTENTIONALL

## **19. OPERATION OF AIRPORT**

- 19.1. Insofar as is possible, the Contractor agrees that the sequence of operations under this Contract shall be scheduled and carried out so as to ensure regular operation of the airport except for scheduled closings. The Contractor will not be allowed to close any areas for construction until so authorized by the Engineer. When the Contract work requires the Contractor to work within the areas used by aircraft and support vehicles of the airport on an intermittent basis, the Contractor shall obtain an airfield radio and constantly monitor radio communications (Unicom Frequency 122.950) from pilots using the airport, immediately vacate runway and taxiway areas until traffic is clear. Failure to maintain the specified communications or to obey these instructions shall be cause for suspension of the Contractor's operations in such areas until the satisfactory conditions are provided.

## **20. SEVERABILITY**

- 20.1. If any provision of the Contract shall be declared invalid or unenforceable, the remainder of the Contract shall continue in full force and effect.

## **21. NOT USED**

## **22. DUTIES, RESPONSIBILITIES AND LIMITATIONS OF AUTHORITY OF RESIDENT PROJECT REPRESENTATIVE**

- 22.1. GENERAL - The Resident Project Representative shall be the representative of the Engineer and shall act under the direction of the Engineer. The Engineer and the Engineer's Resident Project Representative shall have authority to act on behalf of the Owner only to the extent provided in the contractual agreements to which the Engineer is a party. The Resident Project Representative shall confer with the Engineer regarding their required actions at intervals and on occasions appropriate to the progress of construction. The Resident Project Representative's interaction and communications in matters pertaining to the on-site work in general shall be only with the Engineer and the Contractor. The Resident Project Representative shall communicate with Subcontractors only through, or with the full knowledge and authorization of, the Contractor or his superintendent. The Resident Project Representative shall generally communicate with the Owner only through or as directed by the Engineer.

- 22.2. DUTIES AND RESPONSIBILITIES - The Resident Project Representative shall:

- 22.2.1. Review the construction progress schedule, schedule of Shop Drawing submittals, schedule of values, schedules of equipment, materials and supplies order placement, project manpower schedule and other schedules prepared by the Contractor and consult with the Engineer, who shall likewise consult with the Owner in this same regard, concerning their acceptability. Throughout the course of the Work, he shall monitor the construction progress schedule and report to the Engineer, who shall likewise report to the Owner, any conditions which may cause delay in completion of the Work.
- 22.2.2. Attend the project preconstruction meeting. Schedule progress meetings and other job conferences in consultation with the Engineer and notify in advance those expected to attend. Attend meetings, including progress meetings, job conferences

and any others as directed by the Engineer, maintain and circulate copies of minutes thereof, and report to the Engineer, who shall likewise report to the Owner, on the proceedings.

- 22.2.3. Serve as the Engineer's liaison with the Contractor, working principally through the Contractor's superintendent, and assist the Contractor in understanding the intent of the Contract Documents. Assist the Engineer in serving as the Owner's liaison with the Contractor when the Contractor's operations affect the Owner's on-site operations.
- 22.2.4. As requested by the Engineer, assist in obtaining from the Owner additional details or information and in making necessary arrangements and carrying out coordination of activities when required at the job site for proper execution of the Work.
- 22.2.5. In the interest of preserving the proper channels of communication, advise the Engineer if he is aware of any direct communication between the Owner and the Contractor.
- 22.2.6. Assist the Engineer in reviewing Shop Drawings, Product Data and Samples.
- 22.2.7. Receive and record the date of receipt of Shop Drawings and Samples and any actions subsequent to shop drawing reviews by the Engineer.
- 22.2.8. Receive and log Samples which are required to be furnished at the site by the Contractor for the Engineer's approval, notify the Engineer of their availability and readiness for examination, and record the Engineer's approval or other action. Maintain custody of approved samples.
- 22.2.9. Notify the Engineer and the Contractor or his resident superintendent immediately if any portion of the Work requiring submittal of Shop Drawings, Product Data or Samples is commenced before the Engineer has approved such submittals.
- 22.2.10. Conduct on-site observations and inspections of the progress and quality of the Work to determine and assist the Engineer in determining and to make certain within reason that the project is proceeding in accordance with the Contract Documents and that all work performed by the Contractor is in accordance with the intent and conforms to the requirements of the Contract Documents.
- 22.2.11. Notify the Engineer, who shall likewise notify the Owner, and the Contractor immediately whenever he believes that any Work in progress or completed is unsatisfactory, faulty or defective, is not in accordance with the intent and/or does not conform to the requirements of the Contract Documents, has been damaged, or does not meet the requirements of any inspections, tests or approvals required to be made.
- 22.2.12. Notify the Engineer, who shall likewise notify the Owner and the Contractor immediately whenever he believes that Work in progress or completed should be uncovered for observation or requires special inspection or testing.
- 22.2.13. Reject unsatisfactory, faulty or defective Work in progress or completed which is not in accordance with the intent and/or the requirements of the Contract Documents, immediately and directly inform the Contractor or his superintendent of such rejection, and report such rejection to the Engineer, who shall likewise notify the



Owner, and require correction of such unsatisfactory, faulty or defective Work immediately or within a reasonable period of time.

- 22.2.14. Make certain that all unsatisfactory, faulty or defective Work previously rejected is properly corrected before being covered up by the Contractor or other Work being placed above.
- 22.2.15. Verify that tests, equipment and systems startups and operating and maintenance instructions are conducted or followed as required by the Contract Documents and in the presence of the required personnel, that the Contractor maintains adequate records thereof, and maintain details relative to test procedures, startups and test results. Verify the accuracy of all testing invoices which are to be paid by the Owner. Order all tests required by the Contract Documents which are to be paid for by the Owner.
- 22.2.16. Accompany the Owner's authorized representative and visiting inspectors representing public or other agencies having jurisdiction over the Project on visits to the Project site, record the names, titles, dates, times and outcomes relative to such inspections, and report this information to the Engineer.
- 22.2.17. Review the Contract Documents with the Contractor's superintendent. Obtain necessary clarifications and interpretations of the Contract Documents from the Engineer and transmit them to the Contractor.
- 22.2.18. Consider and evaluate the suggestions and recommendations of the Contractor for modifications to the Plans and Specifications and submit them with recommendations to the Engineer for a final decision.
- 22.2.19. Maintain at the job site orderly records and files for correspondence, reports of job conferences, Shop Drawings, Product Data and Sample submittals, reproductions of original Contract Documents including all Addenda, Change Orders, Field Orders, additional or supplementary Plans issued subsequent to the execution of the Contract, the Engineer's clarifications and interpretation of the Contract Documents, progress reports, requests for payment, directives of the Engineer, names, addresses, and telephone numbers of all contractors, subcontractors and principal equipment and materials suppliers, and other Project-related documents. Transmitting communications on acceptance of work, requests for information to or from the Contractor, or other important information relating to project schedule, inspections, activities or work issues shall be made in writing to the Contractor with a copy to the Engineer. These written communications should include the date and time of transmittal.
- 22.2.20. Keep a diary or log book throughout the Construction Phase, recording the Contractor's hours, manpower and equipment on the job site, the Resident Project Representative's time on and daily activities related to the Project, weather conditions, nature and location of Work being performed each working day by each Contractor, verbal instructions and interpretations received from the Engineer and/or given to the Contractor, data relative to questions of extras or deductions, list of principal visitors with dates and times of visits, decisions reached, observations in general, specific observations in more detail as in the case of observing test procedures, instances of rejected Work and corrective action taken by the Contractor

relative thereto, and other pertinent and relevant information. The Resident Project Representative should have available a digital camera to record meaningful construction progress, buried or obscured utilities, potentially faulty work or other items of work where digital photograph records would prove beneficial to documenting the construction work. These digital records should be stored on reproducible media and transmitted along with copies of each week's daily inspection reports to the Engineer and the Owner the first of the following week.

- 22.2.21. Observe the Contractor's record plans continually and notify the Engineer and the Contractor of any apparent failure by the Contractor to maintain an up-to-date copy of record plans at the Project site.
  - 22.2.22. Furnish the Engineer and the Owner periodic summary reports, in addition to the daily inspection reports, of the progress of the Work and of the Contractor's compliance with the approved construction progress schedule, schedule of Shop Drawing submittals and other schedules.
  - 22.2.23. Consult with the Engineer in advance of schedules major tests, inspections or start of important phases of the Work.
  - 22.2.24. Review Applications for Payment with the Contractor for compliance with the procedure established by the Contract Documents for their submittal and forward them with recommendations for disposition to the Engineer, noting particularly their relation to the schedule of values, work satisfactorily completed and materials and equipment delivered to and stored at the Project site.
  - 22.2.25. During the course of the Work, verify that guarantees, certificates, maintenance and operating manuals and other data required to be assembled and furnished by the Contractor are applicable to the items actually installed, and deliver these data to the Engineer for his review and forwarding to the Owner prior to final acceptance of the Work.
  - 22.2.26. If a semi-final inspection is performed, transmit to the Contractor a list of observed items requiring correction.
  - 22.2.27. Assist the Engineer in final inspection of the Work in the company of the Owner and the Contractor and preparation and transmittal to the Contractor of a final list of items to be corrected.
  - 22.2.28. Verify that all items on the final inspection list have been corrected and make recommendations to the Engineer concerning acceptance.
  - 22.2.29. Receive from the Contractor and prepare for transmittal to the Owner the documentation the Contractor is required to furnish at the completion of the Work.
- 22.3. LIMITATIONS OF AUTHORITY - Except upon written instructions and directions of the Engineer, the Resident Project Representative shall not:
- 22.3.1. Authorize any deviation from the Contract Documents or approve any substitute materials or equipment.

- 22.3.2. Assume or undertake any of the responsibilities of the Contractor, Subcontractors or the Contractor's superintendent.
- 22.3.3. Expedite the Work for the Contractor.
- 22.3.4. Advise on or issue directions relative to any aspect of the means, methods, techniques, sequences or procedures of construction unless such is specifically called for in the Contract Documents.
- 22.3.5. Advise on or issue directions as to safety precautions and programs in connection with the Work.
- 22.3.6. Authorize or suggest that the Owner occupy the Project in whole or in part.
- 22.3.7. Personally conduct or participate in specialized field or laboratory tests or inspections conducted by others or require special inspection or testing.
- 22.3.8. Assist the Contractor in maintaining an up-to-date copy of record plans or prepare or certify to the preparation of record plans.
- 22.3.9. Issue a Certificate of Payment or a Certificate of Completion of the Work.
- 22.3.10. Order the Contractor to stop the Work or any portion thereof.

## **23. AIRPORT PROJECT PROCEDURES (CONSTRUCTION SAFETY PLAN)**

(See appendix for CSPP)

- 23.1. The Contractor shall limit his work within the areas designated on the Construction Safety Plan. Regardless of any other written or verbal communication issued on this Project, Safety is solely the responsibility of the Contractor.
- 23.2. The Contractor is required to employ a Safety Officer who will be the liaison between the Contractor, the Engineer, and the Owner in all safety related matters for the duration of the project. The safety officer shall be on call 24 hours per day for emergency maintenance of airport hazard lighting, barricades, and other safety features.
- 23.3. The Contractor shall be responsible for field marking and protecting all utilities within the construction limits.
- 23.4. All equipment, vehicles, and materials must be stored in the designated storage or staging area or in areas acceptable to the Engineer. The Contractor's vehicles and equipment shall be marked in accordance with state and federal safety regulations.
- 23.5. No open flames or burning will be allowed on Airport property except as specifically authorized by the Engineer in writing.
- 23.6. The Contractor shall comply with all applicable federal, state, and local laws, ordinances, and regulations governing safety, health, and sanitation; shall provide barricades; and shall take any other needed actions, on his own responsibility, that are reasonably necessary to protect life and health of employees on the job, the safety of airport users, the safety of moving and parked vehicles and other property during the performance of the work.

- 23.7. Except as otherwise specified, the most current version of FAA AC 150/5370-2 and all its references shall be used in maintaining airport operational safety during construction.
- 23.8. The Contractor shall integrate and maintain requirements of airport operational safety into each planning and work schedule. The Contractor's Safety Officer shall continuously monitor all planning schedules and work underway for compliance to AC 150/5370-2; and shall maintain vigilance to detect areas needing attention due to oversight or altered construction activities. Airport operational safety during construction will be on the agenda at the pre-construction conference and each coordination and progress meeting.
- 23.9. Except as specified directly, no measurement or payment will be made for the work in this section; it will be considered as incidental cost to Mobilization and other items of work.

## **24. PROJECT TIME AND LIQUIDATED DAMAGES**

- 24.1. The work as described by the Contract documents and as shown on the plans shall be completed and ready for use by the Owner within the time shown below after the date of Notice to Proceed. The time schedule for completion of this project is critical and liquidated damages as prescribed in the Contract will be enforced.
- 24.2. Owner and Contractor recognize that time is of the essence and that the Owner will suffer financial loss if the work is not substantially complete in the accordance with the time specified herein. They also recognize the delays, expenses and difficulties involved in proving in a legal or arbitration preceding the actual loss suffered by the Owner if the work is not completed on time. Accordingly, instead of requiring any such proof, the Owner and Contractor agree that as liquidated damages for delay (but not as a penalty) the Contractor shall pay the Owner the amounts stipulated herein.
- 24.3. The Contractor further understands and hereby expressly agrees that in addition to liquidated damages specified herein, to pay the Owner the actual costs to the Owner for any inspector or inspectors necessarily employed by the Owner on the work and the actual costs to the Owner for the Engineer's observation of construction and project representative services including all travel and subsistence expenses after the date specified for project completion until the work is completed and ready for final payment. Further, the Contractor agrees that the sums to be paid the Owner may be deducted from the sum due the Contractor for work performed.

Contract Time: **Overall Project - 270 Calendar Days**

### **Phase 1A (Taxiway Closure) – 40 Calendar Days**

- 24.4. The Contractor shall complete all punch list items determined by the Owner and the Engineer within 14 consecutive calendar days from the date of Final Inspection, except for final pavement marking. Failure to do so will result in liquidated damages of \$2,000 per day beyond the 14-day period.

## 25. PROJECT RECORD DOCUMENTS

### 25.1. RECORDING

- 25.1.1. During daily progress of the work, the job superintendent for the Contractor shall record information concurrently with construction progress. Do not conceal any work until required information is recorded.
- 25.1.2. All field data for record information shall be obtained by a surveyor who is a Registered Land Surveyor (RLS) in the State of North Carolina. All field notes to determine the "as-built" conditions shall be sealed by the RLS who performed the survey and shall be submitted to the Engineer.
- 25.1.3. Record Information includes but is not limited to the following:
  - 25.1.3.1. Depths of various elements of foundation in relation to finish reference datum.
  - 25.1.3.2. Horizontal and vertical locations of pavements and underground utilities and appurtenances, referenced to permanent surface improvements or finish reference datum.
  - 25.1.3.3. Field changes of dimension and detail.
  - 25.1.3.4. Details not on original Contract Drawings.
  - 25.1.3.5. Changes made by field order or by Change Order.
  - 25.1.3.6. Extent and dimensions of pavement removal.
  - 25.1.3.7. Any other changes in the plans.
  - 25.1.3.8. Storm Drainage and Sanitary Sewer Systems:
    - 25.1.3.8.1. Pipes: Size, Material and invert elevations
    - 25.1.3.8.2. Structures (manhole, junction box, headwalls, etc.):  
Dimensions, invert, top and bottom elevations, and special weir walls.
  - 25.1.3.9. Electrical, Communication, Water, Gas and other non-gravity utilities:
    - 25.1.3.9.1. Exact distance between all manholes and points of intersection.
    - 25.1.3.9.2. Exact size and location of duct bank or conduit run and what circuits it applies to.
    - 25.1.3.9.3. Rim and invert elevation of all manholes and duct banks.
    - 25.1.3.9.4. Depth of cover on direct burial lines.
- 25.1.4. All horizontal control dimensions shall be to the nearest tenth of a foot. Elevations shall be to the nearest one-hundredth of a foot.

25.2. SUBMITTAL

- 25.2.1. At the close of the job and prior to receipt of final payment, the Contractor shall deliver to the Engineer for the Owner one complete set of Record Documents. Record drawings shall be submitted in AutoCAD and as a PDF signed and sealed by a Registered Land Surveyor (RLS) in the State of North Carolina.

**END OF SECTION**

## **TECHNICAL SPECIFICATIONS - CIVIL**

**This Page Intentionally Left Blank**



**Civil (WK Dickson)**

- 01 - C-100 Contractor Quality Control Program (CQCP)
- 02 - C-102 Temporary Air and Water Pollution, Soil Erosion, and Siltation Control
- 03 - C-105 Mobilization
- 04 - C-110 Method of Estimating Percentage of Material within Specification Limits (PWL)
  
- 05 - P-101 Preparation/Removal of Existing Pavements
- 06 - P-152 Excavation, Subgrade and Embankment
- 07 - P-209 Crushed Aggregate Base Course
- 08 - P-401 Asphalt
- 09 - P-603 Emulsified Asphalt Tack Coat
- 10 - P-610 Concrete for Miscellaneous Structures
- 11 - P-620 Runway and Taxiway Markings
  
- 12 - F-162 Chain Link Fence
  
- 13 - D-701 Pipe for Storm Drains and Culverts
- 14 - D-751 Manholes, Catch Basins, Inlets and Inspection Holes
  
- 15 - T-901 Seeding
- 16 - T-905 Topsoiling
- 17 - T-908 Mulch
  
- 18 - 01 31 22 Pre-Engineered Hangar Buildings
- 19 - 31 23 16.13 Trenching
- 20 - 32 12 16 Asphalt Paving
- 21 - 32 17 23 Pavement Markings
- 22 - 33 01 10.58 Disinfection of Water Utility Piping Systems
- 23 - 33 05 61 Concrete Manholes
- 24 - 33 11 00 Water Utility Distribution Piping

25 – 33 14 17 Site Water Service Utility Laterals

26 – 33 31 00 Sanitary Utility Sewerage Piping

**Electrical (WE Engineering)**

27 - L-100 General Provisions and Requirements for Electrical Work

28 - L-104 General Electrical Safety Requirements and Temporary Airfield Lighting

29 - L-105 Alterations, Removal, and Demolition

30 – L-106 Submittals, Record Documents

31 - L-108 Underground Power Cable for Airports

32 - L-110 Airport Underground Electrical Duct Banks and Conduits

33 - L-115 Electrical Manholes and Junction Structures

34 - L-125 Installation of Airport Lighting Systems

35 - L-131 Demonstrations, Tests, and Performance Verification

**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 both the Contractor and the Engineer 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 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

C-100-1

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 **on-site** 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.

C-100-2

(2) Engineer-in-training with two (2) years of airport paving experience.

(3) National Institute for Certification in Engineering Technologies (NICET) Civil Engineering Technology Level IV with three (3) years of airport paving experience.

(4) An individual with four (4) years of airport paving experience, with a Bachelor of Science Degree in Civil Engineering, Civil Engineering Technology or Construction.

The CQCPA must have full authority to institute any and all actions necessary for the successful implementation of the CQCP to ensure compliance with the contract plans and technical specifications. The CQCPA authority must include the ability to immediately stop production until materials and/or processes are in compliance with contract specifications. The CQCPA must report directly to a principal officer of the construction firm. The CQCPA may supervise the Quality Control Program on more than one project provided that person can be at the job site within two (2) hours after being notified of a problem.

**b. QC technicians.** A sufficient number of QC technicians necessary to adequately implement the CQCP must be provided. These personnel must be either Engineers, engineering technicians, or experienced craftsman with qualifications in the appropriate field equivalent to NICET Level II in Civil Engineering Technology or higher, and shall have a minimum of two (2) years of experience in their area of expertise.

The QC technicians must report directly to the CQCPA and shall perform the following functions:

(1) Inspection of all materials, construction, plant, and equipment for conformance to the technical specifications, and as required by paragraph 100-6.

(2) Performance of all QC tests as required by the technical specifications and paragraph 100-8.

(3) Performance of tests for the RPR when required by the technical specifications.

Certification at an equivalent level of qualification and experience by a state or nationally recognized organization will be acceptable in lieu of NICET certification.

**c. Staffing levels.** The Contractor shall provide sufficient qualified QC personnel to monitor each work activity at all times. Where material is being produced in a plant for incorporation into the work, separate plant and field technicians shall be provided at each plant and field placement location. The scheduling and coordinating of all inspection and testing must match the type and pace of work activity. The CQCP shall state where different technicians will be required for different work elements.

**100-4 Project progress schedule.** Critical QC activities must be shown on the project schedule as required by Section 80, paragraph 80-03, *Execution and Progress*.

**100-5 Submittals schedule.** The Contractor shall submit a detailed listing of all submittals (for example, mix designs, material certifications) and shop drawings required by the technical specifications. The listing can be developed in a spreadsheet format and shall include as a minimum:

a. Specification item number

b. Item description

c. Description of submittal

d. Specification paragraph requiring submittal

e. Scheduled date of submittal

**100-6 Inspection requirements.** QC inspection functions shall be organized to provide inspections for all definable features of work, as detailed below. All inspections shall be documented by the Contractor as specified by paragraph 100-9.

Inspections shall be performed as needed to ensure continuing compliance with contract requirements until completion of the particular feature of work. Inspections shall include the following minimum requirements:

**a.** During plant operation for material production, QC test results and periodic inspections shall be used to ensure the quality of aggregates and other mix components, and to adjust and control mix proportioning to meet the approved mix design and other requirements of the technical specifications. All equipment used in proportioning and mixing shall be inspected to ensure its proper operating condition. The CQCP shall detail how these and other QC functions will be accomplished and used.

**b.** During field operations, QC test results and periodic inspections shall be used to ensure the quality of all materials and workmanship. All equipment used in placing, finishing, and compacting shall be inspected to ensure its proper operating condition and to ensure that all such operations are in conformance to the technical specifications and are within the plan dimensions, lines, grades, and tolerances specified. The CQCP shall document how these and other QC functions will be accomplished and used.

#### **100-7 Contractor QC testing facility.**

**a.** For projects that include Item P-401, Item P-403, and Item P-404, the Contractor shall ensure facilities, including all necessary equipment, materials, and current reference standards, are provided that meet requirements in the following paragraphs of ASTM D3666, *Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials*:

- 8.1.3 Equipment Calibration and Checks;
- 8.1.9 Equipment Calibration, Standardization, and Check Records;
- 8.1.12 Test Methods and Procedures

**b.** For projects that include P-501, the Contractor shall ensure facilities, including all necessary equipment, materials, and current reference standards, are provided that meet requirements in the following paragraphs of ASTM C1077, *Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation*:

- 7 Test Methods and Procedures
- 8 Facilities, Equipment, and Supplemental Procedures

**100-8 QC testing plan.** As a part of the overall CQCP, the Contractor shall implement a QC testing plan, as required by the technical specifications. The testing plan shall include the minimum tests and test frequencies required by each technical specification Item, as well as any additional QC tests that the Contractor deems necessary to adequately control production and/or construction processes.

The QC testing plan can be developed in a spreadsheet fashion and shall, as a minimum, include the following:

- a.** Specification item number (e.g., P-401)
- b.** Item description (e.g., Hot Mix Asphalt Pavements)
- c.** Test type (e.g., gradation, grade, asphalt content)
- d.** Test standard (e.g., ASTM or American Association of State Highway and Transportation Officials (AASHTO) test number, as applicable)
- e.** Test frequency (e.g., as required by technical specifications or minimum frequency when requirements are not stated)
- f.** Responsibility (e.g., plant technician)

**g. Control requirements (e.g., target, permissible deviations)**

The QC testing plan shall contain a statistically-based procedure of random sampling for acquiring test samples in accordance with ASTM D3665. The RPR shall be provided the opportunity to witness QC sampling and testing.

All QC test results shall be documented by the Contractor as required by paragraph 100-9.

**100-9 Documentation.** The Contractor shall maintain current QC records of all inspections and tests performed. These records shall include factual evidence that the required QC inspections or tests have been performed, including type and number of inspections or tests involved; results of inspections or tests; nature of defects, deviations, causes for rejection, etc.; proposed remedial action; and corrective actions taken.

These records must cover both conforming and defective or deficient features, and must include a statement that all supplies and materials incorporated in the work are in full compliance with the terms of the contract. Legible copies of these records shall be furnished to the RPR daily. The records shall cover all work placed subsequent to the previously furnished records and shall be verified and signed by the CQCPA.

Contractor QC records required for the contract shall include, but are not necessarily limited to, the following records:

**a. Daily inspection reports.** Each Contractor QC technician shall maintain a daily log of all inspections performed for both Contractor and subcontractor operations. These technician's daily reports shall provide factual evidence that continuous QC inspections have been performed and shall, as a minimum, include the following:

- (1) Technical specification item number and description
- (2) Compliance with approved submittals
- (3) Proper storage of materials and equipment
- (4) Proper operation of all equipment
- (5) Adherence to plans and technical specifications
- (6) Summary of any necessary corrective actions
- (7) Safety inspection.
- (8) Photographs and/or video

The daily inspection reports shall identify all QC inspections and QC tests conducted, results of inspections, location and nature of defects found, causes for rejection, and remedial or corrective actions taken or proposed.

The daily inspection reports shall be signed by the responsible QC technician and the CQCPA. The RPR shall be provided at least one copy of each daily inspection report on the work day following the day of record. When QC inspection and test results are recorded and transmitted electronically, the results must be archived.

**b. Daily test reports.** The Contractor shall be responsible for establishing a system that will record all QC test results. Daily test reports shall document the following information:

- (1) Technical specification item number and description
- (2) Test designation
- (3) Location
- (4) Date of test
- (5) Control requirements
- (6) Test results

C-100-5

- (7) Causes for rejection
- (8) Recommended remedial actions
- (9) Retests

Test results from each day's work period shall be submitted to the RPR prior to the start of the next day's work period. When required by the technical specifications, the Contractor shall maintain statistical QC charts. When QC daily test results are recorded and transmitted electronically, the results must be archived.

**100-10 Corrective action requirements.** The CQCP shall indicate the appropriate action to be taken when a process is deemed, or believed, to be out of control (out of tolerance) and detail what action will be taken to bring the process into control. The requirements for corrective action shall include both general requirements for operation of the CQCP as a whole, and for individual items of work contained in the technical specifications.

The CQCP shall detail how the results of QC inspections and tests will be used for determining the need for corrective action and shall contain clear rules to gauge when a process is out of control and the type of correction to be taken to regain process control.

When applicable or required by the technical specifications, the Contractor shall establish and use statistical QC charts for individual QC tests. The requirements for corrective action shall be linked to the control charts.

**100-11 Inspection and/or observations by the RPR.** All items of material and equipment are subject to inspection and/or observation by the RPR at the point of production, manufacture or shipment to determine if the Contractor, producer, manufacturer or shipper maintains an adequate QC system in conformance with the requirements detailed here and the applicable technical specifications and plans. In addition, all items of materials, equipment and work in place shall be subject to inspection and/or observation by the RPR at the site for the same purpose.

Inspection and/or observations by the RPR does not relieve the Contractor of performing QC inspections of either on-site or off-site Contractor's or subcontractor's work.

#### **100-12 Noncompliance.**

**a.** The 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-100-6



- 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**

**This Page Intentionally Left Blank**

## ITEM C-102

### TEMPORARY AIR AND WATER POLLUTION, SOIL EROSION, AND SILTATION CONTROL

#### DESCRIPTION

**102-1.** This item shall consist of temporary control measures as shown on the plans or as ordered by the 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, ditches, check dams, sediment basins, fiber mats, gravel, mulches, grasses, 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. Use of bird attracting seed such as millet will not be allowed.

**102-2.2 Mulches.** Mulches may be hay, straw, fiber mats, netting, bark, wood chips, or other suitable material reasonably clean and free of noxious weeds and deleterious materials per Item T-908. Mulches shall not create a wildlife attractant.

**102-2.3 Fertilizer.** Fertilizer shall be a standard commercial grade and shall conform to all federal and state regulations and to the standards of the Association of Official Agricultural Chemists.

**102-2.4 Silt fence.** Silt fence shall consist of polymeric filaments which are formed into a stable network such that filaments retain their relative positions. Synthetic filter fabric shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life. Silt fence shall meet the requirements of ASTM D6461.

**102-2.5 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.

C-102-1

**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" and a maximum of 34" above the ground surface. Posts shall be set no more than 10' 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" overlap and securely sealed. A trench shall be excavated approximately 4" deep by 4" 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 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*.

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 diversion ditches will be measured by the linear foot of ditches installed to redirect overland flow per project plans and details.
- b.** Temporary silt fence and silt fence outlets will be measured by the linear foot for silt fence installed maintained and removed per project plans and details.
- c.** Temporary sediment basins and removal of sediment basins shall be measured by each basin installed, and maintained and then removed and restored to final ground cover conditions per the project plans and details.
- d.** Temporary seeding and mulching will be measured by the acre. Fertilizers and necessary soil amendments shall be included in the price bid for temporary seeding and mulch.
- e.** Temporary construction entrances, concrete washouts, fiber check dams, inlet protection and riprap inlet protection shall all be measured by each unit installed per the project plans.
- f.** Erosion control matting and rip rap aprons shall be measured by the square yard of installed units that comply with the project plans and details.

**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 will be paid for under:

Item C-102-1	Temporary diversion ditch - per linear feet
Item C-102-2	Temporary silt fence - per linear feet
Item C-102-3	Temporary silt fence outlet - per each
Item C-102-4	Temporary sediment basin - per each
Item C-102-5	Temporary seeding and mulching - per acre
Item C-102-6	Temporary Construction Entrance
Item C-102-7	Erosion Control Matting
Item C-102-8	Rip Rap Apron (Class B)

C-102-3

Item C-102-9	Temporary Concrete Washout
Item C-102-10	Temporary Fiber Check Dams
Item C-102-11	Temporary Inlet Protection
Item C-102-12	Sediment Basin Removal
Item C-102-13	Temporary Rip Rap Inlet Protection

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. Contractor shall be required to provide staked construction survey of the project areas, and furnish and install barricades and safety features as directed on the Construction Safety and Phasing Plan (CSPP). Additionally, the work covered by this section consists of preparatory work and operations, including but not limited to:

1. Those necessary for the movement of personnel, equipment, supplies, and incidentals to the project site.
2. Those items necessary for providing the items required by the General Provisions, Special Provisions, and General Requirements.
3. Those items including but not limited to the establishment of all staging areas, temporary access and haul routes, and other facilities necessary for work in the project areas including restoration in these areas in accordance with the plans and specifications.
4. Those items necessary for the maintenance of vehicle and construction traffic; including but not limited to portable and stationary construction signs, barricades, drums, cones, and other traffic control devices.
5. Surveying and construction staking.
6. All barricades, barricade lights, and other phasing and detour devices.
7. Performance bond, labor and materials bond, insurance.
8. Those items for all other work in the various items on the project site which must be performed, or costs incurred prior to beginning work.
9. This item also includes all work outside the limits of construction that is necessary to demobilize and restore areas disturbed by the Contractor to their original condition including, but not limited to, haul route restoration, pavement rehabilitation, grading, seeding, mulching, cleaning, and disposal.

**105-2 Mobilization limit.** Mobilization shall be limited to **10** percent of the total project cost as bid.

**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.** An Engineer/RPR field office is not required.

**105-5.1 Airfield Barricades.** Airfield barricades and closed taxiway markers will be provided by the Contractor. The Contractor shall properly maintain and protect the barricades and markers during the construction. The Contractor shall be responsible for any damage due to his negligence and replace and repair as directed.

Payment for providing airfield barricades and taxiway closure markers shall be included in the lump sum price for mobilization. This price shall be full compensation for installing, relocating, repairing, furnishing all labor, equipment, tools and incidentals necessary to complete this item.

**105-5.2 FOD Equipment and Personnel.** The Contractor shall provide and maintain equipment and dedicated personnel for removal of Foreign Object Damage (FOD) debris from runways, taxiways, and apron areas. FOD shall be classified as any material such as dirt, rocks, sticks, or miscellaneous trash that can be hazardous to aircraft tires, ingested into the engine, or capable of becoming a projectile that could be hazardous to aircraft or personnel.

Payment for this item shall be included in the lump sum price for Mobilization. This price shall be full compensation for providing dedicated equipment and personnel throughout the duration of the project, hauling of FOD off the project site, maintenance of equipment, furnishing all materials, all labor, tools, tools and incidentals to complete this item.

#### **METHOD OF MEASUREMENT**

**105-6.1 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**

**105-6.2 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**

**This Page Intentionally Left Blank**

## 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:  $d_1 = (x_1 - X)$ ,  $d_2 = (x_2 - X)$  ...  $d_n = (x_n - X)$   
 $n$  = Number of subplot test values

**f.** For single sided specification limits (i.e., L only), compute the Lower Quality Index  $Q_L$  by use of the following formula:

$$Q_L = (X - L) / S_n$$

Where: L = specification lower tolerance limit

Estimate the percentage of material within limits (PWL) by entering Table 1 with  $Q_L$ , using the column appropriate to the total number ( $n$ ) of measurements. If the value of  $Q_L$  falls between values shown on the table, use the next higher value of PWL.

**g.** For double-sided specification limits (i.e., L and U), compute the Quality Indexes  $Q_L$  and  $Q_U$  by use of the following formulas:

$$Q_L = (X - L) / S_n$$

AND

$$Q_U = (U - X) / S_n$$

Where: L and U = specification lower and upper tolerance limits

Estimate the percentage of material between the lower (L) and upper (U) tolerance limits (PWL) by entering Table 1 separately with  $Q_L$  and  $Q_U$ , using the column appropriate to the total number ( $n$ ) of measurements, and determining the percent of material above  $P_L$  and percent of material below  $P_U$  for each tolerance limit. If the values of  $Q_L$  fall between values shown on the table, use the next higher value of  $P_L$  or  $P_U$ . Determine the PWL by use of the following formula:

$$PWL = (P_U + P_L) - 100$$

Where:  $P_L$  = percent within lower specification limit

$P_U$  = percent within upper specification limit

## EXAMPLE OF PWL CALCULATION

**Project:** Example Project

**Test Item:** Item P-401, Lot A.

### **A. PWL Determination for Mat Density.**

1. Density of four random cores taken from Lot A.

A-1 = 96.60

A-2 = 97.55

A-3 = 99.30

A-4 = 98.35

$n = 4$

2. Calculate average density for the lot.

$$X = (x_1 + x_2 + x_3 + \dots + x_n) / n$$

$$X = (96.60 + 97.55 + 99.30 + 98.35) / 4$$

$$X = 97.95\% \text{ density}$$

3. Calculate the standard deviation for the lot.

$$S_n = [((96.60 - 97.95)^2 + (97.55 - 97.95)^2 + (99.30 - 97.95)^2 + (98.35 - 97.95)^2) / (4 - 1)]^{1/2}$$

$$S_n = [(1.82 + 0.16 + 1.82 + 0.16) / 3]^{1/2}$$

$$S_n = 1.15$$

4. Calculate the Lower Quality Index  $Q_L$  for the lot. ( $L=96.3$ )

$$Q_L = (X - L) / S_n$$

$$Q_L = (97.95 - 96.30) / 1.15$$

$$Q_L = 1.4348$$

5. Determine PWL by entering Table 1 with  $Q_L = 1.44$  and  $n = 4$ .

$$PWL = 98$$

## B. PWL Determination for Air Voids.

1. Air Voids of four random samples taken from Lot A.

$$A-1 = 5.00$$

$$A-2 = 3.74$$

$$A-3 = 2.30$$

$$A-4 = 3.25$$

2. Calculate the average air voids for the lot.

$$X = (x_1 + x_2 + x_3 + \dots + x_n) / n$$

$$X = (5.00 + 3.74 + 2.30 + 3.25) / 4$$

$$X = 3.57\%$$

3. Calculate the standard deviation  $S_n$  for the lot.

$$S_n = [((3.57 - 5.00)^2 + (3.57 - 3.74)^2 + (3.57 - 2.30)^2 + (3.57 - 3.25)^2) / (4 - 1)]^{1/2}$$

$$S_n = [(2.04 + 0.03 + 1.62 + 0.10) / 3]^{1/2}$$

$$S_n = 1.12$$

4. Calculate the Lower Quality Index  $Q_L$  for the lot. ( $L = 2.0$ )

$$Q_L = (X - L) / S_n$$

$$Q_L = (3.57 - 2.00) / 1.12$$

$$Q_L = 1.3992$$

5. Determine  $P_L$  by entering Table 1 with  $Q_L = 1.41$  and  $n = 4$ .

$$P_L = 97$$

6. Calculate the Upper Quality Index  $Q_U$  for the lot. ( $U = 5.0$ )

$$Q_U = (U - X) / S_n$$

$$Q_U = (5.00 - 3.57) / 1.12$$

$$Q_U = 1.2702$$

7. Determine  $P_U$  by entering Table 1 with  $Q_U = 1.29$  and  $n = 4$ .

$$P_U = 93$$

8. Calculate Air Voids PWL

$$PWL = (P_L + P_U) - 100$$

$$PWL = (97 + 93) - 100 = 90$$

### EXAMPLE OF OUTLIER CALCULATION (REFERENCE ASTM E178)

**Project:** Example Project

**Test Item:** Item P-401, Lot A.

#### A. Outlier Determination for Mat Density.

1. Density of four random cores taken from Lot A arranged in descending order.

$$A-3 = 99.30$$

$$A-4 = 98.35$$

$$A-2 = 97.55$$

$$A-1 = 96.60$$

2. From ASTM E178, Table 1, for  $n=4$  an upper 5% significance level, the critical value for test criterion = 1.463.

3. Use average density, standard deviation, and test criterion value to evaluate density measurements.

a. For measurements greater than the average:

If (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

Percent Within Limits (P <sub>L</sub> and P <sub>U</sub> )	Positive Values of Q (Q <sub>L</sub> and Q <sub>U</sub> )							
	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10
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

Percent Within Limits (P <sub>L</sub> and P <sub>U</sub> )	Positive Values of Q (Q <sub>L</sub> and Q <sub>U</sub> )							
	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10
55	0.1806	0.1500	0.1406	0.1363	0.1338	0.1322	0.1312	0.1304
54	0.1447	0.1200	0.1125	0.1090	0.1070	0.1057	0.1049	0.1042
53	0.1087	0.0900	0.0843	0.0817	0.0802	0.0793	0.0786	0.0781
52	0.0725	0.0600	0.0562	0.0544	0.0534	0.0528	0.0524	0.0521
51	0.0363	0.0300	0.0281	0.0272	0.0267	0.0264	0.0262	0.0260
50	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Percent Within Limits (P <sub>L</sub> and P <sub>U</sub> )	Negative Values of Q (Q <sub>L</sub> and Q <sub>U</sub> )							
	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



Percent Within Limits (P <sub>L</sub> and P <sub>U</sub> )	Negative Values of Q (Q <sub>L</sub> and Q <sub>U</sub> )							
	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10
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**

**This Page Intentionally Left Blank**

**ITEM P-101**  
**DEMOLITION PAVEMENTS, STRUCTURES, PIPE**

**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.** This work does not apply to this project.

**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. The pavement shall be removed so the joint for each layer of pavement replacement is offset 1 foot from the joint in the preceding layer. This does not apply if the removed pavement is to be replaced with concrete or soil. The removed material shall be disposed of off the airport, unless otherwise specified.

**c. Repair or removal of Base, Subbase, and/or Subgrade.** All failed material including surface, base course, subbase course, and subgrade shall be removed and repaired as shown on the plans or as directed by the RPR. Materials and methods of construction shall comply with the applicable sections of these specifications. Any damage caused by Contractor's removal process shall be repaired at the Contractor's expense.

**101-3.2 Preparation of joints and cracks prior to overlay/surface treatment.** This work does not apply to this project.

**101-3.3 Removal of Foreign Substances/contaminates prior to overlay and remarking.** Removal of foreign substances/contaminates from existing pavement that will affect the bond of the new overlay or 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 RPR in the field during construction.

**High-pressure water, cold milling, or rotary grinding** may be used. Chemicals shall not be used. 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 deep. If it is deemed by the RPR 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 RPR.

Removal of foreign substances shall not proceed until approved by the RPR. 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 off-site at an approved dumping site.

#### **101-3.4 Concrete spall or failed asphaltic concrete pavement repair.**

**a. Repair of concrete spalls in areas to be overlaid with asphalt.** This article is not applicable for this project.

**b. Asphalt pavement repair.** The Contractor shall repair all spalled concrete as shown on the plans or as directed by the RPR. The failed areas shall be removed as specified in paragraph 101-3.1b. All failed material including surface, base course, subbase course, and subgrade shall be removed. Materials and methods of construction shall comply with the applicable sections of these specifications.

**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 unless specified otherwise on the plans. 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 RPR shall layout the area to be milled with a straightedge in increments of 1-foot 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'-0" and it shall be equipped with electronic grade control devices that will cut the surface to the grade specified. The tolerances shall be maintained within +0 inch and -1/4 inch of the specified grade. The machine must cut vertical edges and have a positive method of dust control. The machine must have the ability to remove the millings or cuttings from the pavement and load them into a truck.

**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 unless specified otherwise on the plans.

**101-3.6. Preparation of asphalt pavement surfaces prior to surface treatment.** Existing asphalt pavements to be treated with a surface treatment shall be prepared as follows:

**a. Patch asphalt pavement surfaces that have been softened by petroleum derivatives or have failed due to any other cause.** Remove damaged pavement to the full depth of the damage and replace with new asphalt pavement similar to that of the existing pavement in accordance with paragraph 101-3.4b.

**b. Repair joints and cracks in accordance with paragraph 101-3.2.**

c. Remove oil or grease that has not penetrated the asphalt pavement by scrubbing with a detergent and washing thoroughly with clean water. After cleaning, treat these areas with an oil spot primer.

d. Clean pavement surface immediately prior to placing the surface treatment so that it is free of dust, dirt, grease, vegetation, oil or any type of objectionable surface film.

**101-3.7 Maintenance.** The Contractor shall perform all maintenance work necessary to keep the pavement in a satisfactory condition until the full section is complete and accepted by the RPR. The surface shall be kept clean and free from foreign material. The pavement shall be properly drained at all times. If cleaning is necessary or if the pavement becomes disturbed, any work repairs necessary shall be performed at the Contractor's expense.

**101-3.8 Preparation of Joints in Rigid Pavement prior to resealing.** This article is not applicable for this project.

**101-3.8.1 Removal of Existing Joint Sealant.** All existing joint sealants will be removed by plowing or use of hand tools. Any remaining sealant and or debris will be removed by use of wire brushes or other tools as necessary. Resaw joints removing no more than 1/16 inch from each joint face. Immediately after sawing, flush out joint with water and other tools as necessary to completely remove the slurry.

**101-3.8.2 Cleaning prior to sealing.** Immediately before sealing, joints shall be cleaned by removing any remaining laitance and other foreign material. Clean joints by sandblasting, or other method approved by the Engineer, on each joint face with nozzle held at an angle and not more than 3" from face. Following sandblasting, clean joints with air free of oil and water. Allow sufficient time to dry out joints prior to sealing. Joint surfaces will be surface-dry prior to installation of sealant.

**101-3.8.3 Joint sealant.** Article not applicable for this project.

**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 RPR, that the method used cleans the cracks and does not damage the pavement.

**101-3.9.1 Preparation of Crack.** Widen crack with router or random crack saw 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.

**101-3.9.2 Removal of Existing Crack Sealant.** Existing sealants will be removed by routing or random crack saw. Following routing or sawing any remaining debris will be removed by use of a hot lance combined with oil and water-free compressed air.

**101-3.9.3 Crack Sealant.** Emulsified Tack Coat shall be used for cracks in areas to receive flexible pavement in accordance with **Item P-603**.

**101-3.9.4 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 RPR, inlets, manholes, and/or drainage endwalls 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 100% of ASTM D1557, when outside of paved areas must be compacted to 95% of ASTM D698.

## METHOD OF MEASUREMENT

**101-4.1 Gate Removal.** Removal of existing fence gates shall be measured per each gate access removed. This includes any necessary fence fabric and post removals that are required to install the new gate.

**101-4.2 Full Depth gravel and asphalt pavement removal.** The unit of measurement for pavement removal shall be the number of square yards removed by the Contractor. Full depth asphalt pavement removal shall also include the removal of the stone base under the existing asphalt. 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 Milling 2" Depth.** The unit of measure for cold milling shall be 2-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.

**101-4.3 Removal of Pipe and other Buried Structures.** The unit of measurement for removal of pipe and other buried structures will be made at the contract unit price for each completed and accepted item. This price shall be full compensation for all labor, equipment, tools, and incidentals necessary to complete this item in accordance with paragraph 101-3.9.4.

## BASIS OF PAYMENT

**101-5.1 Payment.** Payment shall be made at contract unit price for the unit of measurement as specified above. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Item P-101-1	Remove Existing Gate – per each
Item P-101-2	Full Depth Gravel Road Removal – per square yard
Item P-101-3	Full Depth Asphalt Pavement Removal - per square yard
Item P101-4	Rip Rap Removal and replacement - per square yard
Item P-101-5	Milling 2" Depth – per square yard
Item P-101-6	Remove 12" RCP – per linear foot
Item P-101-7	Remove 18" RCP – per linear foot
Item P-101-8	Remove 36" RCP – per linear foot
Item P-101-9	Remove Dual 36" Headwall – per each.

P-101-4

## **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**

**This Page Intentionally Left Blank**



**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.

The construction areas have been surveyed by the Owner to facilitate the determination of the quantities of excavation and embankment for this project. The Contractor shall have the option to accept the Owner's surveyed elevations, measurements, and quantities in the bid form, or provide surveyed elevations and measurements for determination of actual quantities to be accepted and approved by the Owner. Should the Contractor choose not to accept the Owner's surveyed elevations, measurements and quantities, he shall so notify the Engineer in writing prior to commencing earthwork activities. The Owner and Engineer shall agree on the licensed professional land surveyor (PLS) to be used and the survey parameters to include the spacing of cross sectional elevations and measurements. Surveyed cross sectional elevations and measurements of existing ground provided by the Contractor shall be performed prior to beginning of work under this contract, shall be monitored by the Engineer, shall be performed by personnel qualified to perform this type of work, and shall be at the Contractor's expense with no additional cost to the Owner. Likewise, surveyed cross sectional elevations and measurements of finished ground provided by the Contractor shall be performed immediately after satisfactory completion of work under this contract, shall be monitored by the Engineer, shall be performed by personnel qualified to perform this type of work, and shall be at the Contractor's expense with no additional cost to the Owner.

**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. Rock excavation.** This article is not applicable for this project.

**c. 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.

**d. Drainage excavation.** Drainage excavation shall consist of all excavation made for the primary purpose of drainage and includes drainage ditches, such as intercepting, inlet or outlet ditches; temporary levee construction; or any other type as shown on the plans.

**e. Borrow excavation.** Borrow excavation shall consist of approved material required for the construction of embankments or for other portions of the work in excess of the quantity of usable material available from required excavations. ~~Borrow material shall be obtained from areas designated by the Engineer within the limits of the airport property but outside the normal limits of necessary grading, or from areas outside the airport boundaries.~~

**f. Embankment in Place.** Embankment in place shall consist of the excavation, hauling, placing in layers, mechanical and/or chemical drying, compacting, watering, mixing, sloping and other necessary operations

for construction of embankments, regardless of its nature, which is not otherwise classified and paid for under the following items.

**152-1.3 Unsuitable excavation.** Unsuitable material shall be disposed of off airport property. 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 off of airport property. Waste areas, if approved by the Engineer and only if/where shown on the plans, 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", to loosen and pulverize the soil. Stones or rock fragments larger than 4 inches in their greatest dimension will not be permitted in the top 6 inches of the subgrade.

There shall be no separate payment for work associated with returning areas impacted by the Contractor's staging or hauling operations. All work associated with restoring the haul route/staging areas to pre-construction conditions, including seed/mulch, shall be considered incidental to the project.

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.

Digital terrain model (DTM) files of the existing surfaces, finished surfaces and other various surfaces were used to develop the design plans.

Volumetric quantities were calculated by comparing DTM files of the applicable design surfaces and generating Triangle Volume Reports. Electronic copies of DTM files and a paper copy of the original topographic map will be issued to the successful bidder.

Existing grades on the design cross sections or DTM's, where they do not match the locations of actual spot elevations shown on the topographic map, were developed by computer interpolation from those spot elevations. Prior to disturbing original grade, Contractor shall verify the accuracy of the existing ground surface by verifying spot elevations at the same locations where original field survey data was obtained as indicated on the topographic map. Contractor shall recognize that, due to the interpolation process, the actual ground surface at any particular location may differ somewhat from the interpolated surface shown on the design cross sections or obtained from the DTM's. Contractor's verification of original ground surface, however, shall be limited to verification of spot elevations as indicated herein, and no adjustments will be made to the original ground surface unless the Contractor demonstrates that spot elevations shown are incorrect. For this purpose, spot elevations which are within 0.1 foot of the stated elevations for ground surfaces, or within 0.04 foot for hard surfaces (pavements, buildings, foundations, structures, etc.) shall be considered "no change". Only deviations in excess of these will be considered for adjustment of the original ground surface. If Contractor's verification identifies discrepancies in the topographic map, Contractor shall notify the Engineer in writing at least two weeks before disturbance of existing grade to allow sufficient time to verify the submitted information and make adjustments to the design cross sections or DTM's. Disturbance of existing grade in any area shall constitute acceptance by the Contractor of the accuracy of the original elevations shown on the topographic map for that area.

All areas to be excavated shall be stripped of vegetation and topsoil. Topsoil shall be stockpiled for future use in areas designated on the plans or by the 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 off of Airport property.

The grade shall be maintained so that the surface is well drained at all times. When necessary, temporary drains and drainage ditches shall be installed to intercept or divert surface water that may affect the work.

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 so that it can be measured for payment. The more suitable material shall then be placed and compacted as specified. Selective grading shall be considered incidental to the work involved. The cost of stockpiling and placing the material shall be included in the various pay items of work involved.

**b. Undercutting.** Rock, shale, hardpan, loose rock, boulders, or other material unsatisfactory for safety areas, subgrades, roads, shoulders, or any areas intended for turf shall be excavated to a minimum depth of 12 inches below the subgrade or to the depth specified by the 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 off the airport. The cost is incidental to this item. This excavated material shall be paid for at the contract unit price per cubic yard for unsuitable 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.

**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 someone other than the Contractor; for example, the utility unless shown otherwise on the plans. All existing foundations shall be excavated at least 2 feet below the top of subgrade or as indicated on the plans, and the material disposed of as directed by the 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 within the airport property are indicated on the plans.~~ Borrow excavation shall be made only at these designated locations and within the horizontal and vertical limits as staked or as directed by the Engineer. All unsuitable material shall be disposed of by the Contractor off of airport property. All borrow pits shall be opened to expose the various strata of acceptable material to allow obtaining a uniform product. Borrow areas shall be drained and left in a neat, presentable condition with all slopes dressed uniformly. Borrow areas shall not create a hazardous wildlife attractant.

When borrow sources are outside the boundaries of the airport property, it shall be the Contractor's responsibility to locate and obtain the borrow sources, subject to the approval of the Engineer. The Contractor shall notify the Engineer at least 15 days prior to beginning the excavation so necessary tests for suitability can be made. All unsuitable material shall be disposed of by the Contractor. Borrow areas shall be excavated to regular lines to permit accurate measurements.

**152-2.4 Drainage excavation.** Drainage excavation shall consist of excavating for drainage ditches such as intercepting, inlet, or outlet ditches; for temporary levee construction; or for any other type as designed or types as shown on the plans. The work shall be performed in sequence with the other construction. Intercepting 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 1557. 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.** In the areas of pavement and building construction where an embankment is to be constructed to a height of 4 feet or less, 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" and shall then be compacted per paragraph 152-2.10. When the height of fill is greater than 4 feet, sod not required to be removed shall be thoroughly disked and recompacted to the density of the surrounding ground before construction of embankment.

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" 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 8 inches 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.** Unless specified otherwise on the plans, the material shall be constructed in lifts as established in the control strip, but not less than 6 inches nor more than 8 inches of compacted thickness.

When more than one lift is required to establish the layer thickness shown on the plans, the construction procedure described here shall apply to each lift. No lift shall be covered by subsequent lifts until tests verify that compaction requirements have been met. The Contractor shall rework, re-compact and retest any material placed which does not meet the specifications.

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 D 1557. A new Proctor shall be developed for each soil type based on visual classification.

Quality assurance density tests will be taken by the Owner's representative for every 1,000 square yards of compacted embankment for each lift which is required to be compacted, with a minimum of one test per lift, or other appropriate frequencies as determined by the Engineer.

If the material has greater than 30% retained on the 3/4-inch 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 95% of maximum density for non-cohesive soils, and 90% of maximum density for cohesive soils as determined by ASTM D1557. Under all areas to be paved, the embankments shall be compacted to:

- Non-cohesive Soils: A depth of 12-inches from the top of subgrade and to a density of not less than 100% percent of the maximum dry density as determined by ASTM D1557.
- Cohesive Soils: A depth of 12-inches from the top of subgrade and to a density of not less than 95% percent of the maximum dry 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 6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938.. The Contractor's laboratory shall perform all density tests in the Engineer's presence and provide the test results upon completion to the Engineer for acceptance. 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.

Unless specified otherwise on the plans, when rock and other embankment material are excavated at approximately the same time as the subgrade, the rock shall be incorporated into the outer portion of the embankment and the subgrade material shall be incorporated under the future paved areas. Stones or fragmentary rock larger than 4" in their greatest dimensions will not be allowed in the top 6 inches 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 or boulders shall not be disposed of except at places and in the manner designated on the plans or by the Engineer.

For lifts located lower than 4 vertical feet below finish grade and 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 by the Engineer, in lifts not exceeding 2 feet in thickness. Each lift shall be leveled and smoothed with suitable equipment by distribution of spalls and finer fragments of rock. A lift of 2 feet in thickness shall not be constructed above an elevation 4'-0" below the finished subgrade. For lifts within the top 4 vertical feet of an embankment, or below a finished subgrade, the Contractor shall be responsible for crushing, pulverizing and further breaking down pieces, such that the material may be placed in the embankment as directed in lifts not exceeding 8 inches in thickness, except for the top 12 inches where particle size is limited to 4" in their greatest dimension.

There will be no separate measurement of payment for compacted embankment. All costs incidental to placing in lifts, compacting, diskings, 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 a minimum of 80 psi in the presence of the Engineer. Apply a minimum of two 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 or show permanent deformation greater than 1 inch shall be removed and replaced with suitable material or reworked to conform to the moisture content and compaction requirements in accordance with these specifications.

**152-2.10 Compaction requirements.** The subgrade under areas to be paved shall be compacted to a depth of 12 inches and to a density of not less than 95 percent of the maximum dry density as determined by ASTM D1557. The subgrade in areas outside the limits of the pavement areas shall be compacted to a depth of 12 inches and to a density of not less than 90 percent of the maximum density as determined by ASTM D698.

The material to be compacted shall be within  $\pm 2\%$  of optimum moisture content before being rolled to obtain the prescribed compaction (except for expansive soils). When the material has greater than 30 percent retained on the  $\frac{3}{4}$  inch sieve, follow the methods in ASTM D698. Tests for moisture content and compaction will be taken at a minimum of 500 S.Y. of subgrade. Contractor shall be responsible for their own Quality Control testing. All quality assurance acceptance testing shall be done by the Owner's representative and coordinated through 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.

The finished grading operations, conforming to the typical cross-section, shall be completed and maintained a minimum of two days of work ahead of the paving operations, or as directed by the Engineer.

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 loose or protruding rocks on the back slopes of cuts shall be pried loose or otherwise removed to the slope finished grade line. 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. After the subgrade is substantially complete, the Contractor shall remove any soft or other unstable material over the full width of the subgrade that will not compact properly. All low areas, holes or depressions in the subgrade shall be brought to grade with suitable select material. Scarifying, blading, rolling and other methods shall be performed to provide a thoroughly compacted subgrade shaped to the lines and grades shown on the plans. All ruts or rough places that develop in the completed subgrade shall be graded, re-compacted, and retested. The Contractor shall protect the subgrade from damage and limit hauling over the finished subgrade to only traffic essential for construction purposes.

The Contractor shall maintain the completed course in satisfactory condition throughout placement of subsequent layers. No subbase, base, or surface course shall be placed on the subgrade until the subgrade has been accepted by the 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, reshaped and re-compacted 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 In those areas upon which a subbase or base course is to be placed, the top of the subgrade shall be of such smoothness that it shall not vary more than  $\pm \frac{1}{2}$  inch when tested with a 12-foot straightedge applied parallel with and at right angles to the centerline. The straightedge shall be moved continuously forward at half the length of the 12-foot straightedge for the full length of each line on a 50-foot grid. Any deviation in excess of this amount shall be corrected by loosening, adding or removing materials, reshaping and recompacting.
- b. **Grade.** The grade and crown shall be measured on a 50-foot grid and shall be within  $\pm 0.05$  feet of the specified grade.

On safety areas, turfed areas, intermediate and other designated areas, the surface shall be of such smoothness that within the grading limits where no subbase or base is to be placed, the constructed grade shall not vary more than 0.10 feet from specified design 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. No direct payment will be made for topsoil under Item P-152. The quantity removed and placed directly or stockpiled shall be paid for at the contract unit price per cubic yard for "Topsoil (Obtained Onsite)", T-905-1 or "Topsoil (Disposed Offsite)" T-905-2.

When stockpiling of topsoil and later rehandling of such material is directed by the Engineer, the material so rehandled shall be paid for at the contract unit price per cubic yard for "topsoiling," as provided in Item T-905.

**152-2.15 Subgrade Preparation.** The contractor shall prepare the subgrade and perform proofrolling per the geotechnical engineer recommendations and under the supervision of the geotechnical engineer. Once any areas of cut have been excavated to the proposed subgrade elevation, the exposed subgrade soils in the construction footprint should be densified in place using a vibratory roller. The roller should make at least six passes across the preparation area, with the second set of three passes perpendicular to the first set of three passes with intermittent vibration activated. If water is brought to the surface by the vibratory rolling, the operation should be discontinued until the water subsides. Static rolling and additional repairs should be anticipated for areas too wet for vibratory rolling.

After the vibratory rolling, pore pressures should be allowed to dissipate for a minimum of 16 hours. After the waiting period, proofrolling should be performed on the exposed subgrade soils in areas to receive fill or at the subgrade elevation with a loaded, tandem-axle dump truck weighing 15 to 20 tons total. Proofrolling should be performed during a period of dry weather to avoid degrading an otherwise suitable subgrade. Subgrade soils that exhibit excessive rutting or deflection during proofrolling should be repaired as directed by the field representative. Typical repairs include overexcavation followed by replacement with either properly compacted fill or by a subgrade stabilization fabric in conjunction with a sand fill or crushed stone. Fifty-percent (50%) of the proposed pavement area has been assumed to require subgrade preparation as described in this specification.

If subgrade soils are unsuitable, they will require removal and replacement; however, if they are unstable due to excessive moisture, the contractor shall remediate by scarification, drying and recompacting the material. This work shall include overexcavation of the unstable material as required. Overexcavated areas shall be backfilled with either approved structural fill or geotextile and ABC Stone. Construction traffic shall be kept to a minimum on prepared subgrades. Subgrade preparation work should be performed during a period of dry weather according to the project schedule.

## METHOD OF MEASUREMENT

**152-3.1** Measurement for payment specified by the cubic yard shall be computed the comparison of digital terrain model (DTM) surfaces 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. After completion of all excavation, and embankment operations and prior to the placing of base or subbase material, and/or topsoiling, the final excavation, and/or embankment shall be verified by the Contractor by means of field cross-sections taken randomly at station intervals not exceeding 50 linear feet.

**152-3.2** The quantity of **borrow** excavation to be paid for shall be the number of cubic yards hauled from offsite and used in the project area. Measurement shall not include the quantity of materials installed without

authorization beyond normal slope lines, or the quantity of material used for purposes other than those directed. Borrow excavation shall be measured in its final position.

**152-3.3** The quantity of embankment in place shall be the number of cubic yards measured in its final position.

**152-3.4** The quantity of unsuitable excavation shall be the number of cubic yards removed from the work area as measured in its original position. Unsuitable materials shall be properly disposed of off airport property in an approved permitted location.

**152-3.5** The quantity of subgrade preparation shall be the number of square yards scarified, overexcavated and proofrolled from the work area relative to the undercut any areas of project. These areas shall be brought to appropriate compaction density as outlined in the specification.

#### **BASIS OF PAYMENT**

**152-4.1** Payment for excavation and preparation items shall be made at the contract unit prices shown below. This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item P-152-1	Subgrade Preparation - per square yard
Item P-152-2	Borrow Excavation (Offsite) - per cubic yard
Item P-152-3	Embankment in place - per cubic yard
Item P-152-4	Unsuitable 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 (10-lb) Rammer and a (18-in.) Drop
--------------	--

ASTM International (ASTM)

ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft <sup>3</sup> )
-----------	--

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 <sup>3</sup> )
ASTM D6938	Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
Advisory Circulars (AC)	
AC 150/5370-2	Operational Safety on Airports During Construction Software
Software	
FAARFIELD – FAA Rigid and Flexible Iterative Elastic Layered Design	
U.S. Department of Transportation	
FAA RD-76-66	Design and Construction of Airport Pavements on Expansive Soils

## END OF ITEM P-152

**This Page Intentionally Left Blank**

**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 and 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 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**

<b>Material Test</b>	<b>Requirement</b>	<b>Standard</b>
<b>Coarse Aggregate</b>		
Resistance to Degradation	Loss: 45% maximum	ASTM C131
Soundness of Aggregates by Use of Sodium Sulfate <b>or</b> 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 100% with at least one fractured face <sup>1</sup>	ASTM D5821
Flat Particles, Elongated Particles, or Flat and Elongated Particles	10% maximum, by weight, of flat, elongated, or flat and elongated particles <sup>2</sup>	ASTM D4791
<b>Fine Aggregate</b>		
Liquid limit	Less than or equal to 25	ASTM D4318
Plasticity Index	Not more than five (5)	ASTM D4318

<sup>1</sup> 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.

<sup>2</sup> 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 % by Weight passing	Contractor's Final Gradation	Job Control Grading Band Tolerances <sup>1</sup> (Percent)
2 inch	100		0
1-1/2 inch	95-100		±5
1 inch	70-95		±8
3/4 inch	55-85		±8
No. 4	30-60		±8
No. 40 <sup>2</sup>	5-30		±5
No. 200 <sup>2</sup>	0-5		±3

<sup>1</sup> 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.

<sup>2</sup> The fraction of material passing the No 200 sieve shall not exceed two-thirds the fraction passing the No 40 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 Type IV, Class 3, 0.05 sec<sup>-1</sup> permittivity and Apparent opening size per AASHTO M288.

## **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 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 base shall be underlaid by woven separation geotextile fabric, pay item 209-1. Geotextile fabric shall be placed under pavement areas that coincide with soil undercut of unsuitable soils.

The aggregate shall meet gradation and moisture requirements prior to compaction. The base course shall be constructed in lifts as established in the control strip, but not less than 4 inches nor more than 12 inches of compacted thickness.

When more than one lift is required to establish the layer thickness shown on the plans, the construction procedure described here shall apply to each lift. No lift shall be covered by subsequent lifts until tests verify that compaction requirements have been met. The Contractor shall rework, re-compact and retest any material placed which does not meet the specifications at the Contractor's expense.

**209-3.5 Compaction.** Immediately after completion of the spreading operations, compact each layer of the base course, as specified, with approved compaction equipment. The number, type, and weight of rollers shall be sufficient to compact the material to the required density within the same day that the aggregate is placed on the subgrade.

The field density of each compacted lift of material shall be at least 100% of the maximum density of laboratory specimens prepared from samples of the subbase material delivered to the jobsite. The laboratory specimens shall be compacted and tested in accordance with ASTM D1557. The moisture content of the material during placing operations shall be within  $\pm 2$  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", reshaped and recompact 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" when tested with a 12'-0" 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'-0" straightedge for the full length of each line on a 50'-0" grid.

**b. Grade.** The grade and crown shall be measured on a 50'-0" grid and shall be within +0 and -1/2" 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 1,200 square yds (1,000 m<sup>2</sup>). Sampling locations will be determined on a random basis per ASTM D3665.

**a. Density.** The Contractor's laboratory shall perform all density tests in the Engineer's presence and provide the test results upon completion to the Engineer for acceptance.

Each area shall be accepted for density when the field density is at least 100% of the maximum density of laboratory specimens compacted and tested per ASTM 1557. The in-place field density shall be determined per ASTM D1556 or ASTM D6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938. If the specified density is not attained, the area represented by the failed test must be reworked and/or recompact and two additional random tests made. This procedure shall be followed until the specified density is reached. Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

**b. Thickness.** Depth tests shall be made by test holes at least 3 inches in diameter that extend through the base. The thickness of the base course shall be within +0 and -1/2 inch of the specified thickness as determined by depth tests taken by the Contractor in the presence of the Engineer for each area. Where the thickness is deficient by more than 1/2-inch, the Contractor shall correct such areas at no additional cost by scarifying to a depth of at least 3 inches, adding new material of proper gradation, and the material shall be blended and recompact to grade. The Contractor shall replace, at his expense, base material where depth tests have been taken.



## METHOD OF MEASUREMENT

**209-4.1** 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.

**209-4.2** The quantity of crushed aggregate base course (CABC) 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.

**209-4.3** The quantity of crushed aggregate base for Roadways 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. This material is to be placed under asphalt pavement of the local roadway section as base material and as the gravel road section for the gravel access road. This quantity is separate from the Aggregate base used on the air side underneath apron and taxilane pavements and shall not be included in any other excavation quantities.

## BASIS OF PAYMENT

**209-5.1** 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.

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-209-1 Woven Separation Geotextile Fabric –per square yard

Item P-209-2 Crushed Aggregate Base Course (CABC) - per cubic yard

Item P-209-3 Aggregate Base Course (Road) - per cubic yard

## REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM 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- $\mu$ m (No. 200) Sieve in Mineral Aggregates by Washing

P-209-5

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 <sup>3</sup> (600 kN-m/m <sup>3</sup> ))
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 <sup>3</sup> (2700 kN-m/m <sup>3</sup> ))
ASTM D2167	Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D2419	Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate
ASTM D3665	Standard Practice for Random Sampling of Construction Materials
ASTM D4318	Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4491	Standard Test Methods for Water Permeability of Geotextiles by Permittivity
ASTM D4643	Standard Test Method for Determination of Water Content of Soil and Rock by Microwave Oven Heating
ASTM D4751	Standard Test Methods for Determining Apparent Opening Size of a Geotextile
ASTM D4791	Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM D5821	Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate
ASTM D6938	Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM D7928	Standard Test Method for Particle-Size Distribution (Gradation) of Fine-Grained Soils Using the Sedimentation (Hydrometer) Analysis
American Association of State Highway and Transportation Officials (AASHTO)	
M288	Standard Specification for Geosynthetic Specification for Highway Applications

## END OF ITEM P-209

**ITEM P-401**  
**ASPHALT MIX PAVEMENT**

**DESCRIPTION**

**401-1.1** This item shall consist of pavement courses composed of mineral aggregate and asphalt binder mixed in a central mixing plant and placed on a prepared base or stabilized course in accordance with these specifications and shall conform to the lines, grades, thicknesses, and typical cross-sections shown on the plans. Each course shall be constructed to the depth, typical section, and elevation required by the plans and shall be rolled, finished, and approved before the placement of the next course.

**MATERIALS**

**401-2.1 Aggregate.** Aggregates shall consist of crushed stone, crushed gravel, 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 sieve. Fine aggregate is the material passing the No. 4 sieve.

**a. Coarse aggregate.** Coarse aggregate shall consist of sound, tough, durable particles, free from films of matter that would prevent thorough coating and bonding with the asphalt material and free from organic matter and other deleterious substances. Coarse aggregate material requirements are given in the table below.

**Coarse Aggregate Material Requirements**

<b>Material Test</b>	<b>Requirement</b>	<b>Standard</b>
Resistance to Degradation	Loss: 40% maximum	ASTM C131
Soundness of Aggregates by Use of Sodium Sulfate <b>or</b> 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 <sup>1</sup>	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 <sup>1</sup>	

Flat, Elongated, or Flat and Elongated Particles	8% maximum, by weight, of flat, elongated, or flat and elongated particles at 5:1 <sup>2</sup>	ASTM D4791
Bulk density of slag <sup>3</sup>	Weigh not less than 70 pounds per cubic foot	ASTM C29.

<sup>1</sup> 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.

<sup>2</sup> 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).

<sup>3</sup> 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 <b>or</b> 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	<b>45 minimum</b>	ASTM D2419
Natural Sand	0%maximum by weight of total aggregate	ASTM D1073

**c. Sampling.** ASTM D75 shall be used in sampling coarse and fine aggregate.

**401-2.2 Mineral filler.** Mineral filler (baghouse fines) may be added in addition to material naturally present in the aggregate. Mineral filler shall meet the requirements of ASTM D242.

#### Mineral Filler Requirements

Material Test	Requirement	Standard
Plasticity Index	4 maximum	ASTM D4318

**401-2.3 Asphalt binder.** Asphalt binder shall conform to ASTM D6373 Performance Grade (PG) 70-22.

#### **Asphalt Binder PG Plus Test Requirements**

<b>Material Test</b>	<b>Requirement</b>	<b>Standard</b>
Elastic Recovery	75% minimum	ASTM D6084 <sup>1</sup>

<sup>1</sup> 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 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.
- The JMF shall state that the percentage of reclaimed asphalt shingles (RAS), post consumer reclaimed asphalt shingles (PRAS), and manufacturer-waste reclaimed asphalt shingles (MRAS) is equal to zero (0) percent.
- The JMF shall state that the percentage of crushed glass is equal to zero (0) percent.

**Table 1. Asphalt Design Criteria**

Test Property	Value	Test Method
Number of gyrations	75	Asphalt Pavement Analyzer (APA)
Air voids (%)	3.5	ASTM D3203
Percent voids in mineral aggregate (VMA), minimum	See Table 2	ASTM D6995
Tensile Strength Ratio (TSR) <sup>1</sup>	not less than 85 at a saturation of 70-80%	ASTM D4867
Asphalt Pavement Analyzer (APA) <sup>2</sup>	Less than 10 mm @ 4000 passes	AASHTO T340 at 250 psi hose pressure at 64°C test temperature

<sup>1</sup> Test specimens for TSR shall be compacted at  $7 \pm 1.0$  % air voids. In areas subject to freeze-thaw, use freeze-thaw conditioning in lieu of moisture conditioning per ASTM D4867.

<sup>2</sup> AASHTO T340 at 100 psi hose pressure at 64°C test temperature may be used in the interim. If this method is used the required Value shall be less than 5 mm @ 8000 passes

The mineral aggregate shall be of such size that the percentage composition by weight, as determined by laboratory sieves, will conform to the gradation or gradations specified in Table 2 when tested in accordance with ASTM C136 and ASTM C117.

The gradations in Table 2 represent the limits that shall determine the suitability of aggregate for use from the sources of supply; be well graded from coarse to fine and shall not vary from the low limit on one sieve to the high limit on the adjacent sieve, or vice versa.

**Table 2. Aggregate - Asphalt Pavements**

Sieve Size	Percentage by Weight Passing Sieve
1 inch	100
3/4 inch	100
1/2 inch	90-100
3/8 inch	72-88
No. 4	53-73
No. 8	38-60
No. 16	26-48
No. 30	18-38
No. 50	11-27
No. 100	6-18
No. 200	3-6
<b>Minimum Voids in Mineral Aggregate (VMA)<sup>1</sup></b>	

	<b>15.0</b>
<b>Asphalt Percent:</b>	
Stone or gravel	<b>5.0-7.5</b>
Slag	<b>6.5-9.5</b>
<b>Recommended Minimum Construction Lift Thickness</b>	<b>2 inch</b>

<sup>1</sup>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 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. 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, air voids, and joint density meet the requirements specified in paragraphs 401-6.2.

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.

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 or greater	40 <sup>1</sup>	4
2-inches < Thickness > 3-inches	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 when added to the aggregate. The temperature of modified asphalt binder shall be no more than 350°F when added to the aggregate.

**401-4.9 Preparation of mineral aggregate.** The aggregate for the asphalt shall be heated and dried. The maximum temperature and rate of heating shall be such that no damage occurs to the aggregates. The temperature of the aggregate and mineral filler shall not exceed 350°F when the asphalt binder is added. Particular care shall be taken that aggregates high in calcium or magnesium content are not damaged by overheating. The temperature shall not be lower than is required to obtain complete coating and uniform distribution on the aggregate particles and to provide a mixture of satisfactory workability.

**401-4.10 Preparation of Asphalt mixture.** The aggregates and the asphalt binder shall be weighed or metered and mixed in the amount specified by the JMF. The combined materials shall be mixed until the aggregate obtains a uniform coating of asphalt binder and is thoroughly distributed throughout the mixture. Wet mixing time shall be the shortest time that will produce a satisfactory mixture, but not less than 25 seconds for batch plants. The wet mixing time for all plants shall be established by the Contractor, based on the procedure for determining the percentage of coated particles described in ASTM D2489, for each individual plant and for each type of aggregate used. The wet mixing time will be set to achieve 95% of coated particles. For continuous mix plants, the minimum mixing time shall be determined by dividing the weight of its contents at operating level by the weight of the mixture delivered per second by the mixer. The moisture content of all asphalt upon discharge shall not exceed 0.5%.

**401-4.11 Application of Prime and Tack Coat.** Immediately before placing the asphalt mixture, the underlying course shall be cleaned of all dust and debris.

A tack coat shall be applied in accordance with Item P-603 to all vertical and horizontal asphalt and concrete surfaces prior to placement of the first and each subsequent lift of asphalt mixture.

**401-4.12 Laydown plan, transporting, placing, and finishing.** Prior to the placement of the asphalt, the Contractor shall prepare a laydown plan with the sequence of paving lanes and width to minimize the number of cold joints; the location of any temporary ramps; laydown temperature; and estimated time of completion for each portion of the work (milling, paving, rolling, cooling, etc.). The laydown plan and any modifications shall be approved by the 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 12-feet except where edge lanes require less width to complete the area. Additional screed sections attached to widen the paver to meet the minimum lane width requirements must include additional auger sections to move the asphalt mixture uniformly along the screed extension.

The longitudinal joint in one course shall offset the longitudinal joint in the course immediately below by at least one foot; however, the joint in the surface top course shall be at the centerline of crowned pavements. Transverse joints in one course shall be offset by at least 10 feet from transverse joints in the previous course. Transverse joints in adjacent lanes shall be offset a minimum of 10 feet. On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impractical, the asphalt may be spread and luted by hand tools.

The 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 long.

**401-4.13 Compaction of asphalt mixture.** After placing, the asphalt mixture shall be thoroughly and uniformly compacted by self-propelled rollers. The surface shall be compacted as soon as possible when the asphalt has attained sufficient stability so that the rolling does not cause undue displacement, cracking

or shoving. The sequence of rolling operations and the type of rollers used shall be at the discretion of the Contractor. The speed of the roller shall, at all times, be sufficiently slow to avoid displacement of the hot mixture and be effective in compaction. Any surface defects and/or displacement occurring as a result of the roller, or from any other cause, shall be corrected at the Contractor's expense.

Sufficient rollers shall be furnished to handle the output of the plant. Rolling shall continue until the surface is of uniform texture, true to grade and cross-section, and the required field density is obtained. To prevent adhesion of the asphalt to the roller, the wheels shall be equipped with a scraper and kept moistened with water as necessary.

In areas not accessible to the roller, the mixture shall be thoroughly compacted with approved power tampers.

Any asphalt that becomes loose and broken, mixed with dirt, contains check-cracking, or in any way defective shall be removed and replaced with fresh hot mixture and immediately compacted to conform to the surrounding area. This work shall be done at the Contractor's expense. Skin patching shall not be allowed.

**401-4.14 Joints.** The formation of all joints shall be made to ensure a continuous bond between the courses and obtain the required density. All joints shall have the same texture as other sections of the course and meet the requirements for smoothness and grade.

The roller shall not pass over the unprotected end of the freshly laid asphalt except when necessary to form a transverse joint. When necessary to form a transverse joint, it shall be made by means of placing a bulkhead or by tapering the course. The tapered edge shall be cut back to its full depth and width on a straight line to expose a vertical face prior to placing the adjacent lane. In both methods, all contact surfaces shall be coated with an asphalt tack coat before placing any fresh asphalt against the joint.

Longitudinal joints which have been left exposed for more than four (4) hours; the surface temperature has cooled to less than 175°F; or are irregular, damaged, uncompacted or otherwise defective shall be cut back with a cutting wheel or pavement saw a maximum of 3 inches to expose a clean, sound, uniform vertical surface for the full depth of the course. All cutback material and any laitance produced from cutting joints shall be removed from the project. Asphalt tack coat in accordance with P- 603 shall be applied to the clean, dry joint prior to placing any additional fresh asphalt against the joint.

The cost of this work shall be considered incidental to the cost of the asphalt.

**401-4.15 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.

**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.

**a. 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.

**b. 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.

**c. Moisture content of asphalt.** The moisture content shall be determined once per day in accordance with AASHTO T329 or ASTM D1461.

**d. 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.

**e. 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.

**f. Smoothness for Contractor Quality Control.**

The Contractor shall perform smoothness testing in transverse and longitudinal directions daily to verify that the construction processes are producing pavement with variances less than ¼ inch in 12 feet, identifying areas that may pond water which could lead to hydroplaning of aircraft. If the smoothness criteria is not met, appropriate changes and corrections to the construction process shall be made by the Contractor before construction continues

The Contractor may use a 12-foot “straightedge, a rolling inclinometer meeting the requirements of ASTM E2133 or rolling external reference device that can simulate a 12-foot straightedge approved by the 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 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; and at the third points of paving lanes when widths of paving lanes are 20 ft or greater.

Deviations on the final surface course in either the transverse or longitudinal direction that will trap water greater than 1/4 inch shall be corrected with diamond grinding per paragraph 401-4.16 or by removing and replacing the surface course to full depth. Grinding shall be tapered in all directions to provide smooth transitions to areas not requiring grinding. All areas in which diamond grinding has been performed shall be subject to the final pavement thickness tolerances specified in paragraph 401-6.1d(3). Areas that have been ground shall be sealed with a surface treatment in accordance with Item P-608. To avoid the surface treatment creating any conflict with runway or taxiway markings, it may be necessary to seal a larger area.

Control charts shall be kept to show area of each day's placement and the percentage of corrective grinding required. Corrections to production and placement shall be initiated when corrective grinding is required. If the Contractor's machines and/or methods produce significant areas that need corrective actions in excess of 10 percent of a day's production, production shall be stopped until corrective measures are implemented by the Contractor.

**g. Grade.** Grade shall be evaluated daily to allow adjustments to paving operations when grade measurements do not meet specifications. As a minimum, grade shall be evaluated prior to and after the placement of the first lift and after placement of the surface lift.

Measurements will be taken at appropriate gradelines (as a minimum at center and edges of paving lane) and longitudinal spacing as shown on cross-sections and plans. The final surface of the pavement will not vary from the gradeline elevations and cross-sections shown on the plans by more than 1/2 inch vertically and 0.1 feet laterally. The documentation will be provided by the Contractor to the 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 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	±6%	±9%
1/2 inch	±6%	±9%
3/8 inch	±6%	±9%
No. 4	±6%	±9%
No. 16	±5%	±7.5%
No. 50	±3%	±4.5%
No. 200	±2%	±3%
<b>Asphalt Content</b>	±0.45%	±0.70%
<b>Minimum VMA</b>	-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	11%
3/8 inch	11%
No. 4	11%
No. 16	9%

No. 50	6%
No. 200	3.5%
<b>Asphalt Content</b>	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 D6925.

**d. In-place asphalt mat and joint density.** Each subplot will be tested for in-place mat and joint density as a percentage of the theoretical maximum density (TMD).

**(1) Sampling.** The Contractor will cut minimum 5 inch 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 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 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 and Profilograph roughness.

**b. Air Voids and Mat density.** Acceptance of each lot of plant produced material for mat density and air voids will be based on the percentage of material within specification limits (PWL). If the PWL of the lot equals or exceeds 90%, the lot will be acceptable. Acceptance and payment will be determined in accordance with paragraph 401-8.1.

**c. Joint density.** Acceptance of each lot of plant produced asphalt for joint density will be based on the PWL. If the PWL of the lot is equal to or exceeds 90%, the lot will be considered acceptable. If the PWL is less than 90%, the Contractor shall evaluate the reason and act accordingly. If the PWL is less than 80%, the Contractor shall cease operations and until the reason for poor compaction has been determined. If the PWL is less than 71%, the pay factor for the lot used to complete the joint will be reduced by five (5) percentage points. This lot pay factor reduction will be incorporated and evaluated in accordance with paragraph 401-8.1.

**d. Grade.** The final finished surface of the pavement shall be surveyed to verify that the grade elevations and cross-sections shown on the plans do not deviate more than 1/2 inch vertically or 0.1 feet laterally.

Cross-sections of the pavement shall be taken at a minimum 50-foot longitudinal spacing and at all longitudinal grade breaks. Minimum cross-section grade points shall include grade at centerline,  $\pm 10$  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.** The final profilograph shall be the full length of the project to facilitate testing of roughness between lots. The Contractor, in the presence of the Engineer shall perform a profilograph roughness test on the completed project with a profilograph meeting the requirements of ASTM E1274 or a Class I inertial profiler meeting ASTM E950. Data and results shall be provided within 48 hrs of profilograph roughness tests.

The pavement shall have an average profile index less than 15 inches per mile per 1/10 mile. The equipment shall utilize electronic recording and automatic computerized reduction of data to indicate “must grind” bumps and the Profile Index for the pavement using a 0.2- inch blanking band. The bump template must span one inch with an offset of 0.4 inches. The profilograph must be calibrated prior to use and operated by a factory or State DOT approved, trained operator. Profilograms shall be recorded on a longitudinal scale of one inch equals 25 feet and a vertical scale of one inch equals one inch. Profilograph shall be performed one foot right and left of project centerline and 15 feet right and left of project centerline. Any areas that indicate “must grind” shall be corrected with diamond grinding per paragraph 401-4.16 or by removing and replacing full depth of surface course. as directed by the Engineer. Where corrections are necessary, a second profilograph run shall be performed to verify that the corrections produced an average profile index of 15 inches per mile per 1/10 mile or less.

**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
<b>Air Voids Total Mix (%)</b>	2.0	5.0
<b>Surface Course Mat Density (%)</b>	92.8	-
<b>Base Course Mat Density (%)</b>	92.0	-
<b>Joint density (%)</b>	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 schedule<sup>1</sup>**

<b>Percentage of material within specification limits (PWL)</b>	<b>Lot pay factor (percent of contract unit price)</b>
96 – 100	106
90 – 95	PWL + 10
75 – 89	0.5 PWL + 55
55 – 74	1.4 PWL – 12
Below 55	Reject <sup>2</sup>

<sup>1</sup> 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.

<sup>2</sup> 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.** The Contractor will receive full payment when the profilograph average profile index is in accordance with paragraph 401-6.2e.

When the final average profile index for the entire length of pavement does not exceed 15 inches per mile per 1/10 mile, payment will be made at the contract unit price for the completed pavement.

#### **401-8.1 Payment.**

Payment will be made under:

Item P-401	Hot Mix Asphalt (HMA) Pavement 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

P-401-18

AC 150/5370-10H, Issued 12/21/18

Updated: 11/12/19, 6/26/20 and 8/19/20 Errata

Albert J. Ellis Airport (OAJ)  
South GA Expansion Project (1/29/2025)  
Arduurra Project No. 20240074.00.WK

ASTM C131	Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C142	Standard Test Method for Clay Lumps and Friable Particles in Aggregates
ASTM C566	Standard Test Method for Total Evaporable Moisture Content of Aggregate by Drying
ASTM D75	Standard Practice for Sampling Aggregates
ASTM D242	Standard Specification for Mineral Filler for Bituminous Paving Mixtures
ASTM D946	Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction
ASTM D979	Standard Practice for Sampling Asphalt Paving Mixtures
ASTM D1073	Standard Specification for Fine Aggregate for Asphalt Paving Mixtures
ASTM D1188	Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Coated Samples
ASTM D2172	Standard Test Method for Quantitative Extraction of Bitumen from Asphalt Paving Mixtures
ASTM D1461	Standard Test Method for Moisture or Volatile Distillates in Asphalt Paving Mixtures
ASTM D2041	Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
ASTM D2419	Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate
ASTM D2489	Standard Practice for Estimating Degree of Particle Coating of Bituminous-Aggregate Mixtures
ASTM D2726	Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures
ASTM D2950	Standard Test Method for Density of Bituminous Concrete in Place by Nuclear Methods
ASTM D3203	Standard Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures
ASTM D3381	Standard Specification for Viscosity-Graded Asphalt Cement for Use in Pavement Construction
ASTM D3665	Standard Practice for Random Sampling of Construction Materials
ASTM D3666	Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials
ASTM D4318	Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity

## Index of Soils

ASTM D4552	Standard Practice for Classifying Hot-Mix Recycling Agents
ASTM D4791	Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM D4867	Standard Test Method for Effect of Moisture on Asphalt Concrete Paving Mixtures
ASTM D5361	Standard Practice for Sampling Compacted Asphalt Mixtures for Laboratory Testing
ASTM D5444	Standard Test Method for Mechanical Size Analysis of Extracted Aggregate
ASTM D5821	Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate
ASTM D6084	Standard Test Method for Elastic Recovery of Bituminous Materials by Ductilometer
ASTM D6307	Standard Test Method for Asphalt Content of Hot Mix Asphalt by Ignition Method
ASTM D6373	Standard Specification for Performance Graded Asphalt Binder
ASTM D6752	Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Automatic Vacuum Sealing Method
ASTM D6925	Standard Test Method for Preparation and Determination of the Relative Density of Hot Mix Asphalt (HMA) Specimens by Means of the SuperPave Gyratory Compactor.
ASTM 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 T 340	Standard Method of Test for Determining the Rutting Susceptibility of Hot Mix Asphalt (APA) Using the Asphalt Pavement Analyzer (APA)
Asphalt Institute (AI)	
Asphalt Institute Handbook MS-26, Asphalt Binder	
Asphalt Institute MS-2 Mix Design Manual, 7th Edition	
AI State Binder Specification Database	
Federal Highway Administration (FHWA)	
Long Term Pavement Performance Binder Program	
Advisory Circulars (AC)	
AC 150/5320-6	Airport Pavement Design and Evaluation
FAA Orders	
5300.1	Modifications to Agency Airport Design, Construction, and Equipment Standards
Software	
FAARFIELD	

**END OF ITEM P-401**

**This Page Intentionally Left Blank**



**ITEM P-603**  
**EMULSIFIED ASPHALT TACK COAT**

**DESCRIPTION**

**603-1.1** This item shall consist of preparing and treating an asphalt or concrete surface with asphalt material in accordance with these specifications and in reasonably close conformity to the lines shown on the plans.

**MATERIALS**

**603-2.1 Asphalt materials.** The asphalt material shall be an emulsified asphalt as specified in ASTM D3628 as an asphalt application for tack coat appropriate to local conditions. The emulsified asphalt shall not be diluted. The Contractor shall provide a copy of the manufacturer's Certificate of Analysis (COA) for the asphalt material to the Resident Project Representative (RPR) before the asphalt material is applied for review and acceptance. The furnishing of COA for the asphalt material shall not be interpreted as a basis for final acceptance. The manufacturer's COA may be subject to verification by testing the material delivered for use on the project.

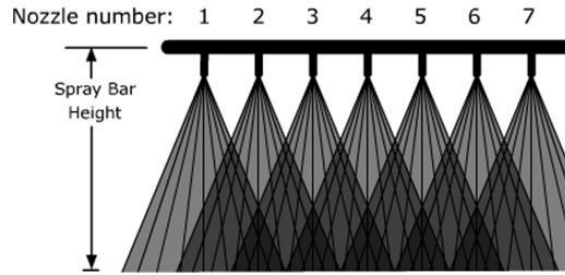
**CONSTRUCTION METHODS**

**603-3.1 Weather limitations.** The tack coat shall be applied only when the existing surface is dry and the atmospheric temperature is 50°F (10°C) or above; the temperature has not been below 35°F (2°C) for the 12 hours prior to application; and when the weather is not foggy or rainy. The temperature requirements may be waived when directed by the RPR.

**603-3.2 Equipment.** The Contractor shall provide equipment for heating and applying the emulsified asphalt material. The emulsion shall be applied with a manufacturer-approved computer rate-controlled asphalt distributor. The equipment shall be in good working order and contain no contaminants or diluents in the tank. Spray bar tips must be clean, free of burrs, and of a size to maintain an even distribution of the emulsion. Any type of tip or pressure source is suitable that will maintain predetermined flow rates and constant pressure during the application process with application speeds under eight (8) miles per hour (13 km per hour) or seven (700) feet per minute (213 m per minute).

The equipment will be tested under pressure for leaks and to ensure proper set-up before use to verify truck set-up (via a test-shot area), including but not limited to, nozzle tip size appropriate for application, spray-bar height and pressure and pump speed, evidence of triple-overlap spray pattern, lack of leaks, and any other factors relevant to ensure the truck is in good working order before use.

A correct triple overlap spray pattern is when, except for the nozzles on the outside end of the spray bar, each point on the pavement surface receives a uniform coating of tack by exactly three spray nozzles, as depicted in the image below.



The distributor truck shall be equipped with a minimum 12-foot (3.7-m) spreader spray bar with individual nozzle control with computer-controlled application rates. The distributor truck shall have an easily accessible thermometer that constantly monitors the temperature of the emulsion, and have an operable mechanical tank gauge that can be used to cross-check the computer accuracy. If the distributor is not equipped with an operable quick shutoff valve, the prime operations shall be started and stopped on building paper.

The distributor truck shall be equipped to effectively heat and mix the material to the required temperature prior to application as required. Heating and mixing shall be done in accordance with the manufacturer's recommendations. Do not overheat or over mix the material.

The distributor shall be equipped with a hand sprayer.

Asphalt distributors must be calibrated annually in accordance with ASTM D2995. The Contractor must furnish a current calibration certification for the asphalt distributor truck from any State or other agency as approved by the RPR.

A power broom and/or power blower suitable for cleaning the surfaces to which the asphalt tack coat is to be applied shall be provided.

**603-3.3 Application of emulsified asphalt material.** The emulsified asphalt shall not be diluted. Immediately before applying the emulsified asphalt tack coat, the full width of surface to be treated shall be swept with a power broom and/or power blower to remove all loose dirt and other objectionable material.

The emulsified asphalt material shall be uniformly applied with an asphalt distributor at the rates appropriate for the conditions and surface specified in the table below. The type of asphalt material and application rate shall be approved by the RPR prior to application.

**Emulsified Asphalt**

Surface Type	Residual Rate, gal/SY (L/square meter)	Emulsion Application Bar Rate, gal/SY (L/square meter)
New asphalt	0.02-0.05 (0.09-0.23)	0.03-0.07 (0.13-0.32)
Existing asphalt	0.04-0.07 (0.18-0.32)	0.06-0.11 (0.27-0.50)
Milled Surface	0.04-0.08 (0.18-0.36)	.06-0.12 (0.27-0.54)
Concrete	0.03-0.05 (0.13-0.23)	0.05-0.08 (0.23-0.36)

After application of the tack coat, the surface shall be allowed to cure without being disturbed for the period of time necessary to permit drying and setting of the tack coat. This period shall be determined by the RPR. The Contractor shall protect the tack coat and maintain the surface until the next course has been placed. When the tack coat has been disturbed by the Contractor, tack coat shall be reapplied at the Contractor's expense.

**603-3.4 Freight and waybills** The Contractor shall submit waybills and delivery tickets, during progress of the work. Before the final statement is allowed, file with the RPR certified waybills and certified delivery tickets for all emulsified asphalt materials used in the construction of the pavement covered by the contract. Do not remove emulsified asphalt material from storage until the initial outage and temperature measurements have been taken. The delivery or storage units will not be released until the final outage has been taken.

### **METHOD OF MEASUREMENT**

**603-4.1** The emulsified asphalt material for tack coat shall be measured by the gallon Volume shall be corrected to the volume at 60°F (16°C) in accordance with ASTM D1250. The emulsified asphalt material paid for will be the measured quantities used in the accepted work, provided that the measured quantities are not 10% over the specified application rate. Any amount of emulsified asphalt material more than 10% over the specified application rate for each application will be deducted from the measured quantities, except for irregular areas where hand spraying of the emulsified asphalt material is necessary. Water added to emulsified asphalt will not be measured for payment.

### **BASIS OF PAYMENT**

**603.5-1** Payment shall be made at the contract unit price per gallon of emulsified asphalt material. This price shall be full compensation for furnishing all materials, for all preparation, delivery, and application of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item P-603	Bituminous 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 ITEM P-603**

**This Page Intentionally Left Blank**

**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, at the locations and of the form and dimensions shown on the plans. This specification shall be used for all concrete, including signage bases, 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 1/2 inch	467 or 4 and 67
1 inch	57
3/4 inch	67
1/2 inch	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 or ASTM C595 Type 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 or ASTM D1752.

**610-2.9 Joint filler.** The filler for joints shall be self-leveling and compatible with the material being sealed.

**610-2.10 Steel reinforcement.** Reinforcing shall be in accordance with the plans and conforming to the requirements below.

#### Steel Reinforcement

<b>Reinforcing Steel</b>	<b>ASTM A615, ASTM A706, ASTM A775, ASTM A934</b>
<b>Welded Steel Wire Fabric</b>	<b>ASTM A1064, ASTM A884</b>
<b>Welded Deformed Steel Fabric</b>	<b>ASTM A1064</b>
<b>Bar Mats</b>	<b>ASTM A184 or ASTM A704</b>

**610-2.11 Materials for curing concrete.** Curing materials shall conform to one of the following requirements.

#### Materials for Curing

<b>Waterproof paper</b>	<b>ASTM C171</b>
<b>Clear or white Polyethylene Sheeting</b>	<b>ASTM C171</b>
<b>White-pigmented Liquid Membrane-Forming Compound, Type 2, Class B</b>	<b>ASTM C309</b>

### 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 minimum compressive strength of 3,000 psi in 28 days as determined by test cylinders made in accordance with ASTM C31 and tested in accordance with ASTM C39. The concrete shall contain not less than 470 pounds of cementitious material per cubic yard.

The water cementitious ratio shall not exceed 0.45 by weight. The air content of the concrete shall be 5% +/- 1.2% as determined by ASTM C231 and shall have a slump of not more than 4 inches as determined by ASTM C143. **610-3.3 Mixing.** Concrete may be mixed at the construction site, at a central point, or wholly or in part in truck mixers. The concrete shall be mixed and delivered in accordance with the requirements of ASTM C94 or ASTM C685.

The concrete shall be mixed only in quantities required for immediate use. Concrete shall not be mixed while the air temperature is below 40°F without the 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 nor more than 100°F. The Contractor shall be held responsible for any defective work, resulting from freezing or injury in any manner during placing and curing, and shall replace such work at his expense.

Retempering of concrete by adding water or any other material is not permitted.

The rate of delivery of concrete to the job shall be sufficient to allow uninterrupted placement of the concrete.

**610-3.4 Forms.** Concrete shall not be placed until all the forms and reinforcements have been inspected and approved by the 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. 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. Where bars meeting ASTM A775 or A934 are used, the vibrators shall be equipped with rubber or non-metallic vibrator heads. Furnish a spare, working, vibrator on the job site whenever concrete is placed. Consolidate concrete slabs greater than 4" in depth with high frequency mechanical vibrating equipment supplemented by hand spading and tamping. Consolidate concrete slabs 4" or less in depth by wood tampers, spading, and settling with a heavy leveling straightedge. Operate internal vibrators with vibratory element submerged in the concrete, with a minimum frequency of not less than 6,000 cycles per minute when submerged. Do not use vibrators to transport the concrete in the forms. Penetrate the previously placed lift with the vibrator when more than one lift is required. Use external vibrators on the exterior surface of the forms when internal vibrators do not provide adequate consolidation of the concrete. Vibrators shall be manipulated to work the concrete thoroughly around the reinforcement and embedded fixtures and into corners and angles of the forms. The vibration at any point shall be of sufficient duration to accomplish compaction but shall not be prolonged to where segregation occurs. Concrete deposited under water shall be carefully placed in a compact mass in its final position by means of a tremie or other approved method and shall not be disturbed after placement.

**610-3.10 Construction Joints.** Joints shall be constructed as indicated on the plans. If the placement of concrete is suspended, necessary provisions shall be made for joining future work before the placed concrete takes its initial set. For the proper bonding of old and new concrete, provisions shall be made for grooves, steps, reinforcing bars or other devices as specified. The work shall be arranged so that a section begun on any day shall be finished during daylight of the same day. Before depositing new concrete on or against concrete that has hardened, the surface of the hardened concrete shall be cleaned by a heavy steel broom, roughened slightly, wetted, and covered with a neat coating of cement paste or grout.

**610-3.11 Expansion joints.** Expansion joints shall be constructed at such points and dimensions as indicated on the drawings. The premolded filler shall be cut to the same shape as the surfaces being joined. The filler shall be fixed firmly against the surface of the concrete already in place so that it will not be displaced when concrete is deposited against it.

**610-3.12 Defective work.** Any defective work discovered after the forms have been removed, which in the opinion of the Engineer cannot be repaired satisfactorily, shall be immediately removed and replaced at the expense of the Contractor. Defective work shall include deficient dimensions, or bulged, uneven, or honeycomb on the surface of the concrete.

**610-3.13 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. Mortar finishing shall not be permitted, nor shall dry cement or sand-cement mortar be spread over the concrete during the finishing of horizontal plane surfaces.

The surface finish of exposed concrete shall be a rubbed finish. If forms can be removed while the concrete is still green, the surface shall be wetted and then rubbed with a wooden float until all irregularities are removed. If the concrete has hardened before being rubbed, a carborundum stone shall be used to finish the surface. When approved, the finishing can be done with a finishing machine.

**610-3.14 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. The concrete shall be protected from the weather, flowing water, and from defacement of any nature during the project. The concrete shall be cured by covering with an approved material as soon as it has sufficiently hardened. Water-absorptive coverings shall be thoroughly saturated when placed and kept saturated for at least three (3) days following concrete placement. All curing mats or blankets shall be sufficiently weighted or tied down to keep the concrete surface covered and to prevent the surface from being exposed to air currents. Wooden forms shall be kept

wet at all times until removed to prevent opening of joints and drying out of the concrete. Traffic shall not be allowed on concrete surfaces for seven (7) days after the concrete has been placed.

**610-3.15 Drains or ducts.** Drainage pipes, conduits, and ducts that are to be encased in concrete shall be installed by the Contractor before the concrete is placed. The pipe shall be held rigidly so that it will not be displaced or moved during the placing of the concrete.

**610-3.16 Cold weather placing.** When concrete is placed at temperatures below 40°F, the Contractor shall provide satisfactory methods and means to protect the mix from injury by freezing. The aggregates, or water, or both, shall be heated to place the concrete at temperatures between 50°F and 100°F. Contractor shall submit to the Engineer their planned methods for cold weather placement a minimum of 5 days prior to ordering concrete materials.

Calcium chloride may be incorporated in the mixing water when directed by the Engineer. Not more than pounds of Type 1 nor more than 1.6 pounds of Type 2 shall be added per bag of cement. After the concrete has been placed, the Contractor shall provide sufficient protection such as cover, canvas, framework, heating apparatus, etc., to enclose and protect the structure and maintain the temperature of the mix at not less than 50°F until at least 60% of the designed strength has been attained.

**610-3.17 Hot weather placing.** When concrete is placed in hot weather greater than 85°F, follow the hot weather concreting recommendations found in ACI 305R, Hot Weather Concreting.

## QUALITY ASSURANCE (QA)

**610-4.1 Quality Assurance sampling and testing.** Concrete for each day's placement will be accepted on the basis of the compressive strength specified in paragraph 610-3.2. The 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 Sidewalks.** Concrete for sidewalks shall be measured by the number of square yards of concrete complete in place and meeting the dimensions and material requirements shown on these plans.

## BASIS OF PAYMENT

**610-6.1 CONCRETE FOR SIDEWALKS.** Payment shall be made at the contract price by the number of square yards of approved concrete materials. this price shall be full compensation for furnishing all materials including reinforcement and embedded items and for all preparation, delivery, installation, and curing of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item P-610      Concrete Sidewalk – 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 A184	Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement
ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A704	Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement
ASTM A706	Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
ASTM A775	Standard Specification for Epoxy-Coated Steel Reinforcing Bars
ASTM A884	Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement
ASTM A934	Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars
ASTM A1064	Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
ASTM C31	Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C33	Standard Specification for Concrete Aggregates
ASTM C39	Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C94	Standard Specification for Ready-Mixed Concrete
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C114	Standard Test Methods for Chemical Analysis of Hydraulic Cement
ASTM C136	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C143	Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C150	Standard Specification for Portland Cement
ASTM C171	Standard Specification for Sheet Materials for Curing Concrete
ASTM C172	Standard Practice for Sampling Freshly Mixed Concrete
ASTM C231	Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method

ASTM C260	Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C309	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C311	Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use in Portland-Cement Concrete
ASTM C494	Standard Specification for Chemical Admixtures for Concrete
ASTM C618	Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C666	Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing
ASTM C685	Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing
ASTM C989	Standard Specification for Slag Cement for Use in Concrete and Mortars
ASTM C1017	Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete
ASTM C1077	Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
ASTM C1157	Standard Performance Specification for Hydraulic Cement
ASTM C1260	Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
ASTM C1365	Standard Test Method for Determination of the Proportion of Phases in Portland Cement and Portland-Cement Clinker Using X-Ray Powder Diffraction Analysis
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D1751	Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Asphalt Types)
ASTM D1752	Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction

#### American Concrete Institute (ACI)

ACI 305R	Hot Weather Concreting
ACI 306R	Cold Weather Concreting
ACI 308R	Guide to External Curing of Concrete
ACI 309R	Guide for Consolidation of Concrete

**END OF ITEM P-610**

**ITEM P-620**  
**RUNWAY AND TAXIWAY MARKING**

**DESCRIPTION**

**620-1.1** This item shall consist of the preparation and painting of numbers, markings, and stripes on the surface of runways, taxiways, and aprons, in accordance with these specifications and at the locations shown on the plans, or as directed by the Resident Project Representative (RPR) and 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 RPR upon arrival of a shipment of materials to the site. All material shall arrive in sealed containers that are easily quantifiable for inspection by the RPR.

**620-2.2 Marking materials.**

**Table 1. Marking Materials**

<b>Paint<sup>1</sup></b>				<b>Glass Beads<sup>2</sup></b>	
<b>Type</b>	<b>Color</b>	<b>Fed Std. 595 Number</b>	<b>Application Rate Maximum</b>	<b>Type</b>	<b>Application Rate Minimum</b>
Waterborne Type I or II	Yellow & Black	33538, 33655 & 37038	115 ft <sup>2</sup> /gal	Type I	7 lb/gal

<sup>1</sup> See paragraph 620-2.2a

<sup>2</sup> See paragraph 620-2.2c

**a. Paint.** Paint shall be waterborne in accordance with the requirements of this paragraph. Paint colors shall comply with Federal Standard No. 595.

**b. Waterborne.** Paint shall meet the requirements of Federal Specification TT-P-1952F, Type I. 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.

**c. Reflective media.** Glass beads for white and yellow paint shall meet the requirements for Federal Specification TT-B-1325D Type I, Gradation A

Glass beads shall be treated with all compatible coupling agents recommended by the manufacturers of the paint and reflective media to ensure adhesion and embedment.

Glass beads shall not be used in black 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 is at least 45°F and rising and the pavement surface temperature is at least 5°F above the dew point or when conditions 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. The area to be painted shall be cleaned by waterblasting, shotblasting, grinding, sandblasting, or by other methods as required to remove all contaminants without damage to the pavement surface. 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 RPR and 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. The locations of markings to receive silica sand 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**

<b>Dimension and Spacing</b>	<b>Tolerance</b>
36 inch or less	±1/2 inch
greater than 36 inch to 6 feet	±1 inch
greater than 6 feet to 60 feet	±2 inch
greater than 60 feet	±3 inch

The paint shall be mixed in accordance with the manufacturer's instructions and applied to the pavement with a marking machine at the rate shown in Table 1. The addition of thinner will not be permitted.

Glass beads shall be distributed upon the marked areas at the locations shown on the plans to receive glass beads immediately after application of the paint. A dispenser shall be furnished that is properly designed for attachment to the marking machine and suitable for dispensing glass beads. Glass beads shall be applied at the rate shown in Table 1. Glass beads shall not be applied to black paint or green paint. Glass beads shall adhere to the cured paint or all marking operations shall cease until corrections are made. Different bead types shall not be mixed. Regular monitoring of glass bead embedment and distribution should be performed.

**620-3.6 Application--preformed thermoplastic airport pavement markings.** 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 reading shall be taken over a 6 square foot area with 3 readings taken from each direction. The average shall be equal to or above the minimum levels of all readings which are within 30% of each other. During application, retro-reflectance testing shall be completed two (2) times per day.

### Minimum Retro-Reflectance Values

Material	Retro-reflectance mcd/m <sup>2</sup> /lux	
	Yellow	Red
Initial Type I	175	35
Initial Type III	300	35
Initial Thermoplastic	100	35
All materials, remark when less than <sup>1</sup>	75	10

<sup>1</sup> Prior to remarking determine if removal of contaminants on markings will restore retro-reflectance

**620-3.9 Temporary Marking.** ~~If the airport operations require pavement marking prior to the recommended waiting period, the paint may be applied in a temporary light coat application. Appropriate modifications to paragraph 3.5 should be included to specify a 30% to 50% application rate for temporary markings. Glass beads are not required for temporary markings. Glass beads will not adhere well at the low application rates for temporary markings and require immediate sweeping and cleanup before aircraft are allowed to use the pavement. Temporary markings are not required for this project.~~

The final marking application must be at full strength in order to adequately set the glass bead.

**620-3.10 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 permanent taxiway markings to be paid for shall be measured by the number of square feet of reflective yellow markings. This item shall include furnishing and installing the black border on both sides of the reflective yellow pavement marking. Taxiway marking includes surface preparation, application of paint and application of glass beads if specified.

### BASIS OF PAYMENT

**620-5.1a** Payment shall be made at the respective contract price per square foot for runway and taxiway painting to include reflective media. 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 in accordance with the plans and specifications.

Payment will be made under:

Item P-620	Pavement Markings, Permanent, Yellow, Reflective – per square foot
------------	--

P-620-4



## REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

### ASTM International (ASTM)

ASTM D476	Standard Classification for Dry Pigmentary Titanium Dioxide Products
ASTM D968	Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive
ASTM D1652	Standard Test Method for Epoxy Content of Epoxy Resins
ASTM D2074	Standard Test Method for Total, Primary, Secondary, and Tertiary Amine Values of Fatty Amines by Alternative Indicator Method
ASTM D2240	Standard Test Method for Rubber Property - Durometer Hardness
ASTM D7585	Standard Practice for Evaluating Retroreflective Pavement Markings Using Portable Hand-Operated Instruments
ASTM E303	Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester
ASTM E1710	Standard Test Method for Measurement of Retroreflective Pavement Marking Materials with CEN-Prescribed Geometry Using a Portable Retroreflectometer
ASTM E2302	Standard Test Method for Measurement of the Luminance Coefficient Under Diffuse Illumination of Pavement Marking Materials Using a Portable Reflectometer
ASTM G154	Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials

### Code of Federal Regulations (CFR)

40 CFR Part 60, Appendix A-7, Method 24	Determination of volatile matter content, water content, density, volume solids, and weight solids of surface coatings
29 CFR Part 1910.1200 Hazard Communication	

### Federal Specifications (FED SPEC)

FED SPEC TT-B-1325D	Beads (Glass Spheres) Retro-Reflective
FED SPEC TT-P-1952F	Paint, Traffic and Airfield Marking, Waterborne
FED STD 595	Colors used in Government Procurement

### Commercial Item Description

A-A-2886B	Paint, Traffic, Solvent Based
-----------	-------------------------------

### Advisory Circulars (AC)

AC 150/5340-1	Standards for Airport Markings
---------------	--------------------------------

AC 150/5320-12

Measurement, Construction, and Maintenance of Skid Resistant Airport  
Pavement Surfaces

**END OF ITEM P-620**

**ITEM F-162**  
**CHAIN-LINK FENCE GATE**

**DESCRIPTION**

**162-1.1** This item shall consist of furnishing and erecting a chain-link fence gate and operator system in accordance with these specifications, the details shown on the plans, and in conformity with the lines and grades shown on the plans or established by the Engineer.

**MATERIALS**

**162-2.1 Fabric.** The fabric shall be woven with a 9-gauge galvanized steel wire in a 2" mesh and shall meet the requirements of ASTM A392, Class 2.

**162-2.2 Barbed wire.** Barbed wire shall be 2-strand 12-1/2 gauge zinc-coated wire with 4-point barbs and shall conform to the requirements of ASTM A121, Class 3.

**162-2.3 Posts, rails, and braces.** Line posts, rails, and braces shall conform to the requirements of ASTM F1043 or ASTM F1083 as follows:

Galvanized tubular steel pipe shall conform to the requirements of Group IA, (Schedule 40) coatings conforming to Type A, or Group IC (High Strength Pipe), External coating Type B, and internal coating Type B or D.

Roll Formed Steel Shapes (C-Sections) shall conform to the requirements of Group IIA, and be galvanized in accordance with the requirements of ASTM F1043, Type A.

Hot-Rolled Shapes (H Beams) shall meet the requirements of Group III, and be galvanized in accordance with the requirements of ASTM F1043, Type A.

Posts, rails, and braces, with the exception of galvanized steel conforming to ASTM F1043 or ASTM F1083, Group 1A, Type A, or aluminum alloy, shall demonstrate the ability to withstand testing in salt spray in accordance with ASTM B117 as follows:

External: 1,000 hours with a maximum of 5% red rust.

Internal: 650 hours with a maximum of 5% red rust.

The dimensions of the posts, rails, and braces shall be in accordance with Tables I through VI of Federal Specification RR-F-191/3.

**162-2.4 Gates.** Gate frames shall consist of galvanized steel pipe and shall conform to the specifications for the same material under paragraph 162-2.3. The fabric shall be of the same type material as used in the fence.

**162-2.5 Wire ties and tension wires.** Wire ties for use in conjunction with a given type of fabric shall be of the same material and coating weight identified with the fabric type. Tension wire shall be 7-gauge marcelled steel wire with the same coating as the fabric type and shall conform to ASTM A824. All material shall conform to Federal Specification RR-F-191/4.

**162-2.6 Miscellaneous fittings and hardware.** Miscellaneous steel fittings and hardware for use with zinc-coated steel fabric shall be of commercial grade steel or better quality, wrought or cast as appropriate to the article, and sufficient in strength to provide a balanced design when used in conjunction with fabric posts, and wires of the quality specified herein. All steel fittings and hardware shall be protected with a zinc coating applied in conformance with ASTM A153. Barbed wire support arms shall withstand a load of 250 pounds applied vertically to the outermost end of the arm.

**162-2.7 Concrete.** Concrete shall be of a commercial grade with a minimum 28-day compressive strength of 3,000 psi.

**162-2.8 Marking.** Each roll of fabric shall carry a tag showing the kind of base metal, kind of coating, the gauge of the wire, the length of fencing in the roll, and the name of the manufacturer. Posts, wire, and other fittings shall be identified as to manufacturer, kind of base metal, and kind of coating.

**162-2.9 Cantilever Sliding Gate.** Each roll of fabric shall carry a tag showing the kind of base metal, kind of coating, the gauge of the wire, the length of fencing in the roll, and the name of the manufacturer. Posts, wire, and other fittings shall be identified as to manufacturer, kind of base metal, and kind of coating.

1. Fabricate gate leaf frames and tracks of aluminum conforming to ASTM B429 alloy 6063-T6 or as required to meet performance requirements of ASTM F1184.
2. Frame Members: Minimum 2 inches 0.91 lb/ft aluminum tubing welded assembly forming rigid, one piece unit.
3. Install fabric securely stretched and held in center of tubing.
4. Brace cantilever overhang frames with 3/8 inch brace rods. For gate leaf sizes greater than 23 feet, fabricate with additional lateral support rail welded adjacent to top and bottom horizontal rails.
5. Provide minimum overhang for each leaf opening size as follows:

Opening	Overhang
Up to 10'-0"	6'-6"
10'-0" -14'-0"	7'-6"
14'-1" -22'-0"	10'-0"
22'-1" - 30'-0"	12'-0"

6. Track: Combined, integral track and rail.
7. Rail: Aluminum extrusion; minimum total weight of 3.72 lb/ft; designed to withstand reaction load of 2,000 lbs.
8. Roller Track Assembly: Two swivel type, zinc, die cast trucks having four, sealed lubricant ball bearing wheels minimum 2 inches diameter by 9/16 inches width designed for same reaction load as rail. Provide two side-rolling wheels for each gate leaf to maintain alignment of truck in track.
9. Fasten trucks to post brackets by minimum 7/8 inch diameter, 1/2 inch shank ball bolts.
10. Provide galvanized steel guide wheel assemblies consisting of two rubber wheels of minimum 4 inch diameter with oil-impregnated bearings for each supporting post.
11. Attach guide wheel assembly to post so bottom horizontal member rolls between wheels and permitting adjustment to maintain plumb gate frames and proper alignment.

**162-2.10 Gate Operator.** Each roll of fabric shall carry a tag showing the kind of base metal, kind of coating, the gauge of the wire, the length of fencing in the roll, and the name of the manufacturer. Posts, wire, and other fittings shall be identified as to manufacturer, kind of base metal, and kind of coating.

- A. General: Provide factory-assembled automatic operating system designed for gate size, type, weight, and operation frequency. Provide operation control system with characteristics suitable for Project conditions, with remote-control stations, safety devices, and weatherproof enclosures; coordinate electrical requirements with building electrical system.
  - 1. Provide operator with UL approved components.
  - 2. Provide controllers, electrical devices, and wiring that comply with requirements specified applicable project electrical specifications.
- B. Motors: Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in applicable project electrical specifications.
  - 1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
- C. Gate Operators: Commercial/Industrial Duty, Concrete base mounted Hydraulic Slide Gate Operator for Cantilever Gate.
- D. Remote Controls: Electric controls separated from gate and motor and drive mechanism, with NEMA ICS 6, Type 4 enclosure for concrete base mounting, and with space for additional optional equipment.
  - 1. Vehicle Detector: Loop system including automatic closing timer with adjustable time delay before closing, and timer cutoff switch designed to open and close gate.
- E. Cantilever Gate Key Pad. Digital Key Pad for code entry, mountable to 42" pad mounted gooseneck stand as detailed on the plans. Housing to be black. Contractor to submit for owner/engineer approval prior to installation. Key pads shall be provided by Linear Pro Access or approved equal products by the engineer.
- F. Obstruction Detection Devices: Provide each motorized gate with automatic safety sensor(s). Activation of sensor(s) causes operator to immediately reverse gate in both opening and closing cycles and hold until clear of obstruction.
- G. Accessories:
  - 1. Warning Module: Audio, ADA/ABA-compliant, strobe-light alarm.
  - 2. Battery Backup System: Battery-powered drive and access-control system.
  - 3. Instructional, Safety, and Warning Labels and Signs: According to UL 325.
  - 4. Gate operator shall be equipped with a visual and audible alarm to sound at the gate location, to be activated if the gate is forced open, held open, or not closed properly.

## CONSTRUCTION METHODS

**162-3.1 General.** The fence shall be constructed in accordance with the details on the plans and as specified here using new materials. All work shall be performed in a workmanlike manner satisfactory to the RPR. The Contractor shall lay out the fence line based on the plans. Fence location shall be verified by the Owner before fence construction begins. The Contractor shall span the opening below the fence with barbed wire at all locations where it is not practical to conform the fence to the general contour of the ground surface because of natural or manmade features such as drainage ditches. The new fence shall be permanently tied to the terminals of existing fences as shown on the plans. The Contractor shall stake down the woven wire fence at several points between posts as shown on the plans.

The Contractor shall arrange the work so that construction of the new fence will immediately follow the removal of existing fences. The length of unfenced section at any time shall not exceed 300 feet. The work shall progress in this manner and at the close of the working day the newly constructed fence shall be tied to the existing fence.

**162-3.2 Clearing fence line.** Clearing shall consist of the removal of all stumps, brush, rocks, trees, or other obstructions that will interfere with proper construction of the fence. Stumps within the cleared area of the fence shall be grubbed or excavated. The bottom of the fence shall be placed a uniform distance above ground, as specified in the plans. When shown on the plans or as directed by the RPR, the existing fences which interfere with the new fence location shall be removed by the Contractor as a part of the construction work unless such removal is listed as a separate item in the bid schedule. All holes remaining after post and stump removal shall be refilled with suitable soil, gravel, or other suitable material and compacted with tampers.

The cost of removing and disposing of the material shall not constitute a pay item and shall be considered incidental to fence construction.

**162-3.3 Installing posts.** All posts shall be set in concrete at the required dimension and depth and at the spacing shown on the plans.

Posts should be spaced not more than 10 feet apart and should be set a minimum of 36 inches in concrete footings. If the frost depth is greater than 36 inches, the posts should be set accordingly. The posts holes shall be in proper alignment so that there is a minimum of 3 inches of concrete on all sides of the posts. The concrete shall be thoroughly compacted around the posts by tamping or vibrating and shall have a smooth finish slightly higher than the ground and sloped to drain away from the posts. All posts shall be set plumb and to the required grade and alignment. No materials shall be installed on the posts, nor shall the posts be disturbed in any manner within seven (7) days after the individual post footing is completed.

Should rock be encountered at a depth less than the planned footing depth, a hole 2 inches larger than the greatest dimension of the posts shall be drilled to a depth of 12 inches. After the posts are set, the remainder of the drilled hole shall be filled with grout, composed of one part Portland cement and two parts mortar sand. Any remaining space above the rock shall be filled with concrete in the manner described above.

In lieu of drilling, the rock may be excavated to the required footing depth. No extra compensation shall be made for rock excavation.

**162-3.4 Installing top rails.** The top rail shall be continuous and shall pass through the post tops. The coupling used to join the top rail lengths shall allow for expansion.

**162-3.5 Installing braces.** Horizontal brace rails, with diagonal truss rods and turnbuckles, shall be installed at all terminal posts.

**162-3.6 Installing fabric.** The wire fabric shall be firmly attached to the posts and braced as shown on the plans. All wire shall be stretched taut and shall be installed to the required elevations. The fence shall generally follow the contour of the ground, with the bottom of the fence fabric no less than 1" or more than 4" from the ground surface. Grading shall be performed where necessary to provide a neat appearance.

At locations of small natural swales or drainage ditches and where it is not practical to have the fence conform to the general contour of the ground surface, longer posts may be used and multiple strands of barbed wire stretched to span the opening below the fence. The vertical clearance between strands of barbed wire shall be 6" or less.

**162-3.7 Electrical grounds.** Electrical grounds shall be constructed where a power line passes over the fence and at 500'-0" intervals. The ground shall be installed directly below the point of crossing. The ground shall be accomplished with a copper clad rod 8'-0" long and a minimum of 5/8" in diameter driven vertically until the top is 6" below the ground surface. A No. 6 solid copper conductor shall be clamped to the rod and to the fence in such a manner that each element of the fence is grounded. Installation of ground rods shall not constitute a pay item and shall be considered incidental to fence construction. The Contractor shall comply with FAA-STD-019, Lightning and Surge Protection, Grounding, Bonding and Shielding Requirements for Facilities and Electronic Equipment, Paragraph 4.2.3.8, Lightning Protection for Fences and Gates, when fencing is adjacent to FAA facilities. Grounding shall be incidental to the fence line pay item.

**162-3.8 Cleaning up.** The Contractor shall remove from the vicinity of the completed work all tools, buildings, equipment, etc., used during construction. All disturbed areas shall be seeded per T-901.

**162-3.9 Erection Tolerance:**

- A. See General Provisions Section 100.
- B. Maximum Variation from Plumb: 1/4 inch.
- C. Maximum Offset from Indicated Position: 1 inch.
- D. Minimum distance from property line: 6 inches.

**METHOD OF MEASUREMENT**

**162-4.1** Gates will be measured as complete units required for operation (including, but not limited to, the gate, posts, keypad, concrete pads, operator, battery backup, and in pavement loops). Work includes all power supply connections as required by the manufacturer, installing electric underground lines to the nearest acceptable power source, and energizing equipment (operator, backup battery).

**162-4.2** Gate Access Control System will be measured for each complete system installed to allow for keypad access for ingress and egress through the gate as shown on the project plans and details. Work includes but is not limited to, furnishing and installing the keypad, bollards, concrete pads, all lighting equipment and installation, which includes the light pole and its foundation. This item will also be measured by completing the power supply connections as required by the manufacturer, installing electric underground lines to the nearest acceptable power source, and energizing equipment (lighting, keypads, and backup battery).

**162-4.3** Chain Link Fence AND ANY NEW FENCE POSTS or foundations required to facilitate the new gate will not be measured for payment. All necessary fencing items associated with furnishing and installing the new gate will be paid under the Electric Gate pay item.

### **BASIS OF PAYMENT**

**162-5.1** Payment for Electric gate and operator will be made at the contract unit price for the complete gate system. The price shall be full compensation for furnishing all materials, and for all preparation, erection, and installation of these materials, and for all labor equipment, tools, and incidentals necessary to complete the item as shown on project plans and details. This work also includes the fencing materials to be used on the fence gate. Fence will not be measured or paid for separately.

**162-5.2** Payment for Gate Access Control System will be per each complete setup for ingress/egress to/from the project area. The price shall be full compensation for furnishing all materials, and for all preparation, erection, and installation of these materials, and for all labor equipment, tools, and incidentals necessary to complete the item as shown on project plans.

Payment will be made under:

Item F-162-1 – Electric Gate and Operator (24’ Opening) - per lump sum

Item F-162-2 – Gate Access Control System – lump sum

### **MATERIAL REQUIREMENTS**

ASTM A121	Standard Specification for Metallic-Coated Carbon Steel Barbed Wire
ASTM A123	Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products
ASTM A153	Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A392	Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric
ASTM A572	Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel
ASTM A653	Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM A824	Standard Specification for Metallic-Coated Steel Marcellled Tension Wire for Use With Chain Link Fence
ASTM A1011	Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High Strength Low Alloy with Improved Formability, and Ultra High Strength
ASTM B117	Standard Practice for Operating Salt Spray (Fog) Apparatus
ASTM B221	Standard Specification for Aluminum and Aluminum Alloy Extruded Bars, Rods, Wire, Profiles and Tubes
ASTM F626	Standard Specification for Fence Fittings
ASTM F1043	Standard Specification for Strength and Protective Coatings on Steel Industrial Fence Framework
ASTM F1083	Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures
ASTM G152	Standard Practice for Operating Open Flame Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials



ASTM G153	Standard Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials
ASTM G154	Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials
ASTM G155	Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Nonmetallic Materials
FED SPEC RR-F-191/3	Fencing, Wire and Post, Metal (Chain-Link Fence Posts, Top Rails and Braces)
FED SPEC RR-F-191/4	Fencing, Wire and Post, Metal (Chain-Link Fence Accessories)
FAA-STD-019	Lightning and Surge Protection, Grounding, Bonding and Shielding Requirements for Facilities and Electronic Equipment
FAA Orders	5300.38AIP Handbook

**END OF SECTION**

**This Page Intentionally Left Blank**

**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 C1479	Standard Practice for Installation of Precast Concrete Sewer, Storm Drain, and Culvert Pipe Using Standard Installations
ASTM C1840	Standard Practice for Inspection and Acceptance of Installed Reinforced Concrete Culvert, Storm Drain, and Storm Sewer Pipe

**701-2.3 Concrete.** Concrete for pipe cradles shall have a minimum compressive strength of 2000 psi (13.8 MPa) at 28 days and conform to the requirements of ASTM C94.

**701-2.4 Rubber gaskets.** Rubber gaskets for rigid pipe shall conform to the requirements of ASTM C443.

**701-2.5 Joint mortar.** Pipe joint mortar shall consist of one part Portland cement and two parts sand. The Portland cement shall conform to the requirements of ASTM C150, Type I. The sand shall conform to the requirements of ASTM C144.

**701-2.6 Joint fillers.** Poured filler for joints shall conform to the requirements of ASTM D6690.

**701-2.7 Plastic gaskets.** Plastic gaskets shall not be used.

**701-2.8. Controlled low-strength material (CLSM).** Controlled low-strength material shall conform to the requirements of Item P-153. When CLSM is used, all joints shall have gaskets

**701-2.9 Precast box culverts.** Manufactured in accordance with and conforming to ASTM C1433.

**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.

## CONSTRUCTION METHODS

**701-3.1 Excavation.** The width of the pipe trench shall be sufficient to permit satisfactory jointing of the pipe and thorough tamping of the bedding material under and around the pipe, but it shall not be less than the external diameter of the pipe plus 12 inches on each side. The trench walls shall be approximately vertical.

The Contractor shall comply with all current federal, state and local rules and regulations governing the safety of men and materials during the excavation, installation and backfilling operations. Specifically, the Contractor shall observe that all requirements of the Occupational Safety and Health Administration (OSHA) relating to excavations, trenching and shoring are strictly adhered to. The width of the trench shall be sufficient to permit satisfactory jointing of the pipe and thorough compaction of the bedding material under the pipe and backfill material around the pipe, but it shall not be greater than the widths shown on the plans trench detail.

Where rock, hardpan, or other unyielding material is encountered, the Contractor shall remove it from below the foundation grade for a depth of at least 8 inch or 1/2 inch for each foot of fill over the top of the pipe (whichever is greater) but for no more than three-quarters of the nominal diameter of the pipe. The excavation below grade should be filled with granular material to form a uniform foundation.

Where a firm foundation is not encountered at the grade established, due to soft, spongy, or other unstable soil, the unstable soil shall be removed and replaced with approved granular material for the full trench width. The 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.** For flexible pipe, the bedding shall conform to the NCDOT details and section 300 of the ncdot Standard specifications. Bedding shall roughly shaped to fit the pipe.

**c. Other pipe materials.** For PVC, polyethylene, polypropylene, or fiberglass pipe, the bedding material shall consist of coarse sands and gravels with a maximum particle size of 3/4 inches (19 mm). For pipes installed under paved areas, no more than 12% of the material shall pass the No. 200 (0.075 mm) sieve. For all other areas, no more than 50% of the material shall pass the No. 200 (0.075 mm) sieve. The bedding shall have a thickness of at least 6 inches (150 mm) below the bottom of the pipe and extend up around the pipe for a depth of not less than 50% of the pipe's vertical outside diameter.

**701-3.3 Laying pipe.** The pipe laying shall begin at the lowest point of the trench and proceed upgrade. The lower segment of the pipe shall be in contact with the bedding throughout its full length. Bell or groove ends of rigid pipes and outside circumferential laps of flexible pipes shall be placed facing upgrade.

Paved or partially lined pipe shall be placed so that the longitudinal center line of the paved segment coincides with the flow line.

Elliptical and elliptically reinforced concrete pipes shall be placed with the manufacturer's reference lines designating the top of the pipe within five degrees of a vertical plane through the longitudinal axis of the pipe.

**701-3.4 Joining pipe.** Joints shall be made with (1) cement mortar, (2) cement grout, (3) rubber gaskets, (4) plastic gaskets, (5) coupling bands.

Mortar joints shall be made with an excess of mortar to form a continuous bead around the outside of the pipe and shall be finished smooth on the inside. Molds or runners shall be used for grouted joints to retain the poured grout. Rubber ring gaskets shall be installed to form a flexible watertight seal.

**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.

All RCP indicated on the plans shall receive external joint wrap. External pipe joints shall be wrapped with an outside sealer wrap that is at least 12 inches wide and covers the joint covering the outside diameter of the pipe. Use Conwrap CS-21 from Concrete Sealants, Inc., EZ-wrap from Press-Seal Gasket Corporation, Seal Wrap from Mar-Mac Manufacturing Co., Inc., or an approved equal. If the outside sealer wrap is not applied in a continuous strip along the entire joint, a 12 inch minimum lap of the outside sealer wrap is permitted. Before placing the outside joint wrap, clean and prime the area receiving the outside joint wrap in accordance with manufacturer's recommendations. The joint wrap shall be covered with a 3 foot strip of filter fabric conforming to type 4 requirements in section 1056 of the NCDOT standard specifications.

**b. Metal pipe.** Not used.

**c. PVC, Polyethylene, or Polypropylene pipe.** Not used.

**d. Fiberglass pipe.** Not used.

**701-3.5 Embedment and Overfill.** Pipes shall be inspected before any fill material is placed; any pipes found to be out of alignment, unduly settled, or damaged shall be removed and re-laid or replaced at the Contractor's expense.

#### **701-3.5-1 Embedment Material Requirements**

**a. Concrete Pipe.** Embedment material and compaction requirements shall be in accordance with the applicable Type of Standard Installation (Types 1, 2, 3, or 4) per ASTM C1479. If a concrete cradle or CLSM embedment material is used, it shall conform to the plan details.

**b. Plastic and fiberglass Pipe.** Not used.

**c. Metal Pipe.** Not used.

#### **701-3.5-2 Placement of Embedment Material**

The embedment material shall be compacted in layers not exceeding 6 inches on each side of the pipe and shall be brought up one foot above the top of the pipe or to natural ground level, whichever is greater. Thoroughly compact the embedment material under the haunches of the pipe without displacing the pipe. Material shall be brought up evenly on each side of the pipe for the full length of the pipe.

When the top of the pipe is above the top of the trench, the embedment material shall be compacted in layers not exceeding 6 inches and shall be brought up evenly on each side of the pipe to one foot above the top of the pipe. All embedment material shall be compacted to a density required under Item P-152.

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 D1557. The soil shall contain no debris, organic matter, frozen material, or stones with a diameter greater than one half the thickness of the compacted layers being placed.

### **701-3.7 Inspection Requirements**

An initial post installation inspection shall be performed in the presence of the Engineer and RPR no sooner than 30 days after completion of installation and final backfill. Clean or flush all lines prior to inspection.

Use a camera with lighting suitable to allow a clear picture of the entire periphery of the pipe interior. Center the camera in the pipe both vertically and horizontally and be able to pan and tilt to a 90 degree angle with the axis of the pipe rotating 360 degrees. Use equipment to move the camera through the pipe that will not obstruct the camera's view or interfere with proper documentation of the pipe's condition. The video image shall be clear, focused, and relatively free from roll, static, or other image distortion qualities that would prevent the reviewer from evaluating the condition of the pipe.

For pipe sizes larger than 48 inches, a walk-through visual inspection shall be performed.

Incorporate specific inspection requirements for the various types of pipes beneath the general inspection requirements.

Reinforced concrete pipe shall be inspected, evaluated, and reported on in accordance with ASTM C1840, "Standard Practice for Inspection and Acceptance of Installed Reinforced Concrete Culvert, Storm Drain, and Storm Sewer Pipe." Any issues reported shall include still photo and video documentation. The zoom ratio shall be provided for all still or video images that document any issues of concern by the inspection firm.

Flexible pipes shall be inspected for rips, tears, joint separations, soil migration, cracks, localized buckling, settlement, alignment, and deflection. Determine whether the allowable deflection has been exceeded by use of a laser profiler for internal pipe diameters of 48 inches or less, or direct measurement for internal pipe diameters greater than 48 inches. Laser profile equipment shall utilize low barrel distortion video equipment. Deflection of installed pipe shall not exceed the limits provided in the table below, as a percentage of the average inside diameter of the pipe.

### Maximum Allowable Pipe Deflection

Type of Pipe	Maximum Allowable Deflection (%)
Corrugated Metal Pipe	5
Concrete Lined CMP	3
Thermoplastic Pipe	5
Fiberglass	5

If deflection readings in excess of the allowable deflection are obtained, remove the pipe with excessive deflection and replace with new pipe. Isolated areas may exceed allowable by 2.5% with concurrence of Engineer. Repair or replace any pipe with cracks exhibiting displacement across the crack, bulges, creases, tears, spalls, or delaminations. The report for flexible pipe shall include as a minimum, the deflection results and final post installation inspection report. The inspection report shall include: a copy of all video taken, pipe location identification, equipment used for inspection, inspector name, deviation from design line and grade, and inspector's notes.

### 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 types and sizes of RCP shall be measured separately. All fittings shall be included in the footage as typical pipe sections in the pipe being measured. Measurement shall include all trenching excavation, backfill, joint wrap for pipe and compaction for acceptable installation of the pipe.

Pipe class and sizes are listed in the pay items in section 701-5.1.

**701-4.2** The end sections shall be measured per each for installation in place, completed, and accepted. All fittings shall be included.

## **BASIS OF PAYMENT**

**701-5.0** These prices shall fully compensate the Contractor for furnishing all materials and for all preparation, excavation, bedding 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 RCP.

Payment will be made under:

Item D-701-1	15-inch Class III RCP – per linear foot
Item D-701-2	18-inch Class III RCP – per linear foot
Item D-701-3	18-inch Class IV RCP – per linear foot
Item D-701-4	24-inch Class IV RCP – per linear foot
Item D-701-5	30-inch Class III RCP – per linear foot
Item D-701-6	30-inch Class IV RCP – per linear foot
Item D-701-7	36-inch Class III RCP – per linear foot
Item D-701-8	48-inch Class IV RCP – per linear foot
Item D-701-9	54-inch Class III RCP – 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

D-701-6



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 ITEM D-701**

**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 nor more than 48 inches. There shall be a gasket between individual sections and sections cemented together with mortar on the inside of the manhole. Gaskets shall conform to the requirements of ASTM C443.

**751-2.5 Corrugated metal.** Corrugated metal shall conform to the requirements of American Association of State Highway and Transportation Officials (AASHTO) M36.

**751-2.6 Frames, covers, and grates.** The castings shall conform to one of the following requirements:

- a. ASTM A48, Class 35B: Gray iron castings
- b. ASTM A47: 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 RPR. The excavation shall be of sufficient size to permit the placing of the full width and length of the structure or structure footings shown. The elevations of the bottoms of footings, as shown on the plans, shall be considered as approximately only; and the RPR may direct, in writing, changes in dimensions or elevations of footings necessary for a satisfactory foundation.

**b.** Boulders, logs, or any other objectionable material encountered in excavation shall be removed. All rock or other hard foundation material shall be cleaned of all loose material and cut to a firm surface either level, stepped, or serrated, as directed by the RPR. All seams or crevices shall be cleaned out and grouted. All loose and disintegrated rock and thin strata shall be removed. Where concrete will rest on a surface other than rock, the bottom of the excavation shall not be disturbed and excavation to final grade shall not be made until immediately before the concrete or reinforcing is placed.

**c.** The Contractor shall do all bracing, sheathing, or shoring necessary to implement and protect the excavation and the structure as required for safety or conformance to governing laws. The cost of bracing, sheathing, or shoring shall be included in the unit price bid for the structure.

**d.** All bracing, sheathing, or shoring involved in the construction of this item shall be removed by the Contractor after the completion of the structure. Removal shall not disturb or damage finished masonry. The cost of removal shall be included in the unit price bid for the structure.

**e.** After excavation is completed for each structure, the Contractor shall notify the RPR. No concrete or reinforcing steel shall be placed until the RPR has approved the depth of the excavation and the character of the foundation material.

### 751-3.2 Brick structures.

**a. Foundations.** 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.** 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 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 nor more than 1/2 inch 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 RPR before the concrete is placed.

All invert channels shall be constructed and shaped accurately to be smooth, uniform, and cause minimum resistance to flowing water. The interior bottom shall be sloped to the outlet.

**751-3.4 Precast concrete structures.** Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another RPR approved third party certification program.

Precast concrete structures shall conform to ASTM C478. Precast concrete structures shall be constructed on prepared or previously placed slab foundations conforming to the dimensions and locations shown on the plans. All precast concrete sections necessary to build a completed structure shall be furnished. The different sections shall fit together readily. Joints between precast concrete risers and tops shall be full-bedded in cement mortar and shall: (1) be smoothed to a uniform surface on both interior and exterior of the structure or (2) utilize a rubber gasket per ASTM C443. The top of the upper precast concrete section shall be suitably formed and dimensioned to receive the metal frame and cover or grate, or other cap, as required. Provision shall be made for any connections for lateral pipe, including drops and leads that may be installed in the structure. The flow lines shall be smooth, uniform, and cause minimum resistance to flow. The metal or metal encapsulated steps that are embedded or built into the side walls shall be aligned and placed in accordance to ASTM C478. When a metal ladder replaces the steps, it shall be securely fastened into position.

**751-3.5 Corrugated metal structures.** Corrugated metal structures shall be prefabricated. All standard or special fittings shall be furnished to provide pipe connections or branches with the correct dimensions and of sufficient length to accommodate connecting bands. The fittings shall be welded in place to the metal structures. The top of the metal structure shall be designed so that either a concrete slab or metal collar may be attached to allow the fastening of a standard metal frame and grate or cover. Steps or ladders shall be furnished as shown on the plans. Corrugated metal structures shall be constructed on prepared foundations, conforming to the dimensions and locations as shown on the plans. When indicated, the structures shall be placed on a reinforced concrete base.

**751-3.6 Inlet and outlet pipes.** Inlet and outlet pipes shall extend through the walls of the structures a sufficient distance beyond the outside surface to allow for connections. They shall be cut off flush with the wall on the inside surface of the structure, unless otherwise directed. For concrete or brick structures, mortar shall be placed around these pipes to form a tight, neat connection.

**751-3.7 Placement and treatment of castings, frames, and fittings.** All castings, frames, and fittings shall be placed in the positions indicated on the plans or as directed by the RPR, and shall be set true to line and elevation. If frames or fittings are to be set in concrete or cement mortar, all anchors or bolts shall be in place before the concrete or mortar is placed. The unit shall not be disturbed until the mortar or concrete has set.

When frames or fittings are placed on previously constructed masonry, the bearing surface of the masonry shall be brought true to line and grade and shall present an even bearing surface so the entire face or back of the unit will come in contact with the masonry. The unit shall be set in mortar beds and anchored to the masonry as indicated on the plans or as directed by the RPR. All units shall set firm and secure.

After the frames or fittings have been set in final position, the concrete or mortar shall be allowed to harden for seven (7) days before the grates or covers are placed and fastened down.

**751-3.8 Installation of steps.** The steps shall be installed as indicated on the plans or as directed by the RPR. When the steps are to be set in concrete, they shall be placed and secured in position before the concrete is placed. When the steps are installed in brick masonry, they shall be placed as the masonry is being built. The steps shall not be disturbed or used until the concrete or mortar has hardened for at least seven (7) days. After seven (7) days, the steps shall be cleaned and painted, unless they have been galvanized.

When steps are required with precast concrete structures they shall meet the requirements of ASTM C478. The steps shall be cast into the side of the sections at the time the sections are manufactured or set in place after the structure is erected by drilling holes in the concrete and cementing the steps in place.

When steps are required with corrugated metal structures, they shall be welded into aligned position at a vertical spacing of 12 inches.

Instead of steps, prefabricated ladders may be installed. For brick or concrete structures, the ladder shall be held in place by grouting the supports in drilled holes. For metal structures, the ladder shall be secured by welding the top support to the structure and grouting the bottom support into drilled holes in the foundation or as directed by the RPR.

### **751-3.9 Backfilling.**

**a.** After a structure has been completed, the area around it shall be backfilled with approved material, in horizontal layers not to exceed 8 inches in loose depth, and compacted to the density required in Item P-152. Each layer shall be deposited evenly around the structure to approximately the same elevation. The top of the fill shall meet the elevation shown on the plans or as directed by the RPR.

**b.** Backfill shall not be placed against any structure until approved by the RPR. For concrete structures, approval shall not be given until the concrete has been in place seven (7) days, or until tests establish that the concrete has attained sufficient strength to withstand any pressure created by the backfill and placing methods.

**c.** Backfill shall not be measured for direct payment. Performance of this work shall be considered an obligation of the Contractor covered under the contract unit price for the structure involved.

**751-3.10 Cleaning and restoration of site.** After the backfill is completed, the Contractor shall dispose of all surplus material, dirt, and rubbish from the site. Surplus dirt may be deposited in embankments, shoulders, or as approved by the RPR. The Contractor shall restore all disturbed areas to their original condition. The Contractor shall remove all tools and equipment, leaving the entire site free, clear, and in good condition.

## METHOD OF MEASUREMENT

**751-4.1** Junction Boxes, drop inlets, end walls and flared end sections shall be measured by each unit installed per the project plans and specifications.

## 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. This price shall be full compensation for furnishing all materials and for all preparation, excavation, backfilling and placing of the materials; furnishing and installation of such specials and connections to pipes and other structures as may be required to complete the item as shown on the plans; and for all labor equipment, tools and incidentals necessary to complete the structure.

Payment will be made under:

Item D-751-1	Pre-Cast Concrete Drop Inlet (Aircraft Rated) - per each
Item D-751-2	48" Concrete Endwall- per each
Item D-751-3	54" Concrete Endwall - per each
Item D-751-4	15" RCP Flared End Section (FES) – per each
Item D-751-5	18" RCP Flared End Section (FES) – per each
Item D-751-6	24" RCP Flared End Section (FES) – per each
Item D-751-7	30" RCP Flared End Section (FES) – per each
Item D-751-8	Pre-Cast Concrete Junction Box – per each
Item D-751-9	Pre-Cast Concrete Junction Box (Custom 6'x12') – per each
Item D-751-10	Pre-Cast Sewer Manhole (Aircraft Rated) – 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	Standard Specification for Corrugated Steel Pipe, Metallic-Coated, for Sewers and Drains

**END OF ITEM D-751**



## ITEM T-901

### SEEDING

#### DESCRIPTION

**901-1.1** This item shall consist of soil preparation, seeding 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 and RPR duplicate signed copies of a statement by the vendor certifying that each lot of seed has been tested by a recognized laboratory for seed testing within six (6) months of date of delivery. This statement shall include: name and address of laboratory, date of test, lot number for each kind of seed, and the results of tests as to name, percentages of purity and of germination, and percentage of weed content for each kind of seed furnished, and, in case of a mixture, the proportions of each kind of seed. Wet, moldy, or otherwise damaged seed will be rejected.

Seeds shall be applied as follows: As noted on the plans.

**901-2.2 Lime.** Lime shall be ground limestone containing not less than 85% of total carbonates, and shall be ground to such fineness that 90% will pass through a No. 20 mesh sieve and 50% will pass through a No. 100 mesh sieve. Coarser material will be acceptable, providing the rates of application are increased to provide not less than the minimum quantities and depth specified in the special provisions on the basis of the two sieve requirements above. Dolomitic lime or a high magnesium lime shall contain at least 10% of magnesium oxide. Lime shall be applied at the rate of 1,000 lbs/acre. All liming materials shall conform to the requirements of ASTM C602.

**901-2.3 Fertilizer.** Fertilizer shall be standard commercial fertilizers supplied separately or in mixtures containing the percentages of total nitrogen, available phosphoric acid, and water-soluble potash. They shall be applied at the rate and to the depth specified, and shall meet the requirements of applicable state laws. They shall be furnished in standard containers with name, weight, and guaranteed analysis of contents clearly marked thereon. No cyanamide compounds or hydrated lime shall be permitted in mixed fertilizers.

The fertilizers may be supplied in one of the following forms:

- a. A dry, free-flowing fertilizer suitable for application by a common fertilizer spreader;
- b. A finely-ground fertilizer soluble in water, suitable for application by power sprayers; or
- c. A granular or pellet form suitable for application by blower equipment.

Fertilizers shall be commercial fertilizer and shall be spread at the rate of 1,000 lbs/acre.

**901-2.4 Soil for repairs.** The soil for fill and topsoiling of areas to be repaired shall be at least of equal quality to that which exists in areas adjacent to the area to be repaired. The soil shall be relatively free from

large stones, roots, stumps, or other materials that will interfere with subsequent sowing of seed, compacting, and establishing turf, and shall be approved by the 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 in any diameter, sticks, stumps, and other debris that might interfere with sowing of seed, growth of grasses, or subsequent maintenance of grass-covered areas. If any damage by erosion or other causes has occurred after the completion of grading and before beginning the application of fertilizer and ground limestone, the Contractor shall repair such damage include filling gullies, smoothing irregularities, and repairing other incidental damage.

An area to be seeded shall be considered a satisfactory seedbed without additional treatment if it has recently been thoroughly loosened and worked to a depth of not less than 5 inches as a result of grading operations and, if immediately prior to seeding, the top 3 inches of soil is loose, friable, reasonably free from large clods, rocks, large roots, or other undesirable matter, and if shaped to the required grade.

When the area to be seeded is sparsely sodded, weedy, barren and unworked, or packed and hard, any grass and weeds shall first be cut or otherwise satisfactorily disposed of, and the soil then scarified or otherwise loosened to a depth not less than 5 inches. Clods shall be broken and the top 3 inches of soil shall be worked into a satisfactory seedbed by discing, or by use of cultipackers, rollers, drags, harrows, or other appropriate means.

### 901-3.2 Dry application method.

**a. Liming.** Lime shall be applied separately and prior to the application of any fertilizer or seed and only on seedbeds that have previously been prepared as described above. The lime shall then be worked into the top 3 inches of soil after which the seedbed shall again be properly graded and dressed to a smooth finish.

**b. Fertilizing.** Following advance preparations and cleanup fertilizer shall be uniformly spread at the rate that will provide not less than the minimum quantity stated in paragraph 901-2.3.

**c. Seeding.** Grass seed shall be sown at the rate specified in paragraph 901-2.1 immediately after fertilizing. The fertilizer and seed shall be raked within the depth range stated in the special provisions. Seeds of legumes, either alone or in mixtures, shall be inoculated before mixing or sowing, in accordance with the instructions of the manufacturer of the inoculant. When seeding is required at other than the seasons shown on the plans or in the special provisions, a cover crop shall be sown by the same methods required for grass and legume seeding.

**d. Rolling.** After the seed has been properly covered, the seedbed shall be immediately compacted by means of an approved lawn roller, weighing 40 to 65 pounds per foot of width for clay soil (or any soil having a tendency to pack), and weighing 150 to 200 pounds per foot of width for sandy or light soils.

### 901-3.3 Wet application method.

**a. General.** The Contractor may elect to apply seed and fertilizer (and lime, if required) by spraying them on the previously prepared seedbed in the form of an aqueous mixture and by using the methods and equipment described herein. The rates of application shall be as specified in the special provisions.

**b. Spraying equipment.** The spraying equipment shall have a container or water tank equipped with a liquid level gauge calibrated to read in increments not larger than 50 gallons over the entire range of the tank capacity, mounted so as to be visible to the nozzle operator. The container or tank shall also be equipped with a mechanical power-driven agitator capable of keeping all the solids in the mixture in complete suspension at all times until used.

The unit shall also be equipped with a pressure pump capable of delivering 100 gallons per minute at a pressure of 100 lbs/sq inches The pump shall be mounted in a line that will recirculate the mixture through the tank whenever it is not being sprayed from the nozzle. All pump passages and pipe lines shall be capable of providing clearance for 5/8 inch (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. One shall be a close-range ribbon nozzle, one a medium-range ribbon nozzle, and one a long-range jet nozzle. For case of removal and cleaning, all nozzles shall be connected to the nozzle pipe by means of quick-release couplings.

In order to reach areas inaccessible to the regular equipment, an extension hose at least 50 feet in length shall be provided to which the nozzles may be connected.

**c. Mixtures.** Lime, if required, shall be applied separately, in the quantity specified, prior to the fertilizing and seeding operations. Not more than 220 pounds of lime shall be added to and mixed with each 100 gallons of water. Seed and fertilizer shall be mixed together in the relative proportions specified, but not more than a total of 220 pounds of these combined solids shall be added to and mixed with each 100 gallons of water.

All water used shall be obtained from fresh water sources and shall be free from injurious chemicals and other toxic substances harmful to plant life. The Contractor shall identify to the 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, 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 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 acres measured on the ground surface, completed and accepted as having established grass cover.

### **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 T-901      Permanent Seeding (Mulched) – 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**

T-901-4

## 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) 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 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 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 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 and RPR sufficiently in advance of operations in order that necessary measurements and tests can be made. The Contractor shall remove the topsoil from approved areas and to the depth as directed. The topsoil shall be hauled to the site of the work and placed for spreading, or spread as required. Any topsoil hauled to the site of the work and stockpiled shall be rehandled and placed without additional compensation.

**905-3.4 Placing topsoil.** The topsoil shall be evenly spread on the prepared areas to a uniform depth of 2 inches 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 turfing operations can proceed with a minimum of soil preparation or tilling.

After spreading, any large, stiff clods and hard lumps shall be broken with a pulverizer or by other effective means, and all stones or rocks (2 inches 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.

**905-4.2** Topsoil obtained and stockpiled onsite that is hauled offsite and disposed off of airport property shall be measured by the number of cubic yards of topsoil measured in its stockpiled position. Topsoil shall be measured by volume in cubic yards computed by the method of end areas.

## BASIS OF PAYMENT

**905-5.1** Payment will be made at the contract unit price per cubic yard for topsoil (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.

**905-5.2** Payment will be made at the contract unit price per cubic yard for topsoil hauled off the site. This price shall be full compensation for stripping and storing topsoil and then removing the topsoil to a location off airport property. The price shall include all preparation, materials, all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item T-905-1 Topsoil (Obtained Onsite) – per cubic yard

Item T-905-2 Topsoil (Disposed Offsite) – per cubic yard

## REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C117	Materials Finer than 75 $\mu\text{m}$ (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

**This Page Intentionally Left Blank**



## 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.

The Contractor may opt to perform the required mulching in accordance with state specifications. If this option is chosen, the Contractor shall notify the Engineer in writing. The Contractor shall follow the requirements of the North Carolina Department of Transportation (NCDOT) Standard Specifications for Roads and Structures (2024), *Section 1660 Seeding and Mulching*.

**a. Hay.** Hay shall be native hay in an air-dry condition and of proper consistency for placing with commercial mulch blowing equipment. Hay shall be sterile, containing no fertile seed.

**b. Straw.** Straw shall be the stalks from threshed plant residue of oats, wheat, barley, rye, or rice from which grain has been removed. Furnish in air-dry condition and of proper consistency for placing with commercial mulch blowing equipment. Straw shall contain no fertile seed.

**c. Hay mulch containing seed.** Hay mulch shall be mature hay containing viable seed of native grasses or other desirable species stated in the special provisions or as approved by the Engineer. The hay shall be cut and handled so as to preserve the maximum quantity of viable seed. Hay mulch that cannot be hauled and spread immediately after cutting shall be placed in weather-resistant stacks or baled and stored in a dry location until used.

**d. Manufactured mulch.** Cellulose-fiber or wood-pulp mulch shall be products commercially available for use in spray applications.

**e. Asphalt binder.** Asphalt binder material shall not be 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 to provide a loose depth of not less than 1-1/2 inches nor more than 3 inches. 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 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 nor more than 2 inches.

**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 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 per 1,000 square feet, or as directed by the Engineer, with a minimum of 6 gallons and a maximum of 10 gallons per 1,000 square feet 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 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 per 1,000 square feet or as directed by the Engineer, with a minimum of 6 gallons and a maximum of 10 gallons per 1,000 square feet depending on the type of mulch and the effectiveness of the binder securing it.

## **METHOD OF MEASUREMENT**

**908-4.1** Section not applicable. Mulch shall be furnished to complete the temporary seeding and mulch, and permanent seeding, bid items.

## **BASIS OF PAYMENT**

**908-5.1** Section not applicable. Mulch shall be included in bid cost for temporary seeding and mulch, bid item C-102-5, and permanent seeding, bid item T-901-1

## **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

## **END OF ITEM T-908**

**This Page Intentionally Left Blank**

**SECTION 13122**  
**PRE-ENGINEERED HANGAR BUILDINGS**

**PART 1- GENERAL**

**1.1 SUMMARY**

- A. Building Type: The pre-engineered hangar building shown is a single story, rigid frame metal building with eave heights, roof slopes and configuration as shown on the drawings. Exterior and interior walls are pre-engineered metal panels. Each unit shall have an electrically operated bi-folding door. All structural and non-structural components of the hangar building, excluding the concrete slabs and foundations, are supplied by the pre-engineered hangar manufacturer. Supplier is to warranty all components of building.
- B. Hangar building shall be supplied by a manufacturer who is regularly engaged in the manufacture of aircraft hangar buildings and hangar doors. The hangar package shall be supplied as a complete system and furnished by a manufacturer who provides hangar doors and hangar building as an integral hangar building package. The hangar manufacturer shall have been engaged in the manufacture for a minimum of five years and upon request from Owner provide a list of completed hangar projects.

**1.2 RELATED SECTIONS**

- A. Field painting or primed metal members shall be per Manufacture's recommendations and in accordance with local building code requirements.

**1.3 DEFINITIONS**

- A. Hangar sizes shall be as defined below:
1. Width shall be determined by manufacturer to conform to nominal dimensions indicated from center line to center line of endwall columns.
  2. Length shall be determined by manufacturer to conform to nominal dimensions indicated from center line to center line of endwall columns.
  3. Eave height shall be determined by manufacturer to conform to nominal dimensions indicated from the top of the eave purlin or door truss to the bottom of perimeter column base plate.
  4. Bi-fold door size shall be the clear opening.

**1.4 SYSTEM PERFORMANCE REQUIREMENTS**

- A. Design Loads: Hangar Building shall be designed for all loads as required by the governing building code. The building engineer shall determine these required loads and clearly note them in calculations and on building drawings. They shall contact the local authorities for verification of governing codes. Minimum roof live load shall be 20 psf. Minimum collateral load shall be 5 psf. Basic design loads include live load, wind load, collateral load and seismic load, in addition to dead load.
1. The metal frame and roof-wall bracing system shall resist the lateral loading applied to the roof and walls, as generated by wind and/or seismic. **No moment shall be induced to the foundation by the frame.**

2. Collateral loads include additional dead loads over and above the weight of the metal building system such as electrical systems, etc. Design each member to withstand stresses resulting from combinations of loads that produce the maximum allowable stresses in that member as prescribed in building code. Coordination of dimensions, deflections, frame spread, tolerances, connections, etc. shall be the responsibility of the metal building manufacturer.
  3. Purlins and frames shall support electrical, including lighting. Add purlins as required.
  4. Deflection of girts and purlins shall not exceed  $L/180$  of their spans when subjected to applicable design loads above and other collateral loads required.
  5. Deflection of roof panels shall not exceed  $L/180$  of their span when subjected to specified vertical live loads.
  6. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for Class 90.
- B. Fire Rated: Building/Structure/Walls shall be fire rated and provided as required by building code and local permitting requirements. As of January 1, 2025 Onslow County does not have additional fire rated requirements above and beyond the North Carolina building code.
- C. Contractor shall perform required testing for emergency responder radio coverage per NCFC Section 510 and determine the need for radio signal booster equipment prior to erecting both hangar building(s). Coordinate testing and timing with the owner prior to ordering hangar buildings.
- D. Additive Bid Number 1 includes the addition of trench floor drains, sanitary sewer service laterals and an oil water separator to serve the hangar pod units. Upon acceptance the additive bid, the Contractor shall be required to furnish and install the sewer drains as shown on the plans. This work shall include connection to the proposed sewer system and testing per the related items within the additive bid. Workmanship and performance shall follow the contract specifications and plans.
- E. Additive Bid Number 2 includes the addition of underground piping connections of the hangar downspouts to the proposed storm drainage system. Upon acceptance the additive bid, the Contractor shall furnish and install all materials, and items required to make soil-tight connections from the hangar downspouts to the proposed drainage structures. Workmanship and performance shall follow the contract specifications and plans.

## **1.5 SUBMITTALS**

- A. Product Data: Submit manufacturer's product information, specifications and installation instructions for building components and accessories.
- B. Calculations: Submit calculations for all structural elements indicating compliance with specified design requirements. Calculations shall be completed and sealed by a Professional Structural Engineer who is licensed in North Carolina.
- C. Shop Drawings: Submit complete erection drawings showing anchor bolt settings, foundation drawings, electrical drawings, mechanical drawings, sidewall, endwall, and roof framing, frame

bracing, transverse cross section, covering and trim details, and accessory installation details to clearly indicate proper assembly of building components.

**Note: Column reactions and anchor bolt requirements are required prior to foundation construction. No moment shall be induced to the foundation by the frame.**

- D. Certification: Submit with calculations and shop drawings, a written Certification prepared and signed by a North Carolina registered Professional Structural Engineer stating that the structural engineering design meets indicated loading requirements and codes of authorities having jurisdiction.

## **1.6 QUALITY ASSURANCE**

- A. Structural Steel: For design of structural steel members, comply with requirements of the American Institute of Steel Construction's (AISC) "Specifications for the Design, Fabrications and Erection of Structural Steel for Buildings: for design requirements and allowable stresses.
- B. Light Gauge Steel: For design of light gauge steel members, comply with requirements of the American Institute of Steel Construction's (AISC) "Specification for Design of Cold Formed Steel Structural Members: and "Design of Light Gauge Steel Diaphragms" for design requirements and allowable stresses.
- C. Welded connections: Comply with requirements of the American Welding Society's (AWS) "Standard Code for Arc and Gas Welding in Building Construction" for welding procedures.
- D. Single Source Responsibility for Pre-engineered building system: Obtain pre-engineered building from a single source for the entire building system as described in this section.
- E. Erector's Qualifications: Pre-engineered building shall be erected by a firm that has not less than 5 years successful experience in the erection of pre-engineered buildings similar to those required for this project.

## **1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver and store prefabricated components, sheets, panels, and other manufactured items so they will not be damaged or deformed. Stack materials on platforms or pallets, covered with tarpaulins or other suitable weather-tight ventilated covering. Store metal sheets or panels so that water accumulations will drain freely. Do not store sheets or panels in contact with other materials which might cause staining.

## **1.8 MAINTENANCE**

- A. Maintenance Stock: Furnish at least 5% excess over required amount of nuts, bolts, and other required fasteners for each building. Pack in cartons and store on site where directed.

## **1.9 WARRANTY**

- A. Special Warranty on Metal Panel Finishes: Manufacturer's standard from in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Paint Finish: Deterioration includes, but is not limited to, the following:

- a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
    - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
    - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
  2. Finish Warranty Period: 20 years from date of Substantial Completion.
- B. Special Weathertightness Warranty for Metal Roof Panels: Contractor agrees to repair or replace metal roof panel assemblies that fail to remain weathertight, including leaks, within specified warranty period.
1. Warranty Period: 2 years from date of Substantial Completion.

## PART 2 – PRODUCTS

### 2.1 MANUFACTURERS:

- A. Available Manufacturer's: Based on the history of installation and years of manufacturing experience in pre-engineered hangar building construction.
1. Erect-a-Tube  
(800) 624-9217                      P.O. Box 100,  
Harvard, Illinois 60030-0100
  2. Ful-Fab Aircraft Hangars                      1525 Whipple Ave. S.W.  
(330) 477-7211                      Canton, Ohio 44710
  3. OSI Building Systems                      P.O. Box 5230,  
(334) 834-3500                      Montgomery, AL 36103
- B. **The bidder may base his/her bid on these pre-qualified manufacturers.** In the event the proposal is based on an alternate building manufacturer, it is the Contractor's responsibility to see that the alternate manufacturer provides a system that meets the complete detailed functions specified herein.

### 2.2 MATERIALS

- A. Structural Framing:
1. Primary structural framing shall be main load carrying structural members. They shall include door trusses, rafters, interior columns and exterior columns.
  2. Rafters shall be steel wide flange beams "W" shaped ASTM A367 or ASTM A992 and shall be pre-punched for purlin connections, door trusses, and interior column connections. Rafters shall be complete with factory welded ridge splice plates, and designed to support specified loads.
  3. Door truss shall span width of hangar door opening and shall be shipped full length for ease of construction. Door truss design shall be integral with door design. Door truss shall be factory welded with chords 4" x 4" x 1/8" minimum square structural welded steel tube ASTM A500 GR.B. and 3" x 1" x 1/8" minimum diagonal webbing. Door truss shall be pre-punched for column connection and rolling door guides pre-located.



4. Door columns shall be manufactured of steel wide flange beams "W" shapes ASTM A36 and or A992 shall be W6 x 15 pounds per foot minimum with pre-welded base plate and door truss saddles.
5. Interior column shall be square structural welded steel tube ASTM A500 with pre-welded base plates and girt clips.
6. Secondary framing shall be the structural members which carry the loads to the primary framing systems; and shall include the purlins, girts, wind bracing and miscellaneous structural members.
7. Purlins shall be nominal 8" deep "Z" shaped members; and shall be manufactured of 16, 14, or 12 gauge steel designed for specified loads and shall be fabricated of material based on the requirements of ASTM A570 or ASTM A572 as applicable.
8. Exterior wall girts shall be fabricated from 4" square structural weld steel tube or roll formed "CEE" sections of ASTM 570 or ASTM A572 as applicable.
9. Provide steel channels of 14-gauge minimum, sized to specified design loads for support at jamb and head of overhead doors. Jamb supports shall be continuous from floor to building frame above and anchored at each end.
10. Interior partition girt shall be fabricated from 4" x 16 gauge red oxide steel "CEE" sections, when specified.
11. Provide wind bracing, rafter bracing, sheeting angles where required.
12. Structural field connections shall be bolted (unless otherwise noted). All primary bolted connections, as shown on manufacturer's drawing, shall be furnished with high strength bolts conforming to the physical specifications of ASTM A-325 or shall be Grade 5. All Grade 5 bolts shall be zinc plated.

B. Sheeting Materials:

1. Roof sheets shall be 24 gauge galvalume coating conforming to ASTM specification A-792. Panel configuration shall be 1-1/8" min. high major ribs 12" on center. Panel coverage shall be 36" and shall be furnished full length from building eave to ridge purlin. A pre-formed ridge cap shall be provided.
2. Wall sheet shall be 26 gauge galvalume coating conforming to ASTM specification A446. Panel configuration shall be 1-1/8" min. major ribs 12" on center. Wall sheet shall be furnished full height.
3. Interior Partition sheet shall be 26 gauge galvalume. Panel configuration shall be full height. Galvalume metal panels on the interior walls shall be applied to both sides of all interior partitions.
4. Building trim shall include eave trim, gable trim, corner trim, service door trim, bi-parting hangar door trim. All trim shall be 26 gauge and manufactured of flat stock material equal in quality to wall sheets and color as selected from manufacturer's standard color chart. Trim pieces shall be packaged for shipment at factory.

5. Fasteners shall be provided as follows:
- Roof fasteners shall be #12-14x1" Atlas Ultimate zinc-alloy headed on Ultimate zinc-alloy head screws with washers
  - Roof stitch screws shall be #12x3/4" A.B. Atlas Ultimate zinc-alloy head screws with washers
  - Wall fasteners shall be #12-14x1" hex head color match self-drilling sheet metal screws with washers
  - Wall sheet stitch screws shall be #12-14x1" hex head color match self-drilling lap screw with washer
  - Partition sheet fasteners shall be #12-3/4" hex head zinc plated self-drilling screws
  - All sheet metal screws shall be installed as shown on building manufacturer's erection plans

C. Accessories:

- Roof caulking shall be at all roof sheet side laps and at pre-formed ridge caps. Roof caulk shall be a taps sealant type and shall be pre-formed butyl rubber base and shall be supplied as a 3/16" x 3/8" extruded shape.
- Joint sealant material shall be as recommended by manufacturer to seal all side and end laps in metal sheets and panels, at ridges, bolt holes before inserting fasteners, for all flashings and corner closure sheets and elsewhere as necessary to provide watertight construction.
- Closures: Inside and outside semi-rigid cross-linked polyethylene foam closure shall be provided as required to provide a bird proof building. Inside closure shall be self-adhesive.
- 3" x 9" x 11 gauge galvanized gas curb angle at the curb of EVERY interior partition wall with fuel resistant sealant on all sides.
- All gutter and downspout joints, rake flashing laps, and ridge flashing laps shall be sealed with pigmented caulk of butyl rubber base to match the color.
- Factory applied sealant used in panel side laps shall be a hot melt, foamable mastic.
- Field applied sealant used at the end laps, ridge assembly and gable flashing shall be 100% solids, butyl-based elastomeric tap sealer, furnished in roll form or pre-cut to length. Sealant used to the eave shall be pre-compressed expanding foam sealant tape.

D. Finishes:

- Painting: All interior exposed structural steel shall receive two coats shop primer. All exterior surfaces of the hangars and hangar doors for all exterior wall **and roof sheeting** shall be factory-painted with a Thermoset coating system composed of polyester resin which has been modified with a silicon resin equal to MS Color Fast 30. All interior surfaces of metal siding, hangar doors, and panels shall be galvanized. All interior divider wall panels shall be galvanized, both sides. Colors shall be as selected by the Owner from the manufacturers' standard selection. Wall sheet shall be full height for exterior cladding and interior dividing partitions.

2. Colors shall be as selected by the Owner from the Manufactures standard selection. Contractor shall submit color swatches to Owner for Approval for selection prior to ordering of material.

E. Insulation:

1. Thermal Insulation: Glass fiber blanket insulation, complying with ASTM C 991, of 0.5 lb. per cu. Ft. density, R13 minimum insulation value, with UL flame spread classification of 25 or less and 2 inch wide continuous vapor-tight edge tabs. Provide roof insulation at hangars.
  - a. Vapor Barrier: Vinyl film
  - b. Retainer Strips: 26-gauge (0.0179-inch) formed galvanized steel retainer clip colored to match the insulation facing

F. Doors:

1. Hollow Metal Doors and Frames: Where indicated on the plans and schedules provide exterior hollow metal door, frames and hardware (see below) with aluminum threshold. The doors dimensions are as follows:
  - a. Width: 3'-0"
  - b. Height: 7'-0"
  - c. Thickness: 1-3/4"
2. Hardware to include 1-1/2 pair ball bearing butts, overhead closer, weather stripping, and heavy-duty cylinder lock set. Provide keying of locks as directed by Owner.
3. Numbering for each hangar unit shall be shown on the door with signage or decal as directed by owner.
4. Hangar Doors: Provide manufacturer's standard electrically operated bi-folding hangar door 41'-6" wide clear opening by 12'-0" high. Each bi-folding door panel shall be provided with a 3'-0" x 7'-0" steel entry door. Provide keying of locks as directed by Owner.
5. Manual Rollup Metal Doors: Provide manufacturer's standard manual rollup door 14'-0" wide by 12'-0" high. The metal door shall be a manual overhead coiling rollup door located at the units proposed for airport storage. Provide keying of locks as directed by Owner.

G. Gutter, Flashing, and Downspouts:

1. Metal gutter and downspouts sizes and spacing to be determined by building manufacturer. Downspouts shall not be connected to a storm drainage system. Adequate splash pads must be provided at each downspout outlet to prevent erosion. Proposed splash pad must be approved by the Owner.
2. Gutters and Flashing: All standard exterior gutters, rake flashing and downspouts are 26-gauge galvalume steel, with painted finish to match.
3. Flashing and Trim: Flashing at the rake (parallel to roof panels) and high eave shall not compromise the integrity of the roof system by constricting movement due to thermal expansion and contraction. The panel manufacturer shall supply the flexible membranes if applicable.

4. Installation: Erection of the roof system shall be in complete accordance with the manufacturer's erection manual.
5. If downspouts are connected to a storm drain system, then roof leaders shall be installed to connect gutter downspouts to a connection or junction of the onsite stormwater pipe system. Roof leaders shall be constructed of Schedule 40 PVC, or approval equal.

## **2.3 FABRICATION**

- A. General: Design prefabricated components and necessary field connections required for erection to permit easy assembly and disassembly. Fabricate components in such a manner that once assembled, they may be disassembled, repackaged and reassembled with a minimum amount of labor.
  1. Clearly and legibly mark each piece and part of the assembly to correspond with previously prepared erection drawings, diagrams and instruction manuals.
- B. Structural Framing: Shop fabricate structural framing components to the indicated size and section complete with base plates, bearing plates and other plates required for erection, welded in place. Provide required holes for anchoring or connections either shop drilled or punched to template dimensions.
- C. Shop Connections: Provide power riveted, bolted or welded shop connections.
- D. Field Connections: Provide bolted field connections.

## **PART 3 — EXECUTION**

### **3.1 EXAMINATION**

- A. Examine substrates, areas, and conditions, with Erector present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Before erection proceeds, survey elevations and locations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments to receive structural framing, with Erector present, for compliance with requirements and metal building system manufacturer's tolerances.
- C. Proceed with erection only after unsatisfactory conditions have been corrected.

### **3.2 PREPARATION:**

- A. Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition.
- B. Provide temporary shores, guys, braces, and other supports during erection to keep structural framing secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural framing, connections, and bracing are in place, unless otherwise indicated.

### **3.3 ERECTION:**

- A. Framing: Erect structural framing true to line, level and plumb, rigid and secure. Level base plates to a true even plan with full bearing to supporting structures, set with double-nutted anchor bolts. Use a non-shrinking grout to obtain uniform bearing and to maintain a level base line elevation. Moist cure grout for not less than 7 days after placement.
- B. Purlins and Girts: Provide rake or gable purlins with tight fitting closure channels and fascias. Secure structural framing and hold rigidly to a straight line by sag rods.
- C. Bracing: Provide angle bracing in both roof and sidewalls as required to meet design criteria. Movement resisting frames may be used in lieu of sidewall rod bracing, to suit manufacturer's standards.
- D. Where aluminum surfaces come in contact with ferrous metal or other incompatible metals, paint the incompatible metal with a coating of heavy-bodied bituminous paint.
- E. Apply sheets or panels for exterior wall construction with the ribs or corrugations in a vertical position. All side and end laps shall be sealed with joint sealant as specified in this section. The placement of closure strips, flashing and sealing materials shall be accomplished in an approved manner which will assure complete weather-tightness.
- F. All roofing sheets or panels shall be applied with the corrugations or ribs parallel to the slope of the roof. Roofing sheets or panels shall be supplied in the longest lengths obtainable with the end laps occurring only at the structural members, with no transverse joints. All side laps shall be laid away from the prevailing wind, and all side and end laps shall be sealed with the joint sealing specified in this section.
- G. Apply sheets or panels for interior wall construction with the ribs or corrugations in a vertical position.
- H. Minimum side laps for all types of sheets or panels shall be one or more corrugation or rib. Minimum end laps for all types of sheets or panels shall be 2-1/2".
- I. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual". Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
  - 1. Install exposed flashing and trim that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
  - 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (600 mm) of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).
  - 3. Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to panel as recommended by manufacturer.

- J. Hollow Metal Doors and Frames: Install doors and frames straight, plumb, and level. Securely anchor frames to building structure. Set units with 1/8" maximum clearance between door and frame at jambs and head <sup>3</sup>/<sub>4</sub>" maximum between door and floor. Adjust for proper operation.
- K. Electrically Operated Bifold Doors: Erect doors in accordance with manufacturer's recommendations and approved trade practice. Doors shall be hung plumb and true to building and shall open in a smooth continuous motion without binding and warping. Adjust all rollers, cables, shafts, hinges, locks, cane bolts, etc., for proper operation.
- L. Manual Rollup Metal Doors: Erect doors in accordance with manufacturer's recommendations and approved trade practice. Doors shall be hung plumb and true to building and shall open in a smooth continuous motion without binding. Adjust all rollers, locks, bolts, etc., for proper operation.
- M. Thermal Insulation: Install insulation concurrently with installation exterior walls and roof panels in accordance with manufacturer's directions. Install blankets straight and true in one-piece lengths with both sets of tabs sealed to provide a complete vapor barrier. Locate insulation on inside of exterior walls and underside of roof sheets, extending across the top flange of purlin members and held taut and snug to roofing panels with retainer clips. Installation retainer strips at each longitudinal joint, straight and taut, nesting with roof rib to hold insulation in place. Bi-Fold doors shall be insulated.

### **3.4 ADJUSTING**

- A. Doors: After completing installation, test and adjust doors to operate easily, free of warp, twist, or distortion.

### **3.5 CLEANING AND PROTECTION**

- A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Touchup Painting: After erection, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted structural framing and accessories.
- C. Metal Panels: Remove temporary protective coverings and strippable films, if any, as metal panels are installed. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.
- D. Doors and Frames: Immediately after installation, sand smooth rusted or damaged areas or prime coat and apply touchup of compatible air-drying primer. Immediately before final inspection, remove protective wrappings from doors and frames.

### **3.6 DEMONSTRATION**

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain hangar doors.

### **3.7 METHOD OF MEASUREMENT AND BASIS OF PAYMENT:**

- A. All work in this section shall be included in and paid for under the following pay items:

Item 01 31 22-1            8 Unit T-Hangar Building w/ Jet Pod – lump sum

Payment will be on a lump sum basis for the hangar building and shall be full compensation for structural design of buildings and foundations, furnishing all materials, for preparing and placing these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item. These pay items shall include the engineering, building permits and associated fees, and any building revisions required for permit approval not specifically listed within the contract documents. The above pay items shall also include construction of hangar building concrete slab and foundation, insulated hangar exterior walls and roof, restroom complete with fixtures, Bi-Fold doors, rollup doors, downspouts, etc.

- B. Additive Bid Number 1 bid items shall be included only upon acceptance by the Owner of the additive bid price.

Payment will be based on the unit costs bid within Bid Additive Number 1. It shall be full compensation for design of and furnishing all materials, to install a trench floor drain, oil water separator, sanitary laterals and cleanouts to serve the hangar pod units. These pay items shall include the engineering, building permits and associated fees related to the Hangar construction.

- C. Additive Bid Number 2 bid items shall be included only upon acceptance by the Owner of the additive bid price.

Payment will be based on the unit costs bid within Bid Additive Number 2. It shall be full compensation for design of and furnishing all materials, to install roof drain connections to the proposed storm sewer, including materials for connections, drainage basins at junctions, hdpe header pipes, and connections to concrete drainage structures. These pay items shall include the required appurtenances and items related to connecting the Hangar downspouts to the storm sewer system.

## **END OF SECTION 13122**

**This Page Intentionally Left Blank**



SECTION 31 23 16.13  
TRENCHING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Excavating trenches for utilities and utility structures.
2. Bedding.
3. Backfilling and compacting to subgrade elevations.
4. Sheet piling and Shoring.
5. Dewatering.
6. Compacting backfill material.

B. Related Sections:

1. Item C-102 Temporary Air and Water Pollution, Soil Erosion, and Siltation Control: Controlling sediment and erosion from Work of this section.
2. Item P-152 Excavation, Subgrade, and Embankment: Topsoil and subsoil removal from site surface.
3. Section 33 11 00 – Water Utility Distribution Piping: Water piping and appurtenances.
4. Section 33 31 00 - Sanitary Sewerage Piping: Sanitary sewer piping and bedding.
5. Section 33 41 00 - Storm Utility Drainage Piping: Storm sewer piping and bedding.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. General: Work of this Section will not be measured for payment but is included in the unit cost for the various utilities and structures installed.

1.3 REFERENCES

A. American Association of State Highway and Transportation Officials:

1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. ASTM International:

1. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
2. ASTM D1556 - Standard Test Method for Density of Soil in Place by the Sand-Cone Method.
3. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>)).
4. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
5. ASTM D2487 – Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).

6. ASTM D6938 – Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

C. NCDOT Standard Specifications:

1. Standard Specifications for Roads and Structures, latest version, published by the North Carolina Department of Transportation.

#### 1.4 DEFINITIONS

- A. Utility: Any buried pipe, duct, conduit, or cable.
- B. Utility Structures: Manholes, catch basins, inlets, valve vaults, hand holes, and other utility access structures as indicated on Drawings.
- C. Trench Terminology:
1. Foundation: Area under bottom of trench supporting bedding.
  2. Bedding: Fill placed under utility pipe.
  3. Haunching: Fill placed from bedding to center line of pipe.
  4. Initial Backfill: Fill placed from center line to 6 to 12 inches above top of pipe.
  5. Final Backfill: Fill placed from initial backfill to subgrade.

#### 1.5 UNIFIED SOIL CLASSIFICATION SYSTEM

- A. Class I
1. ¼” – 1-1/2” well graded stone including coral, slag, cinders, crushed stone and crushed shells.
- B. Class II
1. GW Coarse gravel well graded stone and crushed shells
  2. GP Coarse gravel poorly graded
  3. SW Coarse sands well graded
  4. SP Coarse sands poorly graded
- C. Class III
1. GM Silty-sandy gravel
  2. GC Clayey-sandy gravel
  3. SM Silty-sands
  4. SC Clayey-sands
- D. Class IV
1. ML Inorganic silts and fine sands
  2. CL Inorganic clays – low plasticity
- E. Fill material shall exhibit a plasticity index of less than 20 and Standard Proctor maximum density at optimum moisture greater than 90 pounds per cubic foot. The following materials are unacceptable.
- F. Class V
1. OL Organic silts

- 2. OH        Organic clays
- 3. PT        Highly organic soil
- 4. MH        Inorganic elastic silts
- 5. CH        Inorganic clays – high plasticity

## 1.6 SUBMITTALS

- A. Submittals shall be reviewed and certified by the Contractor that the material submittals provided are acceptable for use on this project. Provide two hard copies along with electronic pdf versions of the submittals.
- B. Excavation Protection Plan: Describe sheeting, shoring, and bracing materials and installation required to protect excavations and adjacent structures and property; include structural calculations to support plan. Prepare excavation protection plan under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of North Carolina.
- C. Dewatering Plan if required: Describe methods of dewatering and disposal of water.
- D. Product Data: Submit data for geotextile fabric indicating fabric and construction.
- E. Samples: Submit to testing laboratory, in air-tight containers, 10-pound sample of each type of fill.
- F. Materials Source: Submit name of imported fill material suppliers.
- G. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

## 1.7 QUALITY ASSURANCE

- A. Perform Work in accordance with Section 1505 of NCDOT Standard Specifications.
- B. Maintain one copy of document on site.

## 1.8 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

## 1.9 COORDINATION

- A. Verify Work associated with lower elevation utilities is complete before placing higher elevation utilities.

## PART 2 PRODUCTS

### 2.1 BACKFILL MATERIALS

- A. Subsoil Fill: Class II, III, or IV - Clean natural soil with a plasticity index of 15 or less that is free of clay, rock, or gravel lumps larger than 2 inches in any dimension; debris; waste; frozen material; and any other deleterious material that might cause settlement. Suitable material excavated from the site may be used as subsoil fill under optimum moisture conditions.
- B. Granular Fill: Class II, III - Clean sand, slightly silty sand, or slightly clayey sand having a Unified Soil Classification of SW, SP, SP-SM or SP-SC.
- C. Foundation Stone: Class I - Clean course aggregate Gradation No. 57 conforming to Sections 1005 and 1006 of the NCDOT Standard Specifications.
- D. Bedding and Haunching Material:
  - 1. Rigid Pipe: Granular Fill.
  - 2. Flexible Pipe: Foundation Stone.
- E. Bedding for Structures: Foundation Stone.
- F. Initial Backfill to 6 inches Minimum Above Utility:
  - 1. Rigid Pipe: Subsoil Fill.
  - 2. Flexible Pipe: Foundation Stone.
- G. Final Backfill to Subgrade:
  - 1. Under Pavement: Granular Fill.
  - 2. Under Landscape: Subsoil Fill.

### 2.2 ACCESSORIES

- A. Geotextile Fabric: Non-woven, non-biodegradable conforming to Section 1056 of the NCDOT Standard Specifications for Type 1 Engineering Fabric.
- B. Concrete: Class A Concrete conforming to Section 1000 of the NCDOT Standard Specifications.
  - 1. Compressive strength of 3,000 psi at 28 days.
  - 2. Air entrained.
  - 3. Water cement ratio of 0.488 with rounded aggregate and 0.532 with angular aggregate.
  - 4. Maximum slump of 3.5 inches for vibrated concrete and 4 inches for non-vibrated concrete.
  - 5. Minimum cement content of 564 lbs per cubic yard for vibrated and 602 lbs. per cubic yard for non-vibrated concrete.

## PART 3 EXECUTION

### 3.1 PREPARATION

- A. Call local utility line information service indicated on Drawings not less than three working days before performing Work.
  - 1. Request underground utilities to be located and marked within and surrounding construction areas.
  - 2. Contractor will not perform work prior to the expiration of the mandatory period unless all utilities have been located.
- B. Notify affected utility companies before starting work and comply with utility's requirements.
- C. Identify required lines, levels, contours, and datum locations.
- D. Protect plant life, lawns, rock outcropping, and other features remaining as portion of final landscaping.
- E. Protect bench marks, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
- F. Maintain and protect above and below grade utilities indicated to remain.
- G. Establish temporary traffic control and detours when trenching is performed in public right-of-way. Relocate controls and reroute traffic as required during progress of Work.

### 3.2 LINES AND GRADES

- A. Excavate to lines and grades indicated on Drawings.
  - 1. Owner reserves right to make changes in lines, grades, and depths of utilities when changes are required for Project conditions.
- B. Use laser-beam instrument with qualified operator to establish lines and grades.

### 3.3 TRENCHING

- A. Excavate subsoil required for utilities.
- B. Remove lumped subsoil, boulders, and rock up of 1/3 cubic yard, measured by volume.
- C. Perform excavation within 48 inches of existing utility service in accordance with utility's requirements.
- D. Do not advance open trench more than 100 feet ahead of installed pipe.
- E. Remove water or materials that interfere with Work.
- F. Trench Width: Excavate bottom of trenches maximum 16 inches wider than outside diameter of pipe or as indicated on Drawings.

- G. Excavate trenches to depth indicated on Drawings. Provide uniform and continuous bearing and support for bedding material and pipe.
- H. Maintain vertical faces to an elevation equal to 12 inches above top of pipe.
  - 1. When Project conditions permit, side walls may be sloped or benched above this elevation.
  - 2. When side walls cannot be sloped, provide sheeting and shoring to protect excavation as specified in this Section.
- I. Support Utilities and Structures:
  - 1. Keep trench width at top of trench to practical minimum to protect adjacent or crossing utility lines
  - 2. Support utilities crossing trench by means acceptable to utility company.
  - 3. Do not interfere with 45-degree bearing splay of foundations.
  - 4. Provide temporary support for structures above and below ground.
- J. When subsurface materials at bottom of trench are loose or soft, excavate to firm subgrade or to depth directed by Engineer.
  - 1. Cut out soft areas of subgrade not capable of compaction in place.
  - 2. Backfill with foundation stone and compact to density equal to or greater than requirements for subsequent backfill material.
- K. Trim Excavation: Hand trim for bell and spigot pipe joints where required. Remove loose matter.
- L. Correct areas over excavated areas with compacted backfill as specified for authorized excavation or replace with fill concrete as directed by Engineer.
- M. Place geotextile fabric over trench foundation stone prior to placing subsequent bedding materials.

### 3.4 SHEETING AND SHORING

- A. Sheet, shore, and brace excavations to prevent danger to persons, structures, and adjacent properties and to prevent caving, erosion, and loss of surrounding subsoil.
- B. Support trenches more than 4 feet deep excavated through unstable, loose, or soft material. Provide sheeting, shoring, bracing, or other protection to maintain stability of excavation.
- C. Design sheeting and shoring to be removed at completion of excavation work unless approved by Engineer.
- D. Repair damage caused by failure of the sheeting, shoring, or bracing and for settlement of filled excavations or adjacent soil.
- E. Repair damage to new and existing Work from settlement, water, or earth pressure or other causes resulting from inadequate sheeting, shoring, or bracing.

### 3.5 SURFACE WATER CONTROL

- A. Control and remove unanticipated water seepage into excavation.
- B. Provide ditches, berms, and other devices to divert and drain surface water from excavation area as specified in Item C-102 Temporary Air and Water Pollution, Soil Erosion, and Siltation Control.
- C. Divert surface water and seepage water within excavation areas into sumps or settling basins prior to pumping water into drainage channels and storm drains.

### 3.6 DEWATERING

- A. Design and provide dewatering system to permit Work to be completed on dry and stable subgrade.
- B. Operate dewatering system continuously until backfill is minimum 2 feet above normal ground water table elevation.
- C. When dewatering system cannot control water within excavation, notify Engineer and stop excavation work.
  - 1. Supplement or modify dewatering system and provide other remedial measures to control water within excavation.
  - 2. Demonstrate dewatering system operation complies with performance requirements before resuming excavation operations.
- D. Modify dewatering systems when operation causes or threatens to cause damage to new construction, existing site improvements, adjacent property, or adjacent water wells.
- E. Discharge ground water and seepage water within excavation areas into sumps or settling basins prior to pumping water into drainage channels and storm drains.
- F. Remove dewatering and surface water control systems after dewatering operations are discontinued.

### 3.7 BEDDING, HAUNCHING, AND INITIAL BACKFILL

- A. Place bedding full width of trench to the depth indicated on Drawings. Excavate for pipe bells.
- B. Install utility pipe and conduit in accordance with the respective utility section.
- C. Support pipe uniformly along entire length of pipe.
- D. Carefully place haunching material to center of pipe, rod and tamp material to fill voids and provide uniform support of pipe haunches.
- E. Carefully place initial backfill to 6 inches above top of pipe or to depth indicated on Drawings.
- F. Compact as indicated on the drawings.

### 3.8 FINAL BACKFILLING TO SUBGRADE

- A. Backfill trenches to contours and elevations with unfrozen fill materials.
- B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.
- C. Place fill material in continuous layers and compact in accordance with schedule at end of this Section.
- D. Employ placement method that does not disturb or damage utilities in trench or foundation perimeter drainage.
- E. Maintain optimum moisture content of fill materials to attain required compaction density.
- F. Do not leave more than 50 feet of trench open at end of working day.
- G. Protect open trench to prevent danger to the public.

### 3.9 DISPOSAL OF EXCESS MATERIAL

- A. Dispose of excess material offsite and legally.
- B. Furnish Engineer with certificate of disposal site or agreement from private property owner.

### 3.10 TOLERANCES

- A. Top Surface of Backfilling: Plus or minus 1 inch from required elevations.
- B. Compaction shall meet the minimum specified compaction.

### 3.11 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Perform laboratory material tests in accordance with ASTM D1557 or AASHTO T180.
- C. Perform in place compaction tests in accordance with the following:
  - 1. Density Tests: ASTM D6938.
  - 2. Moisture Tests: ASTM D6938.
- D. When tests indicate Work does not meet specified requirements, remove Work, replace, compact, and retest.
- E. Frequency of Tests: One test per lift for every 100 feet of trench.

### 3.12 PROTECTION OF FINISHED WORK

- A. Section 01 70 00 - Execution and Closeout Requirements: Protecting finished work.



- B. Reshape and re-compact fills subjected to vehicular traffic during construction.

### 3.13 SCHEDULE OF COMPACTION

- A. Under Pavement and Slabs:
  - 1. Granular Fill in maximum 8-inch loose lifts.
  - 2. Compact to minimum 95 percent maximum density except the top 12 inches.
  - 3. Compact top 12 inches to minimum 100 percent maximum density.
- B. Under Landscape Areas:
  - 1. Subsoil Fill in maximum 8-inch loose lifts.
  - 2. Compact to minimum 90 percent maximum density.
- C. In Unstable or Unsuitable Trench Foundation Areas:
  - 1. Foundation Stone in maximum 12-inch loose lifts.
  - 2. Compact to 98 percent maximum density.

END OF SECTION

**This Page Intentionally Left Blank**

SECTION 32 12 16  
ASPHALT PAVING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
  - 1. Asphaltic Concrete Paving: Surface, binder, and base courses.
  - 2. Prime Coat and Tack Coat.
  - 3. Surface Sealer.
  - 4. Quality Control and Testing.
- B. Related Sections:
  - 1. Section 31 23 00 - Excavation and Fill: Compacted subbase for paving.
  - 2. P-209 - Aggregate Base Courses: Compacted base for paving.
  - 3. P-603 – Emulsified Tack Coat
  - 4. P-610 - Concrete for Miscellaneous Structures: Sidewalk connections.
  - 5. Section 32 17 23 - Pavement Markings.
  - 6. Section 33 05 61 – Concrete Manholes: Frames and lids in pavement.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. 32 12 16-1 NCDOT Asphalt Surface Course, S9.5C:
  - 1. Basis of Measurement: By ton
  - 2. Basis of Payment: Includes tack coating surfaces, placing, compacting and rolling, and testing.

1.3 REFERENCES

- A. NCDOT Standard Specifications:
  - 1. Standard Specifications for Roads and Structures, latest version, published by the North Carolina Department of Transportation.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit product information and mix design.
- C. Manufacturer's Certification: Certify products are produced at a plant approved by NCDOT and that products meet or exceed specified requirements.

- D. Installer Certification: Certify installer is on list of NCDOT approved contractors with an approved Quality Control Plan.

## 1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with Division 3 of NCDOT Standard Specifications.
- B. Maintain on site one copy of each document.
- C. Obtain materials from same source throughout.
- D. Installer Qualification: Company specializing in performing work of this Section with minimum 5 years' experience.

## 1.6 ENVIRONMENTAL REQUIREMENTS

- A. Do not place asphalt base course or intermediate course when ambient air or road surface temperature is less than 35 degrees F. or surface is wet or frozen.
- B. Do not place asphalt surface course when ambient air or road surface temperature is less than 50 degrees F. or wet.
- C. Place bitumen mixture when temperature is not more than 15 degrees F. below temperature at when initially mixed and not more than maximum specified temperature.

## PART 2 PRODUCTS

### 2.1 MATERIALS

- A. Asphalt Plant Mix Materials: Conform to NCDOT Sections 1012 and 1020 of Standard Specifications.
- B. Tack Coat: Conform to P-603Emulsified Tack Coat Specifications.
- C. Reclaimed Asphalt Pavement (RAP): Processed material obtained by milling or full depth removal of existing asphalt concrete pavements. Conform to NCDOT Section 1012 of Standard Specifications.
- D. Sand: Fine aggregate, gradation S1 or S2 conforming to NCDOT Sections 1005 and 1006 of Standard Specifications.

### 2.2 ASPHALT PAVING MIX

- A. General: Use Superpave mix design conforming to Section 610 of NCDOT Standard Specifications.
- B. Surface Course: Type S-9.5C.

- C. Reclaimed Asphalt Pavement (RAP) Content: Use maximum 15 percent for surface course.

## 2.3 SOURCE QUALITY CONTROL AND TESTS

- A. Section 01 40 00 - Quality Requirements: Testing, inspection, and analysis requirements.
- B. Submit proposed mix design of each class of mix for review prior to beginning Work.
- C. Obtain materials from plant approved by NCDOT.
- D. Test plant samples in accordance with Section 609 of NCDOT Standard Specifications.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify compacted subgrade and aggregate base is dry and ready to support paving and imposed loads.
- B. Verify gradients and elevations of base are correct.
- C. Verify utility structure frames and lids are installed in correct position and elevation.

### 3.2 PRIME COAT

- A. Apply primer on aggregate base course at uniform rate of 0.2 to 0.5 gal/sq. yd. in accordance with Section 600 of NCDOT Standard Specifications. Asphalt primer coat is not required.
- B. Apply primer to contact surfaces of curbs and gutters.
- C. Use clean sand to blot excess primer.

### 3.3 TACK COAT

- A. Apply tack coat on asphalt or concrete surfaces at uniform rate in accordance with the P-603 Bituminous Tack Coat specification. Tack Coat is not required on roadway asphalt surfaces.
- B. Apply tack coat to contact surfaces of curbs and gutters.
- C. Coat surfaces of utility structures with oil to prevent bond with asphalt pavement. Do not tack-coat these surfaces.

### 3.4 PLACING ASPHALT PAVEMENT

- A. Install Work in accordance with Section 610 and 620 of NCDOT Standard Specifications.
- B. Place asphalt within 24 hours of applying prime coat or tack coat.

- C. Place asphalt in courses to the thicknesses and dimensions shown on the Drawings.
- D. Place binder and intermediate courses.
- E. Place surface course within 2 hours of placing and compacting binder course. When binder course is placed more than 24 hours before placing wearing course, clean surface and apply tack coat before placing wearing course.
- F. Place surface course to thicknesses and dimensions shown on the Drawings.
- G. Compact each course by rolling to specified density. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.
- H. Perform rolling with consecutive passes to achieve even and smooth finish without roller marks.

### 3.5 JOINTS

- A. Traverse Joints:
  - 1. When Work is suspended long enough to allow mixture to chill, construct transverse joint.
  - 2. Use butt joint when traffic will not pass over pavement.
  - 3. Use sloped wedge ahead of the end of pavement when traffic will pass over pavement. Place paper parting strip to removal of wedge.
  - 4. Tack coat edge of pavement prior to placing adjoining pavement.
- B. Longitudinal Joints:
  - 1. Tack the edge of longitudinal joints prior to placing adjoining pavement.
  - 2. Pinch joint by rolling immediately behind the paver.
  - 3. Offset longitudinal joints in each layer by approximately 6 inches.

### 3.6 TOLERANCES

- A. Density Compaction: Minimum of 92 percent of Maximum Specific Gravity ( $G_{mm}$ ).
- B. Flatness: Maximum variation of 1/8-inch measured with 10-foot straight edge.
- C. Compacted Thickness: Within 1/4-inch.
- D. Variation From Indicated Elevation: Within 1/2-inch.

### 3.7 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Independent testing firm, field testing, and inspecting.
- B. Perform Contractor Quality Control Program in accordance with Section 609 on NCDOT Standard Specifications.
- C. Take compaction tests every 2,000 linear feet or fraction thereof per day on pavement placed at the paver lay down width.

- D. Take 6-inch diameter full depth pavement cores every 2,000 linear feet or fraction thereof per day on pavement placed at the paver lay down width.
- E. When tests indicate Work does not meet specified requirements, remove Work, replace, and retest.

### 3.8 PROTECTION OF FINISHED WORK

- A. Section 01 70 00 - Execution and Closeout Requirements: Protecting finished work.
- B. Immediately after placement, protect pavement from mechanical injury for seven days or until surface temperature is less than 140 degrees F.

END OF SECTION

**This Page Intentionally Left Blank**



SECTION 32 17 23  
PAVEMENT MARKINGS

PART 1 GENERAL

1.1 SUMMARY

1. Traffic lines, legends and markings on asphalt and concrete surfaces.
2. Waterborne Traffic Paint.
3. Thermoplastic Pavement Markings.
4. Glass beads.

B. Related Sections:

1. Section 32 12 16 - Asphalt Paving.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. 321723-1 Pavement Markings:

1. Basis of Measurement: By square feet regardless of color.
2. Basis of Payment: Includes furnishing, installing, inspecting and maintaining pavement markings, and related maintenance and protection of traffic. No additional payment will be made for removal of existing pavement markings.

B. 321723-2 Pavement Symbols:

1. Basis of Measurement: By each symbol.
2. Basis of Payment: Includes furnishing, installing, inspecting and maintaining pavement markings, and related maintenance and protection of traffic.

1.3 REFERENCES

A. American Association of State Highway and Transportation Officials:

1. AASHTO M247 - Standard Specification for Glass Beads Used in Pavement Marking.

B. NCDOT Standard Specifications:

1. Standard Specifications for Roads and Structures, latest version, published by the North Carolina Department of Transportation.

1.4 PERFORMANCE REQUIREMENTS

A. Paint Adhesion: Adhere to road surface forming smooth continuous film one minute after application.

B. Paint Drying: Tack free by touch so as not to require coning or other traffic control devices to prevent transfer by vehicle tires within ten minutes after application.

1.5 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

- B. Product Data: Submit paint formulation for each type of paint and glass beads if required.
- C. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
- D. Manufacturer's Installation Instructions: Submit instructions for application temperatures, eradication requirements, application rate, line thickness, and application of glass beads if required.

#### 1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with NCDOT Section 1205 Standard Specifications, latest edition.
- B. Maintain one copy of document on site.

#### 1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum five years' experience.
- B. Applicator: Company specializing in performing work of this section with minimum five years' experience.

#### 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Invert containers several days prior to use when paint has been stored more than two months. Minimize exposure to air when transferring paint. Seal drums and tanks when not in use.
- B. Where glass beads are required, store glass beads in cool, dry place. Protect from contamination by foreign substances.

#### 1.9 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply materials when surface and ambient temperatures are outside temperature ranges required by paint product manufacturer or:
  - 1. Waterborne Paint: Apply when ambient air temperature and surface temperature is minimum 40 degrees F and rising and a maximum of 160 degrees F.
  - 2. Thermoplastic: Do not apply until ambient air temperature and temperature of the pavement is 50 degrees F or higher.
- B. Do not apply materials during rain or snow when relative humidity is outside humidity ranges or moisture content of surfaces exceed those required by paint product manufacturer.
- C. Volatile Organic Content (VOC). Do not exceed State or Environmental Protection Agency maximum VOC on traffic paint.

## PART 2 PRODUCTS

- A. Furnish materials in accordance with NCDOT Section 1087 Standard Specifications.
- B. Waterborne Paint: Ready mixed, fast dry waterborne traffic paints, lead-free, non-toxic, suitable for roadway or parking lots.
- C. Thermoplastic: Alkyd based ready mixed, fast dry, lead free, non toxic, for roadways.
- D. Glass Beads: AASHTO M247, Type 1, coated to enhance embedment and adherence with paint.

### 2.2 EQUIPMENT

- A. Roadway Application for Continuous Longitudinal Lines: Use equipment with following capabilities.
  - 1. Dual nozzle paint gun to simultaneously apply parallel lines of indicated width in solid or broken patterns or various combinations of those patterns.
  - 2. Pressurized bead-gun to automatically dispense glass beads onto painted surface, at required application rate.
  - 3. Measuring device to automatically and continuously measure length of each line placed, to nearest foot.
  - 4. Device to heat paint to manufacturer's temperature recommendation for fast dry and thermoplastic applications.
- B. Machine Calibration: Calibrate machines to meet specified tolerances.
- C. Other Equipment: For application of crosswalks, intersections, stop lines, legends and other miscellaneous items by walk behind striper, hand spray or stencil trucks, apply with equipment meeting requirements of this section. Do not use hand brushes or rollers. Optionally apply glass beads by hand.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Do not apply paint to concrete surfaces until asphalt concrete has cured for 28 days.

### 3.2 PREPARATION

- A. Maintenance and Protection of Traffic:
  - 1. Provide short term traffic control in accordance with Section 01 50 00 - Temporary Facilities and Controls.
  - 2. Prevent traffic from interrupting or driving on newly applied markings before markings dry.
  - 3. Maintain roadway travel lanes as required by the Engineer.
  - 4. Maintain access to existing airport facilities and other properties requiring access.
- B. Surface Preparation.
  - 1. Clean and dry paved surface prior to painting.

2. Blow or sweep surface free of dirt, debris, oil, grease, or gasoline.
3. Spot location of final pavement markings as specified and as indicated on Drawings by applying pavement spots 25 feet on center.
4. Notify Engineer after placing pavement spots and minimum three days prior to applying traffic lines.

### 3.3 EXISTING WORK

- A. Remove existing markings in an acceptable manner. Do not remove existing pavement markings by painting over with black paint. Remove by methods that will cause least damage to pavement structure or pavement surface. Satisfactorily repair any pavement or surface damage caused by removal methods.
- B. Clean and repair existing or remaining lines and legends.

### 3.4 APPLICATION

- A. Agitate paint for 1-15 minutes prior to application to ensure even distribution of paint pigment.
- B. Dispense paint at temperature recommended by manufacturer to wet-film thickness of 15 mils.
- C. Dispense thermoplastic at temperature recommended by manufacture to thickness of:
  1. 120 mils for center lines, skip lines, transverse markings, and legends.
  2. 90 mils for edge lines diagonals and arrow symbols.
- D. Apply glass beads at rate of 1 to 3 pounds per gallon of paint.
- E. Apply markings to indicated dimensions at indicated locations.
- F. Prevent splattering and over spray when applying markings.
- G. Unless material is track free at end of paint application convoy, use traffic cones to protect markings from traffic until track free.
- H. When vehicle crosses a marking and tracks it or when splattering or overspray occurs, eradicate affected marking and resultant tracking and apply new markings.
- I. Collect and legally dispose of residues from painting operations.

### 3.5 APPLICATION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation from Wet Film Thickness: 1 mil.
- C. Maximum Variation from Wet Paint Line Width: Plus or minus 1/8 inch.
- D. Maintain cycle length for skip lines at tolerance of plus or minus six (6) inches per forty (40) feet and line length of plus or minus three (3) inches per ten (10) feet.

- E. Maximum Variation from Specified Application Temperature: Plus or minus 5 degrees F.

### 3.6 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Inspect for incorrect location, insufficient thickness, line width, coverage, retention, uncured or discolored material, and insufficient bonding.
- C. Repair lines and markings which after application and curing do not meet following criteria:
  - 1. Incorrect Location: Remove and replace incorrectly placed patterns.
  - 2. Insufficient Thickness, Line Width, Paint Coverage, Retention or Glass Bead Coverage (where required): Prepare defective material by acceptably grinding or blast cleaning to remove substantial amount of beads and to roughen marking surface. Remove loose particles and debris. Apply new markings on cleaned surface in accordance with this Section.
  - 3. Uncured or Discolored Material, Insufficient Bonding: Remove defective markings in accordance with this Section and clean pavement surface one foot beyond affected area. Apply new markings on cleaned surface in accordance with this Section.
- D. Replace failed or defective markings in entire section of defective markings within 30 days after notification when any of the following exists:
  - 1. Marking is discolored or exhibits pigment loss and is determined to be unacceptable by visual comparison with beaded color plates.
  - 2. If glass beads are used, the average retro-reflectivity is less than 375 mcd/m<sup>2</sup>/1x for white pavement markings and 250 mcd/m<sup>2</sup>/1x for yellow pavement markings.
- E. When eradication of existing paint lines is necessary, eradicate by shot blast or water blast method. Do not gouge or groove pavement more than 1/16 inch during removal. Limit area of removal to area of marking plus one inch on all sides. Prevent damage to transverse and longitudinal joint sealers, and repair any damage according to requirements in Section 32 12 16 - Asphalt Paving. No additional payment will be made for removal of existing pavement markings.
- F. Maintain daily log showing work complete, results of inspections or tests, pavement and air temperatures, relative humidity, presence of any moisture on pavement, and any material or equipment problems. Make legible entries in log in ink, sign, and submit by end of each work day. Enter environmental data into log prior to starting work each day and at two additional times during day.

### 3.7 PROTECTION OF FINISHED WORK

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for protecting finished Work.
- B. Protect painted pavement markings from vehicular and pedestrian traffic until paint is dry and track free. Follow manufacturer's recommendations or use minimum of 30 minutes. Consider barrier cones as satisfactory protection for materials requiring more than two minutes dry time.

END OF SECTION

SECTION 33 01 10.58  
DISINFECTION OF WATER UTILITY PIPING SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes disinfection of potable water distribution and transmission system; and testing and reporting results.
- B. Related Sections:
  - 1. Section 33 11 00 - Water Utility Distribution Piping: Piping Product and Execution requirements for installation, testing, of water distribution piping.
  - 2. Section 33 14 17 - Site Water Service Utility Laterals.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. General: Work of this Section will not be measured for payment but is included in the unit cost for the various utilities and structures installed.

1.3 REFERENCES

- A. American Water Works Association:
  - 1. AWWA B300 – Standard for Hypochlorites.
  - 2. AWWA B301 – Standard for Liquid Chlorine.
  - 3. AWWA B302 – Standard for Ammonium Sulfate.
  - 4. AWWA B303 – Standard for Sodium Chlorite.
  - 5. AWWA C600 – Standard for Installation of Ductile-Iron Water Mains and Their Appurtenances.
  - 6. AWWA C651 – Standard for Disinfecting Water Mains.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Disinfection Procedure:
  - 1. Submit description of procedure, including type of disinfectant and calculations indicating quantities of disinfectants required to produce specified chlorine concentration.
- C. Product Data: Submit procedures, proposed chemicals, and treatment levels for review.
- D. Test Reports: Indicate results comparative to specified requirements.
- E. Certificate: Certify cleanliness of water distribution system meets or exceeds specified requirements.
- F. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

G. Qualifications Statements: Submit qualifications for manufacturer and applicator.

## 1.5 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.

B. Disinfection Report:

1. Type and form of disinfectant used.
2. Date and time of disinfectant injection start and time of completion.
3. Test locations.
4. Name of person collecting samples.
5. Initial and 24 hour disinfectant residuals in treated water in ppm for each outlet tested.
6. Date and time of flushing start and completion.
7. Disinfectant residual after flushing in ppm for each outlet tested.

C. Bacteriological Report:

1. Date issued, project name, and testing laboratory name, address, and telephone number.
2. Time and date of water sample collection.
3. Name of person collecting samples.
4. Test locations.
5. Initial and 24 hour disinfectant residuals in ppm for each outlet tested.
6. Coliform bacteria test results for each outlet tested.
7. Certify water conforms, or fails to conform, to bacterial standards of authority having jurisdiction.

D. Water Quality Certificate: Certify water conforms to quality standards of authority having jurisdiction, suitable for human consumption.

## 1.6 QUALITY ASSURANCE

A. Perform Work in accordance with AWWA C651; maintain one copy of document on site.

## PART 2 PRODUCTS

### 2.1 DISINFECTION CHEMICALS

A. Chemicals: AWWA B300, Hypochlorite, AWWA B301, Liquid Chlorine, AWWA B302, Ammonium Sulfate, and AWWA B303, Sodium Chlorite.

## PART 3 EXECUTION

### 3.1 EXAMINATION

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for installation examination.



- B. Verify that access fittings have been installed under Section 33 11 00 - Water Utility Distribution Piping and Onslow County Water and Sewer Authority (ONWASA) design standards.
- C. Verify piping system has been cleaned, inspected, and pressure tested.
- D. Perform scheduling and disinfecting activity with start-up, water pressure testing, adjusting and balancing, and demonstration procedures, including coordination with related systems.

### 3.2 INSTALLATION

- A. Provide and attach required equipment to perform the Work of this Section.
- B. Perform disinfection of water distribution system.
- C. Introduce treatment into piping system.
- D. Maintain disinfectant in system for 24 hours minimum.
- E. Flush, circulate, and clean until required cleanliness is achieved; use municipal domestic water.
- F. Replace permanent system devices removed for disinfection.

### 3.3 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Section 01 70 00 - Execution and Closeout Requirements: Requirements for testing, adjusting, and balancing.
- C. Disinfection, Flushing, and Sampling:
  - 1. Notify Engineer, and Owner 72 hours in advance of test and have witness test.
  - 2. Disinfect pipeline installation in accordance with AWWA C651 and Section .1003 - Disinfection of Storage Tanks and Distribution Systems of the Rules Governing Public Water Systems, North Carolina Administrative Code Title 15A Subchapter 18C. Use of liquid chlorine is not permitted.
  - 3. Water line shall be disinfected by the addition and thorough dispersion of a chlorine solution in concentrations sufficient to produce a chlorine residual of at least 50 milligrams per liter (or ppm) in the water throughout the distribution system.
  - 4. The chlorine solution shall remain in contact with the interior surfaces of the water system for a period of 24 hours.
  - 5. Upon completion of retention period required for disinfection, flush pipeline until chlorine concentration in water leaving pipeline is no higher than that generally prevailing in existing system or is acceptable for domestic use.
  - 6. Legally dispose of chlorinated water. When chlorinated discharge may cause damage to environment, apply neutralizing chemical to chlorinated water to neutralize chlorine residual remaining in water.
  - 7. After final flushing and before pipeline is connected to existing system or placed in service, employ an approved independent testing laboratory to sample, test, and certify water quality suitable for human consumption.

END OF SECTION

**This Page Intentionally Left Blank**

## **SECTION 33 05 61 CONCRETE MANHOLES**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Modular precast concrete manholes and structures with tongue-and-groove joints and transition to cover frames, lids, grates, covers, anchorage, and accessories.
  - 2. Manhole connections to existing sanitary or storm sewer lines.
  - 3. Structure connections to existing public utility lines.
  - 4. Vertical adjustment of existing manholes and structures.
  - 5. Bedding and backfill materials.
- B. Related Sections:
  - 1. Documents affecting Work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 01 of these Specifications.
  - 2. Section P-610 - Concrete for Miscellaneous Structures:  
Section 03 30 00 - Cast-in-Place Concrete: Concrete type for manhole and structure foundation slab construction.
  - 3. Section 33 05 05.35 - Sewer and Manhole Testing: Testing requirements for manholes.
  - 4. Section 31 23 16.13 - Trenching: Excavating and backfilling for manholes, structures, and foundation slabs.
  - 5. Section 33 31 11 - Public Sanitary Sewerage Gravity Piping: Piping connections to manholes.

#### **1.2 MEASUREMENT AND PAYMENT**

- A. Connection to Existing Sanitary Sewer:
  - 1. Basis of Measurement: By each connection completed to the existing sewer.
  - 2. Basis of Payment: Includes all materials, appurtenances and excavation required to complete a watertight connection to the existing sanitary sewer per ONWASA standards.
- B. Sanitary Sewer Manhole:
  - 1. Basis of Measurement: By each for various structure types, sizes, materials.
  - 2. Basis of Payment: Includes excavating, bedding, concrete foundation slab, concrete structure sections, cover, frame, installation to indicated depth, forming and sealing of pipe inlets and outlets, backfilling, and testing.
- C. Sanitary Sewer Cleanout:
  - 1. Basis of Measurement: By each cleanout installed and connected to the sewer.
  - 2. Basis of Payment: Includes all materials and appurtenances as described on drawing details to install and connect the cleanout to the sewer and to the building sewer.

#### **1.3 REFERENCES**

- A. American Association of State Highway Transportation Officials:

Albert J. Ellis Airport (OAJ)  
South GA Expansion Project  
WK Dickson Project No.: 20240074.00.WK  
1/8/2025 Issued for [Permitting] [Bidding] [Construction]

Concrete Manholes  
33 05 61 - 1  
Master Updated: 10/2024

1. AASHTO M306 - Standard Specification for Drainage, Sewer, Utility, and Related Castings.
- B. American Concrete Institute: ACI 530/530.1 - Building Code Requirements and Specification for Masonry Structures.
- C. ASTM International:
  1. ASTM A48 - Standard Specification for Gray Iron Castings.
  2. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  3. ASTM C32 - Standard Specification for Sewer and Manhole Brick (Solid Masonry Units Made From Clay or Shale).
  4. ASTM C55 - Standard Specification for Concrete Brick.
  5. ASTM C443 – Standard Specification for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber gaskets.
  6. ASTM C478 - Standard Specification for Precast Reinforced Concrete Manhole Sections.
  7. ASTM C497 - Standard Test Methods for Concrete Pipe, Manhole Sections, or Tile.
  8. ASTM C857 - Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures.
  9. ASTM C877 - Standard Specification for External Sealing Bands for Concrete Pipe, Manholes, and Precast Box Sections.
  10. ASTM C890 - Standard Practice for Minimum Structural Design Loading for Monolithic or Section Precast Concrete Water and Wastewater Structures.
  11. ASTM C891 - Standard Practice for Installation of Underground Precast Concrete Utility Structures.
  12. ASTM C913 - Standard Specification for Precast Concrete Water and Wastewater Structures.
  13. ASTM C923 - Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals.
  14. ASTM C990 - Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants.
  15. ASTM F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
  16. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.

#### 1.4 SUBMITTALS

- A. As specified in Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit catalog cuts and other pertinent manufacturer information for manhole frames and lids, accessories, component construction, features, configuration, dimensions, and joint data.
- C. Shop Drawings:
  1. Standard Fabrication: Indicate structure locations, elevations, sections, equipment support, piping sizes, and elevations of penetrations.
  2. Custom Fabrication: Indicate design, construction and installation details, typical reinforcement, and additional reinforcement at openings for each custom type, size and configuration.
- D. Manufacturer Instructions: Submit detailed instructions on installation requirements

for products specified, including storage and handling procedures.

- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. Source Quality Control Reports: Indicate results of factory tests and inspections.
- G. Field Quality Control Reports: Indicate results of Contractor-furnished tests and inspections.
- H. Project Record Documents: Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.
- I. Qualifications Statement: Submit qualifications for manufacturer and installer.

#### 1.5 CLOSE-OUT SUBMITTALS

- A. As specified in Section 01 70 00 - Execution and Close-out Requirements for submittals.
- B. Project Record Documents: Record actual locations of manholes and connections. Include rim and invert elevations.

#### 1.6 QUALITY ASSURANCE

- A. Perform Work according to:
  - 1. County Water and Sewer Authority (ONWASA) standards.
- B. Maintain 1 copy of each standard affecting Work of this section on-site.

#### 1.7 QUALIFICATIONS

- A. Manufacturer: Must be certified by NPCA Plant Certification Program prior to and during Work of this section.
- B. Installer: Company specializing in performing Work of this section with a minimum of 5 years of documented experience.

#### 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Inspection: Accept materials on-site in manufacturer's original packaging and inspect for damage.
- B. Handling: Comply with precast concrete manufacturer instructions and ASTM C913 - Standard Specification for Precast Concrete Water and Wastewater Structures for unloading and moving precast manholes and drainage structures.
- C. Mark each precast structure by indentation or waterproof paint showing date of manufacture, manufacturer and identifying symbols, and numbers shown on Drawings to indicate its intended use.
- D. Storage:
  - 1. Store materials according to manufacturer instructions.
  - 2. Store precast concrete manholes and drainage structures to prevent damage to Owner's property or other public or private property.
  - 3. Repair property damaged from materials storage.
- E. Protection:
  - 1. Protect materials from moisture and dust by storing in clean, dry location

- remote from construction operations areas.
- 2. Provide additional protection according to manufacturer instructions.

## 1.9 EXISTING CONDITIONS

- A. Field Measurements:
  - 1. Verify field measurements prior to fabrication.
  - 2. Indicate field measurements on Shop Drawings.

## 1.10 COORDINATION

- A. As specified in Section 01 30 00 - Administrative Requirements
- B. Coordinate Work of this section with connection to ONWASA utilities.
- C. Pre-Installation Meeting: Convene a minimum of 1 week prior to commencing Work of this section.

## PART 2 - PRODUCTS

### 2.1 PRECAST CONCRETE MANHOLES

- A. Reinforced precast concrete manholes shall be manufactured in accordance with:
  - 1. ASTM C478 - Standard Specification for Circular Precast Reinforced Concrete Manhole Sections.
  - 2. ASTM C913 - Standard Specification for Precast Concrete Water and Wastewater Structures
- B. Joints:
  - 1. O-Ring Gaskets shall conform to ASTM C443 - Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
- E. Configurations: As indicated on the Drawings and details.
- F. Pipe to Manhole Connections:
  - 1. Concrete manhole connectors shall be of the flexible rubber ring type and shall conform to: ASTM C923 - Standard Specification for Resilient Connectors between Reinforced Concrete Manhole Structures, Pipes, and Laterals.
  - 2. Material: Neoprene.
  - 3. Material shall resist ozone weathering, aging, and chemicals, including acids, alkalis, animal and vegetable fats, oils, and petroleum products.
  - 4. Bands and screw assembly shall be manufactured from totally non-magnetic Series 300 stainless-steel.

### 2.2 CAST-IN-PLACE CONCRETE

- A. Cast-in-Place Concrete: Class B, Concrete, conforming to NCDOT Section 1000 of the Standard Specifications.
  - 1. Compressive strength of 2,500 psi at 28 days.
  - 2. Air entrained.
  - 3. Water cement ratio of 0.488 with rounded aggregate and 0.567 with angular aggregate.
  - 4. Maximum slump of 2.5 inch (hand placed) or 1.5 inch (machine placed) for vibrated concrete and 4 inch for non-vibrated concrete.
  - 5. Minimum cement content of 508 pounds per cubic yard for vibrated and

545 pounds per cubic yard for non-vibrated concrete.

## 2.3 FRAMES AND COVERS

- A. Manufacturers:
  - 1. Barry Pattern and Foundry Co., Inc.
  - 2. East Jordan Iron Works.
  - 3. McKinley Iron Works.
  - 4. Neenah Foundry Co.
  - 5. Substitutions: As specified in Section 00 21 13 - Instructions to Bidders
- B. Description:
  - 1. Material: Cast Iron [Ductile Iron]:
    - a. Shall conform to ASTM A48/A48M - Standard Specification for Gray Iron castings, Class 35
  - 2. Lid:
    - a. Bearing Surface: Machined flat.
    - b. Configuration: Removable.
    - c. Watertightness: Furnish sealing gasket and no vent holes at locations where indicated on Drawings.
    - d. Vents:
      - 1) Use no vent holes at locations where surface water run-off is prominent.
      - 2) Use 2, 1 inch diameter vent holes at locations where surface water run-off is not prominent
  - 3. Live-Load Rating: H-20 in paved areas.
  - 4. Cover: Molded with "UTILITY TYPE", i.e.; "Water", "Sanitary Sewer", etc.
  - 5. Configuration: Provide size and shape as indicated on Drawings.

## 2.4 BEDDING AND BACKFILL MATERIALS

- A. As specified in Section 31 23 16.13 - Trenching: For bedding and backfill around structures.

## 2.5 ACCESSORIES

- A. Joint Sealant: Comply with ASTM C443.
- B. Fasteners: Stainless-steel; ASTM F593.
- C. Grout: Non-shrink, non-metallic, in accordance with ASTM C1107.

## 2.6 SOURCE QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements for testing, inspection, and analysis.
- B. Provide shop inspection and testing of completed assembly.

# PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Verify that items provided by other sections of Work are properly sized and located.
- B. Verify that built-in items are in proper location and are ready for roughing into Work.

- C. Verify that excavation base is ready to receive Work and excavations, and that dimensions and elevations are as indicated on Drawings.

### 3.2 PREPARATION

- A. Mark each precast structure by indentation or waterproof paint showing date of manufacture, manufacturer, and identifying symbols and numbers as indicated on Drawings to indicate its intended use.
- B. Coordinate placement of inlet and outlet pipe or duct sleeves as required by other sections.
- C. Do not install manholes and structures where site conditions induce loads exceeding structural capacity of manholes or structures.
- D. Inspect precast concrete manholes and structures immediately prior to placement in excavation to verify that they are internally clean and free from damage; remove and replace damaged units.

### 3.3 INSTALLATION

- A. Conduct operations not to interfere with, interrupt, damage, destroy, or endanger integrity of surface structures or utilities in immediate or adjacent areas.
- B. Remove large stones or other hard matter impeding consistent backfilling or compaction.
- C. Protect manhole from damage or displacement while backfilling operation is in progress.
- D. Excavating:
  - 1. As specified in Section 31 23 16.13 - Trenching.
  - 2. If ground water is encountered, prevent accumulation of water in excavations; place manhole or structure in dry trench.
  - 3. Where possibility exists of watertight manhole or structure becoming buoyant in flooded excavation, anchor manhole or structure to avoid flotation as approved by Engineer.
- E. Attachments:
  - 1. Cut and fit for pipe.
  - 2. Set cover frames and covers level to correct elevations without tipping.
- F. Backfilling: As specified in Section 31 23 16.13 - Trenching.
- G. Coating: Paint interior with 2 coats of bituminous interior coating at rate of 120sqft/gal for each coat.
- H. Precast Concrete Manholes:
  - 1. Lift precast components at lifting points designated by manufacturer.
  - 2. When lowering manholes and structures into excavations and joining pipe to units, take precautions to ensure that interior of pipeline and structure remains clean.
  - 3. Assembly:
    - a. Assemble multi-section manholes and structures by lowering each section into excavation.
    - b. Install rubber gasket joints between precast sections according to manufacturer recommendations.



- c. Lower, set level, and firmly position base section before placing additional sections.
  4. Remove foreign materials from joint surfaces and verify that sealing materials are placed properly.
  5. Maintain alignment between sections by using guide devices affixed to lower section.
  6. Joint sealing materials may be installed on-site or at manufacturer's plant.
  7. Verify that installed manholes [and structures] meet required alignment and grade.
  8. Remove knock-outs or cut structure to receive piping without creating openings larger than required to receive pipe; fill annular spaces with mortar.
  9. Cut pipe flush with interior of structure.
  10. Shape inverts through manhole [and structures] as indicated on Drawings.
  11. Place joint reinforcement in first [and second] <\_\_\_\_\_> horizontal joints above base pad and below cover frame opening.
- K. Castings:
1. Set frames using mortar and masonry as indicated on Drawings.
  2. Install radially laid concrete brick with 1/4-inches thick, vertical joints at inside perimeter.
  3. Lay concrete brick in full bed of mortar and completely fill joints.
  4. If more than one course of concrete brick is required, stagger vertical joints.
  5. Set frame and cover per the following table:

Location	Top Height Above Finished Grade
Roadway pavement, driveways, sidewalks, parking lots	Flush $\pm$ 1/4 inch
Vehicle Recovery Area	Flush $\pm$ 3 inches
Manicured Areas, such as lawns	Flush
Flood Zones where flood elevation is less than 3 feet above finished grade	1 foot above the 100-year flood elevations
Flood Zones where flood elevation is greater than 3 feet above finished grade	2 feet above finished grade with water-tight frame and cover and vent pipe to 1 foot above 100-year flood
Other areas	2 feet above finished grade

### 3.4 FIELD QUALITY CONTROL

- A. As specified in Section 01 70 00 - Execution and Close-out Requirements for testing, adjusting, and balancing.
- B. Testing:
  1. Compaction Testing: As specified in Section 31 23 16.13 - Trenching.
  2. Concrete Manhole Sections: As specified in Section 33 05 05.35 - Sewer and Manhole Testing. In accordance with ASTM C497.
  3. Cast-in-place Concrete: In accordance with ASTM C39.
- C. Equipment Acceptance: Adjust, repair, modify, or replace components failing to perform as specified and rerun tests.

### 3.5 ADJUSTING

- A. Section 01 70 00 - Execution and Close-out Requirements for starting and adjusting.
- B. Vertical Adjustment of Existing Manholes and Structures:

1. If required, adjust top elevation of existing manholes and structures to finished grades as indicated on Drawings.
2. Frames, Grates, and Covers:
  - a. Remove frames, grates, and covers cleaned of mortar fragments.
  - b. Reset to required elevation according to requirements specified for installation of castings.
- 3.
3. Clean and apply sand-cement bonding compound on existing concrete surfaces to receive Class B concrete as specified above.

END OF SECTION

SECTION 33 11 00  
WATER UTILITY DISTRIBUTION PIPING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Pipe and fittings for potable water line and fire water line.
2. Valves and Valve Boxes
3. Fire Hydrants.
4. Tapping Sleeves and Valves.
5. Underground pipe markers.
6. Thrust Blocking.
7. Pressure Testing

B. Related Sections:

1. Section 31 23 16.13 - Trenching: Excavation and backfill requirements.
2. Section 33 14 17 - Site Water Service Utility Laterals: Tapping and Backflow prevention at water main.

1.2 MEASUREMENT AND PAYMENT

A. 33 11 00-1 2" PVC Water Service:

1. Basis of Measurement: By the linear foot for various pipe sizes, materials and depth of bury.
2. Basis of Payment: Includes all labor, materials, tools, and equipment to furnish the pipe and necessary fittings, complete the excavation, installation, inspection, backfill, chlorination and testing of the new water line. This line item includes all coordination with the utility authority.

B. 33 11 00-2 4" DIP Water Service:

1. Basis of Measurement: By the linear foot for various pipe sizes, materials and depth of bury.
2. Basis of Payment: Includes all labor, materials, tools, and equipment to furnish the pipe and necessary fittings, complete the excavation, installation, inspection, backfill, chlorination and testing of the new water line. This line item includes all coordination with the utility authority.

C. 33 11 00-3 6" DIP Water Service:

1. Basis of Measurement: By the linear foot for various pipe sizes, materials and depth of bury.
2. Basis of Payment: Includes all labor, materials, tools, and equipment to furnish the pipe and necessary fittings, complete the excavation, installation, inspection, backfill, chlorination and testing of the new water line. This line item includes all coordination with the utility authority.

D. 33 11 00-4 8" DIP Water Service:

1. Basis of Measurement: By the linear foot for various pipe sizes, materials and depth of bury.
  2. Basis of Payment: Includes all labor, materials, tools, and equipment to furnish the pipe and necessary fittings, complete the excavation, installation, inspection, backfill, chlorination and testing of the new water line. This line item includes all coordination with the utility authority.
- E. 33 11 00-5 Fire Hydrant Assembly:
1. Basis of Measurement: Per each unit furnished and acceptably installed.
  2. Basis of Payment: Includes all labor, materials, tools, and equipment to furnish the hydrant, and necessary fittings, complete the excavation, installation, inspection, backfill, chlorination and testing of the new water line. This line item includes all coordination with the utility authority.
- F. 33 11 00-6 2" Water Meter & Backflow Preventor:
1. Basis of Measurement: Per each combined unit acceptably installed.
  2. Basis of Payment: Includes all labor, materials, tools, and equipment to furnish the meter, meter setter, necessary fittings, complete the connections to the meter and backflow devices. This also includes excavation, installation, inspection, backfill, chlorination and testing of the new water line. This line item includes all coordination with the utility authority.
- G. 33 11 00-7 4" Gate Valve:
1. Basis of Measurement: Per each unit furnished and acceptably installed.
  2. Basis of Payment: Includes all labor, materials, tools, and equipment to furnish the valve, and necessary fittings, complete the connection to the water line, install the valve box and cover, inspect, operate and backfill. This also includes chlorination and testing, and all coordination with the utility authority.
- H. 33 11 00-8 6" Gate Valve:
1. Basis of Measurement: Per each unit furnished and acceptably installed.
  2. Basis of Payment: Includes all labor, materials, tools, and equipment to furnish the valve, and necessary fittings, complete the connection to the water line, install the valve box and cover, inspect, operate and backfill. This also includes chlorination and testing, and all coordination with the utility authority.
- I. 33 11 00-9 8" Gate Valve:
1. Basis of Measurement: Per each unit furnished and acceptably installed.
  2. Basis of Payment: Includes all labor, materials, tools, and equipment to furnish the valve, and necessary fittings, complete the connection to the water line, install the valve box and cover, inspect, operate and backfill. This also includes chlorination and testing, and all coordination with the utility authority.

### 1.3 REFERENCES

- A. American Water Works Association:
1. AWWA C104 - ANSI Standard for Cement Mortar Lining for Ductile-Iron Pipe and Fittings for Water.

2. AWWA C110 - Standard for Ductile-Iron and Gray-Iron Fittings, 3 In. Through 48 In. (76 mm Through 1,219 mm), for Water.
3. AWWA C111 - Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
4. AWWA C115 - Standard for Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
5. AWWA C151 - Standard for Ductile-Iron Pipe, Centrifugally Cast.
6. AWWA C153 - Standard for Ductile-Iron Compact Fittings.
7. AWWA C500 - Metal-Seated Gate Valves for Water Supply Service.
8. AWWA C502 - Dry-Barrel Fire Hydrants.
9. AWWA C509 - Resilient-Seated Gate Valves, 3 in. through 12 in. NPS, for Water and Sewage Systems.
10. AWWA C517 - Rubber-Sealed Butterfly Valves.
11. AWWA C550 - Protecting Interior Coatings for Valves and Hydrants.
12. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances.
13. AWWA C605 - Underground Installation of PVC and PVCO Pressure Pipe and Fittings.
14. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe, and Fabricated Fittings, 4 in. through 12 in. (100 mm through 300 mm), for Water Distribution.
15. AWWA C901 - Polyethylene (PE) Pressure Pipe and Tubing, 1/2 in. through 3 in. for Water Service.
16. AWWA C905 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 in. through 36 in. (350 mm Through 1,200 mm), for Water Transmission and Distribution.

B. ASTM International:

1. ASTM A36 – Standard Specification for Carbon Structural Steel
2. ASTM D1784 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
3. ASTM D2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).
4. ASTM D3139 - Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
5. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

C. Manufacturer's Standardization Society of the Valve and Fittings Industry:

1. MSS SP-60 - Connecting Flange Joint between Tapping Sleeves and Tapping Valves.

D. National Sanitation Foundation:

1. NSF 61 - Drinking Water System Components - Health Effects
2. NSF 372 – Drinking Water System Components – Lead Content

E. National Fire Protection Association:

1. NFPA 281 - Recommended Practice for Fire Flow Testing and Marking of Hydrants.

Onslow County Water and Sewer Authority (ONWASA):

2. Manual of Standards Specifications and Design, dated 7/2021

F. NCDOT Standard Specifications:

1. Standard Specifications for Roads and Structures, latest edition, published by the North Carolina Department of Transportation.

1.4 SUBMITTALS

- A. Submittal Procedures Provide electronic submittals for review prior to ordering materials.
- B. Shop Drawings: Indicate piping layout, including piping specialties.
- C. Product Data: Submit data on pipe materials, pipe fittings, valves, hydrants, and accessories.
- D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
- E. Project Record Documents: Record actual locations of piping mains, valves, connections, thrust restraints, and invert elevations.
- F. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with Section 1510 of NCDOT Standard Specifications, except as modified herein.
- B. Perform work in accordance with utility company standards.
- C. Maintain one copy of each document on site.
- D. Materials in Contact with Potable Water: Certified to NSF 61 and 372.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store valves in shipping containers with manufacturer's name and pressure rating labeling in place.
- B. Block individual and stockpiled pipe lengths to prevent moving.
- C. Do not place pipe or pipe materials on private property or in areas obstructing pedestrian or vehicle traffic.
- D. Store polyethylene materials out of sunlight.

## PART 2 PRODUCTS

### 2.1 WATER PIPING

- A. Ductile Iron Pipe (DIP): AWWA C151. Bituminous outside coating: AWWA C151. Cement Mortar Lining: AWWA C104.
  - 1. Pipe Thickness Class: 50.
  - 2. Pressure Rating: 350 psi.
  - 3. Fittings: Ductile iron, AWWA C110. Compact fittings, Ductile Iron, AWWA C153.
    - a. Pressure Rating: 350 psi minimum.
    - b. Coating: Bituminous Coating, AWWA C110.
    - c. Lining: Cement Mortar Lining, AWWA C104
  - 4. Joints:
    - a. Mechanical Joints: AWWA C111.
    - b. Push-On Joints: AWWA C111.
    - c. independent of joint seal. Conform to pipe manufacturers specifications.
    - d. Tied Restrained Joints: Per Manufacturer recommendations
- B. Polyvinyl Chloride (PVC): AWWA C900 and AWWA C905, marked with NSF 61 designation for potable water use.
  - 1. Pipe Class: DR 18, 235 psi.
  - 2. Fittings:
    - a. PVC, AWWA C900 and AWWA C905.
    - b. Ductile Iron, Mechanical Joint, AWWA C110.
  - 3. Joints:
    - a. PVC, ASTM D3139 with ASTM F477 flexible elastomeric seals.
    - b. Ductile Iron, Mechanical Joint, AWWA C111.
    - c. Boltless Restrained Joints: Boltless, push-on type, joint restraint independent of joint seal. Conform to pipe manufacturers specifications.

### 2.2 RESILIENT WEDGE GATE VALVES

- A. Manufacturers:
  - 1. American Flow Control.
  - 2. Clow Valve Company.
  - 3. Mueller Company.
  - 4. Substitutions: Approved equals as determined through shop drawing submittals.
- B. Furnish materials in accordance with utility company or governing agency requirements.
- C. Resilient Wedge Gate Valves: AWWA C509; iron body, bronze or ductile iron.
  - 1. Resilient seats.
  - 2. Stem: Non-rising bronze stem.
  - 3. Operating Nut: Square; open counterclockwise unless otherwise indicated.
  - 4. Ends: Flanged, mechanical joint or bell end connections.
  - 5. Coating: AWWA C550; interior/exterior.
  - 6. Sizes 12-Inch Diameter and Smaller: 250 psig minimum.

## 2.3 VALVE BOXES

- A. Vales 12-Inch Diameter and Smaller: Cast iron, two-piece, screw type.
- B. Cast iron lid marked "WATER".

## 2.4 FIRE HYDRANTS

- A. Manufacturers:
  - 1. American Flow Control.
  - 2. Clow Valve Company.
  - 3. Mueller Company.
  - 4. Substitutions: Equal as approved by the Engineer.
- B. Furnish materials in accordance with utility company or governing agency requirements.
- C. Dry-barrel Break-away Type: AWWA C502; cast-iron body, compression type valve.
  - 1. Bury Depth: As indicated on the Drawings.
  - 2. Inlet Connection: 6 inches.
  - 3. Valve Opening: 5-1/4 inch diameter.
  - 4. Ends: Mechanical Joint or Bell End.
  - 5. Bolts and Nuts: Corrosion resistant.
  - 6. Coating: AWWA C550; interior.
  - 7. Direction of Opening: Counterclockwise unless otherwise indicated.
- D. One pumper, two hose nozzles.
  - 1. Obtain thread type and size from local fire department.
  - 2. Attach nozzle caps by separate chains.
- E. Finish: Primer and two coats of enamel, color in accordance with utility company, fire department, or NFPA 281 requirements.

## 2.5 UNDERGROUND PIPE MARKERS

- A. Install blue marking tape 12-inches above the waterline.

## 2.6 CONCRETE FOR THRUST RESTRAINT, ENCASEMENT AND CRADLES

- A. Concrete: Class B Concrete conforming to Section 1000 of the NCDOT Standard Specifications.
  - 1. Compressive strength of 2,500 psi at 28 days.
  - 2. Air entrained.
  - 3. Water cement ratio of 0.488 with rounded aggregate and 0.567 with angular aggregate.
  - 4. Maximum slump of 2.5 inch for vibrated concrete and 4 inch for non-vibrated concrete.
  - 5. Minimum cement content of 508 pounds per cubic yard for vibrated and 545 pounds per cubic yard for non-vibrated concrete.



## 2.7 BEDDING AND COVER MATERIALS

- A. Bedding for Rigid Pipe (DIP, PVC C900, PVC C905, and PCCP): Clean sand, slightly silty sand, or slightly clayey sand having a Unified Soil Classification of SP, SP-SM or SP-SC.
- B. Backfill Around Pipe and Above Pipe: As specified in Section 31 23 16.13 -Trenching.

## 2.8 ACCESSORIES

- A. Steel rods, bolt, lugs and brackets: ASTM A36 or ASTM A307 carbon steel.

# PART 3 EXECUTION

## 3.1 PREPARATION

- A. Verify existing utility water main size, location, and inverts are as indicated on Drawings.

## 3.2 EXCAVATION

- A. Excavate pipe trench in accordance with Section 31 23 16.13 - Trenching for Work of this Section. Hand trim excavation for accurate placement of pipe to elevations indicated on Drawings.
- B. Dewater excavations to maintain dry conditions and preserve final grades at bottom of excavation.
- C. Provide sheeting and shoring as required.
- D. Place bedding material at trench bottom, level fill materials in one continuous layer not exceeding 8 inches in compacted depth; compact to 95 percent.

## 3.3 INSTALLATION – PIPE

- A. Install ductile iron pipe and fittings in accordance with AWWA C600 and manufacturers' instructions.
- B. Install PVC pipe in accordance with AWWA C605 and manufacturers' instructions.
- C. Handle and assemble pipe in accordance with manufacturer's instructions and as indicated on Drawings.
- D. Steel Rods, Bolt, Lugs, and Brackets: Coat buried steel with one coat of coal tar coating before backfilling.
- E. Maintain minimum 10-foot horizontal separation and 18-inch vertical separation of water main from sewer piping or as required by local code.
- F. Install pipe to indicated elevation to within tolerance of 1/2 inch.

- G. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, remove burrs. Use only equipment specifically designed for pipe cutting. The use of chisels or hand saws will not be permitted. Grind edges smooth with beveled end for push-on connections.
- H. Remove scale and dirt on inside and outside before assembly.
- I. Flanged Joints: Not to be used in underground installations except within structures.
- J. Route pipe in straight line. Relay pipe that is out of alignment or grade.
- K. Install pipe with no high points. If unforeseen field conditions arise which necessitate high points, install air release valves as directed by Architect/Engineer.
- L. Install pipe to have bearing along entire length of pipe. Excavate bell holes to permit proper joint installation. Do not lay pipe in wet or frozen trench.
- M. Prevent foreign material from entering pipe during placement.
- N. Install pipe to allow for expansion and contraction without stressing pipe or joints.
- O. Close pipe openings with watertight plugs during work stoppages.
- P. Install access fittings to permit disinfection of water system performed under Section 33 01 10.58 – Disinfection of Water Utility Piping Systems.
- Q. Install underground marking tape continuously 12 inches above pipe line.
- R. Establish elevations of buried piping with not less than 3 feet of cover. Measure depth of cover from final surface grade to top of pipe barrel.

### 3.4 INSTALLATION – FIRE HYDRANTS

- A. Install fire hydrants; provide support blocking and drainage gravel; do not block drain hole.
- B. Set hydrants plumb with pumper nozzle facing roadway; set hydrants with centerline of pumper nozzle 18 inches above finished grade and safety flange not more than 6 inches or less than 2 inches above grade.
- C. Paint hydrants in accordance with local color scheme.
- D. After hydrostatic testing, flush hydrants and check for proper drainage.

### 3.5 INSTALLATION - VALVES

- A. Install valves in conjunction with pipe installation; set valves plumb.
- B. Provide buried valves with valve boxes installed flush with finished grade.

### 3.6 CONCRETE THRUST RESTRAINT

- A. Provide valves, tees, bends, caps, plugs, and dead ends with concrete thrust blocks as indicated on Drawings.
- B. Pour concrete thrust blocks against undisturbed earth. Locate thrust blocks at each elbow or change of pipe direction to resist resultant force and so pipe and fitting joints will be accessible for repair.
- C. Do not encase fitting joints and flanges.

### 3.7 TIED JOINT RESTRAINT

- A. Install tied joint restraint systems in accordance with Section 33 05 09.33 - Thrust Restraint for Utility Piping.

### 3.8 SERVICE CONNECTIONS

- A. Install service connections in accordance with Section 33 14 17 - Site Water Service Utility Laterals.

### 3.9 BACKFILLING

- A. Backfill and compact around sides and to top of pipe in accordance with Section 31 23 16.13 - Trenching.
- B. Maintain optimum moisture content of material to attain required compaction density.

### 3.10 DISINFECTION OF POTABLE WATER PIPING SYSTEM

- A. Flush and disinfect system in accordance with Section 33 01 10.58 - Disinfection of Water Utility Piping Systems.

### 3.11 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Compaction Testing: Perform soil compaction tests in accordance with Section 31 23 16.13 - Trenching.
- C. Tests: Perform pressure test on potable water distribution system in accordance with AWWA C600 and ONWASA requirements.
  - 1. The working pressure shall be 100 psi and the test pressure shall be 150 psi.
- D. Notification: Notify Engineer 72 hours in advance of test and have witness test.

END OF SECTION

**This Page Intentionally Left Blank**

SECTION 33 14 17  
SITE WATER SERVICE UTILITY LATERALS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
  - 1. Pipe and fittings for 2-inch and smaller domestic water service connections to buildings.
  - 2. Corporation stop assembly.
  - 3. Curb stop assembly.
  - 4. Water meters and meter setting equipment.
  - 5. Backflow preventers.
  - 6. Underground pipe markers.
  - 7. Trenching, bedding and cover materials.
- B. Related Sections:
  - 1. Section 31 23 16.13 - Trenching: Excavating backfilling and compacting for Work of this section.
  - 2. Section 33 11 00 - Water Distribution Piping: Flushing and disinfecting of water system.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Section not applicable.

1.3 REFERENCES

- A. American Association of State Highway and Transportation Officials:
  - 1. 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.
- B. American Society of Mechanical Engineers:
  - 1. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.
  - 2. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
- C. American Society of Sanitary Engineering:
  - 1. ASSE 1012 - Backflow Preventer with Intermediate Atmospheric Vent.
  - 2. ASSE 1013 - Reduced Pressure Principle Backflow Preventers.
- D. ASTM International:
  - 1. ASTM A48/A48M - Standard Specification for Gray Iron Castings.
  - 2. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings.
  - 3. ASTM B88 - Standard Specification for Seamless Copper Water Tube.
  - 4. ASTM C858 - Standard Specification for Underground Precast Concrete Utility Structures.
  - 5. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
  - 6. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>)).

7. ASTM D1785 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
8. ASTM D2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).
9. ASTM D2466 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
10. ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.
11. ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

E. American Welding Society:

1. AWS A5.8 - Specification for Filler Metals for Brazing and Braze Welding.

F. American Water Works Association:

1. AWWA C509 - Resilient-Seated Gate Valves for Water Supply Service.
2. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances.
3. AWWA C700 - Cold-Water Meters - Displacement Type, Bronze Main Case.
4. AWWA C701 - Cold-Water Meters - Turbine Type, for Customer Service.
5. AWWA C702 - Cold-Water Meters - Compound Type.
6. AWWA C706 - Direct-Reading, Remote-Registration Systems for Cold-Water Meters.
7. AWWA C800 - Underground Service Line Valves and Fittings.
8. WWA C901 - Polyethylene (PE) Pressure Pipe and Tubing, 1/2 in. through 3 in. for Water Service.
9. AWWA M6 - Water Meters - Selection, Installation, Testing, and Maintenance.
10. AWWA M14 – Backflow Prevention and Cross Connection Control.

G. NCDOT Standard Specifications:

1. Standard Specifications for Roads and Structures, latest edition, published by the North Carolina Department of Transportation.

H. Cape Fear Public Utility Authority (ONWASA):

1. Technical Specifications for construction and
2. Materials Specification Manual

## 1.4 SUBMITTALS

- A. Shop Drawings: Provide shop drawings for precast concrete vaults to include detail drawings showing the vault and accessories.
- B. Product Data: Submit data on pipe materials, pipe fittings, corporation stop assemblies, curb stop assemblies, meters, meter setting equipment, service saddles, backflow preventor, and accessories.
- C. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

## 1.5 CLOSEOUT SUBMITTALS

- A. Execution and Closeout Requirements: Requirements for submittals.

- B. Project Record Documents: Record actual locations of piping mains, curb stops, connections, thrust restraints, and invert elevations.
- C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

#### 1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with utility company standards and NCDOT Sections 1500, 1510, and 1515 of the Standard Specifications.
- B. Maintain one copy of document on site.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. During loading, transporting, and unloading of materials and products, exercise care to prevent any damage.
- B. Store products and materials off ground and under protective coverings and custody, away from walls and in manner to keep these clean and in good condition until used.
- C. Exercise care in handling precast concrete products to avoid chipping, cracking, and breakage.

### PART 2 PRODUCTS

#### 2.1 WATER PIPING AND FITTINGS

- A. PVC Pipe in accordance with the ONWASA Material Specifications Manual (MSM).

#### 2.2 Polyethylene Pipe in accordance with the ONWASA Material Specifications Manual (MSM).CORPORATION STOP ASSEMBLY

- A. Corporation Stop assemblies and service saddles in accordance with the ONWASA Material Specifications Manual (MSM).

#### 2.3 CURB STOP ASSEMBLY

- A. Curb stops, Boxes and Covers in accordance with the ONWASA Material Specifications Manual (MSM).

#### 2.4 METER SETTING EQUIPMENT

- A. Outside Meter Setting per the ONWASA Standard Specifications.

#### 2.5 WATER METERS

- A. Furnish materials in accordance with ONWASA standards.

## 2.6 BACKFLOW PREVENTERS

- A. Furnish materials in accordance with the ONWASA Material Specifications Manual.
- B. Double Check Valve Assemblies: Comply with ASSE 1012; Bronze body with corrosion resistant internal parts and stainless steel springs; two independently operating check valves with intermediate atmospheric vent.

## 2.7 UNDERGROUND PIPE MARKERS

- A. Plastic Ribbon and Trace Wire Tape: Brightly colored blue continuously printed with "WATER SERVICE" in large letters, minimum 6 inches wide by 4 mils thick, with magnetic detectable conductor manufactured for direct burial service.

## 2.8 CONCRETE

- A. Concrete: Class B Concrete conforming to NCDOT Section 1000 of the Standard Specifications.
  - 1. Compressive strength of 2,500 psi at 28 days.
  - 2. Air entrained.
  - 3. Water cement ratio of 0.488 with rounded aggregate and 0.567 with angular aggregate.
  - 4. Maximum slump of 2.5 inch for vibrated concrete and 4 inch for non-vibrated concrete.
  - 5. Minimum cement content of 508 pounds per cubic yard for vibrated and 545 pounds per cubic yard for non-vibrated concrete.

## 2.9 BEDDING AND COVER MATERIALS

- A. Bedding: Clean coarse aggregate Gradation No. 57 conforming to NCDOT Sections 1005 and 1006 of the Standard Specifications.
- B. Backfill around pipe and above pipe: As specified in Section 31 23 16.13 -Trenching.

## 2.10 ACCESSORIES

- A. Thrust Restraints: As specified on the plans.

# PART 3 EXECUTION

## 3.1 PREPARATION

- A. Verify building service connection and municipal utility water main size, location, and invert are as indicated on Drawings.
- B. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, remove burrs.
- C. Remove scale and dirt on inside and outside before assembly.
- D. Prepare pipe connections to equipment with flanges or unions.



### 3.2 INSTALLATION - CORPORATION STOP ASSEMBLY

- A. Make connection for each different kind of water main using suitable materials, equipment and methods approved by the Engineer.
- B. Provide service clamps for mains other than of cast iron or ductile iron mains.
- C. Screw corporation stops directly into tapped and threaded iron main at 10 and 2 o'clock position on main's circumference; locate corporation stops at least 12 inches apart longitudinally and staggered.
- D. For plastic pipe water mains, provide full support for service clamp for full circumference of pipe, with minimum 2-inch width of bearing area; exercise care against crushing or causing other damage to water mains at time of tapping or installing service clamp or corporation stop.
- E. Use proper seals or other devices so no leaks are left in water mains at points of tapping; do not backfill and cover service connection until approved by the Engineer.

### 3.3 EXCAVATION, BEDDING AND BACKFILL

- A. Excavate pipe trench in accordance with Section 31 23 16.13 - Trenching for Work of this Section.
- B. Place bedding material at trench bottom, level in one continuous layer not exceeding 6-inch loose thickness; compact to 95 percent in accordance with Section 31 23 16.13 - Trenching.
- C. Backfill around sides and to top of pipe with cover fill, tamp in place and compact to 95 percent in accordance with Section 31 23 16.13 - Trenching.
- D. Maintain optimum moisture content of fill material to attain required compaction density.

### 3.4 INSTALLATION - PIPE AND FITTINGS

- A. Maintain separation of water main from sewer piping in accordance with local code or a minimum of 10 feet horizontal and 18 inches vertical distance.
- B. Group piping with other site piping work whenever practical.
- C. Install pipe to indicated elevation to within tolerance of 5/8 inch.
- D. Route pipe in straight line.
- E. Install pipe to allow for expansion and contraction without stressing pipe or joints.
- F. Install access fittings to permit disinfection of water system performed under Section 33 01 10.58 – Disinfection of Water Utility Piping Systems.
- G. Thrust Restraints: Form and place concrete for thrust restraints at each elbow or change of direction of pipe.

- H. Form and place concrete for thrust restraints at each elbow or change of direction of pipe main.
- I. Establish elevations of buried piping with not less than 3 feet of cover.
- J. Pipe Markers: As specified in Section 33 05 97 - Identification and Signage for Utilities.
- K. Install plastic ribbon with trace wire continuous over top of pipe buried 6 inches below subgrade above pipe line; coordinate with Section 31 23 16.13 - Trenching.
- L. Backfill trench in accordance with Section 31 23 16.13 – Trenching and Item C-152 Excavation, Subgrade, and Embankment.

### 3.5 INSTALLATION - CURB STOP ASSEMBLY

- A. Set curb stops on solid bearing of compacted soil.
- B. Center and plumb curb box over curb stops. Set box cover flush with finished grade.

### 3.6 INSTALLATION - BACKFLOW PREVENTERS WATER METERS

- A. Install positive displacement meters in accordance with AWWA M6, as indicated on Drawings, and in accordance with manufacturer's instructions.
- B. Install backflow preventer where indicated on Drawings and in accordance with manufacturer's instructions.
- C. Comply with local water company requirements and plumbing codes regarding testing and installation requirements.

### 3.7 SERVICE CONNECTIONS

- A. Install water service in accordance with utility company requirements with backflow preventer and water meter.

### 3.8 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

- A. Flush and disinfect system in accordance with Section 33 01 10.58 - Disinfection of Water Utility Piping Systems.

### 3.9 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Compaction testing for bedding and backfill: Conform to Section 31 23 16.13 - Trenching.
- C. Pressure testing: Perform pressure test on water service connections in accordance with AWWA C600.

- D. Notification: Notify Engineer and utility company 72 hours in advance of test and have them witness test.
- E. Test Pressure: Not less than 200 psi or 50 psi in excess of maximum static pressure, whichever is greater.
- F. Procedure:
1. After completion of pipeline installation, but prior to backfill and final connection to existing system, conduct concurrent pressure and leakage tests in accordance with AWWA C600.
  2. Provide equipment required to perform leakage and pressure tests.
  3. Conduct tests for at least two-hour duration.
  4. No pipeline installation will be approved when pressure varies by more than 5 psi at completion of pressure test.
  5. Before applying test pressure, completely expel air from section of piping under test. Provide corporation cocks so air can be expelled as pipeline is filled with water. After air has been expelled, close corporation cocks and apply test pressure. At conclusion of tests, remove corporation cocks and plug resulting piping openings.
  6. Slowly bring piping to test pressure and allow system to stabilize prior to conducting leakage test. Do not open or close valves at differential pressures above rated pressure.
  7. Examine exposed piping, fittings, valves, and joints carefully during pressure test. Repair or replace damage or defective pipe, fittings, valves, hydrants, or joints discovered, following pressure test.
  8. Correct visible deficiencies and continue testing at same test pressure for additional two hours to determine leakage rate. Maintain pressure within plus or minus 5.0 psi of test pressure.
  9. No pipeline installation will be approved when leakage is greater than that determined by the following formula:

$L = (SD\sqrt{P})/C$
L = allowable, in gallons per hour
S = length of pipe tested, in feet
D = nominal diameter of pipe, in inches
P = average test pressure during leakage test, in pounds per square inch gauge
C = 148,000

10. If pipe under test contains sections of various diameters, calculate allowable leakage from sum of computed leakage for each size.
11. When leakage exceeds specified acceptable rate, locate source and make repairs. Repeat test until specified leakage requirements are met.

END OF SECTION

**This Page Intentionally Left Blank**

SECTION 33 31 00  
SANITARY SEWERAGE PIPING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Sanitary sewer pipe and fittings.
2. Bedding and cover materials.
3. Underground pipe markers.
4. Connection to existing manholes.
5. Wye branches and tees.
6. Sanitary Laterals.

B. Related Sections:

1. Item P-152 Excavation, Subgrade, and Embankment: Requirements for excavation and backfill as required by this Section.
2. Section 31 23 16.13 - Trenching: Excavation, bedding and backfill requirements for trenching required by this section.
3. Section 33 05 13.16 - Public Manholes and Structures: Concrete manholes, frames and lids for sanitary sewer.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. 33 31 00-1 4" Sanitary Sewer Line:

1. Basis of Measurement: By the linear foot for various pipe sizes, materials.
2. Basis of Payment: Includes all labor, materials, tools, and equipment to complete the excavation, installation, connection, and testing of proposed sewer pipe in accord with ONWASA standards. This includes all necessary pipe boots plugs, fittings and accessories required to complete the work.

B. 33 31 00-2 6" Sanitary Sewer Line:

1. Basis of Measurement: By the linear foot for various pipe sizes, materials.
2. Basis of Payment: Includes all labor, materials, tools, and equipment to complete the excavation, installation, connection, and testing of proposed sewer pipe in accord with ONWASA standards. This includes all necessary pipe boots plugs, fittings and accessories required to complete the work.

C. 33 31 00-3 8" Sanitary Sewer Line:

1. Basis of Measurement: By the linear foot for various pipe sizes, materials.
2. Basis of Payment: Includes all labor, materials, tools, and equipment to complete the excavation, installation, connection, and testing of proposed sewer pipe in accord with ONWASA standards. This includes all necessary pipe boots plugs, fittings and accessories required to complete the work.

### 1.3 REFERENCES

- A. American Association of State Highway and Transportation Officials:
  - 1. 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.
- B. American Water Works Association:
  - 1. AWWA C104 - Cement-Mortar Lining for Ductile-Iron Pipe and Fittings.
  - 2. AWWA C105 - Polyethylene Encasement for Ductile-Iron Pipe Systems.
  - 3. AWWA C110 - Ductile-Iron and Gray-Iron Fittings.
  - 4. AWWA C111 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
  - 5. AWWA C150 - Thickness Design of Ductile-Iron Pipe.
  - 6. AWWA C151 - Ductile-Iron Pipe, Centrifugally Cast.
  - 7. AWWA C153 - Ductile-Iron Compact Fittings.
- C. ASTM International:
  - 1. ASTM A746 - Standard Specification for Ductile Iron Gravity Sewer Pipe.
  - 2. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>).
  - 3. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>).
  - 4. ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
- D. American Water Works Association:
  - 1. AWWA C110 - American National Standard for Ductile-Iron and Grey-Iron Fittings, 3 in. Through 48 in. (75 mm through 1200 mm), for Water and Other Liquids.
  - 2. AWWA C111 - American National Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
  - 3. AWWA C153 - American National Standard for Ductile-Iron Compact Fittings for Water Service.
  - 4. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances.
- E. NCDOT Standard Specifications:
  - 1. Standard Specifications for Roads and Structures, latest edition, published by the North Carolina Department of Transportation.

### 1.4 SUBMITTALS

- A. Permits: Submit copies of construction permits obtained for this Work.
- B. Product Data: Submit catalog cuts and other pertinent data indicating proposed materials, accessories, details, and construction information.
- C. Submit reports indicating field tests made and results obtained.
- D. Manufacturer's Installation Instructions:
  - 1. Indicate special procedures required to install Products specified.

2. Submit detailed description of procedures for connecting new sewer to existing sewer line and directional drilling, or pipe jacking installation.

E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Project Record Documents: Record location of pipe runs, connections, manholes, cleanouts, and invert elevations.
- B. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

#### 1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with Section 1520 of NCDOT Standard Specifications.
- B. Maintain one copy of document on site.

#### 1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing Work of this section with minimum 3 years documented experience.

#### 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store valves in shipping containers with labeling in place.
- B. Block individual and stockpiled pipe lengths to prevent moving.
- C. Do not place pipe or pipe materials on private property or in areas obstructing pedestrian or vehicle traffic.
- D. Do not place pipe flat on ground. Cradle to prevent point stress.
- E. Store UV sensitive materials out of direct sunlight.

#### 1.9 FIELD MEASUREMENTS

- A. Verify field measurements and elevations are as indicated.

#### 1.10 COORDINATION

- A. Coordinate Work with local sewerage authority. Convene pre-installation meeting minimum of one week prior to starting Work of this Section.
- B. Notify affected utility companies minimum of 72 hours prior to construction.

## PART 2 PRODUCTS

### 2.1 SANITARY SEWER PIPE AND FITTINGS

- A. PVC Flexible Joint Plastic Pipe: ASTM D3034, Type PSM, Poly (Vinyl Chloride) (PVC) material; bell and spigot style rubber ring sealed gasket joint.
  - 1. Pipe Class: SDR-21 Heavy Wall.
  - 2. Fittings: PVC conforming to pipe specifications.
  - 3. Joints: ASTM F477, elastomeric gaskets.
- B. Ductile Iron Gravity Sewer Pipe: ASTM A746, bell and spigot ends.
  - 1. Minimum Thickness Class: 50.
  - 2. Joints: Rubber gaskets per AWWA C111.
  - 3. Factory Applied Interior Lining:
    - a. Amine cured novolac epoxy containing at least 20% by volume of ceramic quartz pigment applied to a minimum nominal dry film thickness of 40 mils.
  - 4. Exterior Coating:
    - a. Type: Asphaltic.
    - b. Minimum Uniform Thickness: 1 mil.
    - c. Comply with AWWA C151.

### 2.2 FLEXIBLE PIPE BOOT FOR MANHOLE PIPE ENTRANCES

- A. Furnish materials in accordance with authority having jurisdiction.
- B. Flexible Pipe Boot: ASTM C923, ethylene propylene rubber (EPDM), Series 300 stainless steel clamp and stainless steel hardware.

### 2.3 UNDERGROUND PIPE MARKERS

- A. Plastic Ribbon Tape: Brightly colored green continuously printed with "SANITARY SEWER" in large letters, minimum 6 inches wide by 4 mils thick.

### 2.4 MANHOLES

- A. Manholes: As specified in Section 33 05 13.16 - Public Manholes and Structures and indicated on Drawings; cover inscribed with "SANITARY SEWER".

### 2.5 FLEXIBLE COUPLINGS

- A. Provide and install flexible couplings in accordance in accordance with the CFPUA Material Specifications Manual (MSM).

### 2.6 CONCRETE AND GROUT

- A. Concrete: Class B Concrete conforming to Section 1000 of the NCDOT Standard Specifications.
  - 1. Compressive strength of 2,500 psi at 28 days.
  - 2. Air entrained.
  - 3. Water cement ratio of 0.488 with rounded aggregate and 0.567 with angular aggregate.
  - 4. Maximum slump of 2.5 inch for vibrated concrete and 4 inch for non-vibrated concrete.



5. Minimum cement content of 508 pounds per cubic yard for vibrated and 545 pounds per cubic yard for non-vibrated concrete.

- B. Grout: Non-shrink, non-metallic in accordance with Section 1054 of NCDOT Standard Specifications with a compressive strength of at least 5,000 psi at 3 days.

## 2.7 BEDDING AND COVER MATERIALS

- A. General: Conform to Section 31 23 16.13 - Trenching for bedding and backfill around and on top of pipe.
- B. Bedding for Rigid Pipe (CIP, DIP, VCP, and RCP): Clean sand, slightly silty sand, or slightly clayey sand having a Unified Soil Classification of SP, SP-SM or SP-SC.

## 2.8 ACCESSORIES

- A. Pipe Markers in accordance with the CFPUA Material Specifications Manual (MSM)

## 2.9 SOURCE QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Requirements for testing, inspection, and analysis.
- B. Provide shop inspection and testing of pipe.
- C. Owner Inspection:
  1. Make completed pipe sections available for inspection at manufacturer's factory prior to packaging for shipment.
  2. Notify Owner at least seven days before inspection is allowed.
- D. Owner Witnessing:
  1. Allow witnessing of factory inspections and tests at manufacturer's test facility.
  2. Notify Owner at least seven days before inspections and tests are scheduled.
- E. Certificate of Compliance:
  1. If manufacturer is approved by authorities having jurisdiction, submit certificate of compliance indicating Work performed at manufacturer's facility conforms to Contract Documents.
  2. Specified shop tests are not required for Work performed by approved manufacturer.

# PART 3 EXECUTION

## 3.1 EXAMINATION

- A. Verify that trench cut is ready to receive Work of this Section.
- B. Verify existing sanitary sewer utility main size, location, and inverts are as indicated on Drawings.

### 3.2 EXCAVATION AND BEDDING

- A. Excavate pipe trench in accordance with Section 31 23 16.13 - Trenching.
- B. Excavate to lines and grades shown on Drawings or required to accommodate installation of encasement.
- C. Dewater excavations to maintain dry conditions and preserve final grades at bottom of excavation.
- D. Provide sheeting and shoring in accordance with Section 31 23 16.13 - Trenching.
- E. Place bedding material at trench bottom, level continuous layer not exceeding 8-inch compacted depth; compact to 95 percent per Section 31 23 16.13 - Trenching.
- F. Correct over-excavation with fine aggregate.
- G. Remove large stones or other hard materials that could damage pipe or impede consistent backfilling or compaction.
- H. Protect and support existing sewer lines, utilities, and appurtenances.
- I. Utilities:
  - 1. Maintain profiles of utilities.
  - 2. Coordinate with water and storm utilities to eliminate interference.
  - 3. Notify Engineer if crossing conflicts occur.

### 3.3 INSTALLATION – PIPE

- A. Install in accordance with manufactures instructions and as indicated on Drawings.
- B. Install CIP and DIP, fittings, and accessories in accordance with applicable portions of AWWA C600.
- C. Seal joints watertight.
- D. Lay pipe to slope gradients indicated on Drawings with maximum variation from indicated slope of 1/8 inch in 10 feet. Begin at downstream end and progress upstream.
- E. Ensure entire pipe is supported by bedding.
- F. Assemble and handle pipe in accordance with manufacturer's instructions except as modified on the Drawings or by Engineer.
- G. Keep pipe and fittings clean until work is completed and accepted by Engineer. Cap open ends during periods of work stoppage.
- H. Lay bell and spigot pipe with bells upstream.

- I. Connect pipe to existing sewer system as indicated on Drawings at existing manhole or using doghouse manhole connection per Section 33 05 61 - Concrete Manholes.
- J. Place haunching material, rod, and tamp per Section 31 23 16.13 – Trenching to eliminate voids.
- K. Install underground marking tape continuously 18 inches above pipe line.
- L. Backfilling:
  - 1. As specified in Section 31 23 16.13 – Trenching.

### 3.4 TOLERANCES

- A. Maximum Variation from Indicated Slope: 1/8 inch in 10 feet.

### 3.5 CONNECTION TO EXISTING MANHOLE

- A. Core drill existing manhole to clean opening. Using pneumatic hammers, chipping guns, and sledge hammers is not permitted.
- B. Install watertight neoprene gasket and seal with non-shrink concrete grout.
- C. Concrete encase new sewer pipe minimum of 24 inches to nearest pipe joint. Use epoxy binder between new and existing concrete.
- D. Prevent construction debris from entering existing sewer line when making connection.

### 3.6 MANHOLE INSTALLATION

- A. Install manholes in accordance with Section 33 05 13.16 – Public Manholes and Structures.

### 3.7 INSTALLATION - WYE BRANCHES AND TEES

- A. Install wye branches or pipe tees at locations indicated on Drawings concurrent with pipe laying operations. Use standard fittings of same material and joint type as sewer main.
- B. Maintain minimum 5 feet separation distance between wye connection and manhole.
- C. Use saddle wye or tee with stainless steel clamps for taps into existing piping. Mount saddles with solvent cement or gasket and secure with metal bands. Layout holes with template and cut holes with mechanical cutter.

### 3.8 INSTALLATION - SANITARY LATERALS

- A. Construct laterals from wye branch to terminal point at right-of-way or as indicated on Drawings.
- B. Where depth of main pipeline warrants, construct riser type laterals from wye branch.
- C. Maintain 2.5-foot minimum depth of cover over pipe.
- D. Maintain minimum 5-foot separation distance between laterals.

- E. Install watertight plug, braced to withstand pipeline test pressure thrust, at termination of lateral. Install temporary marker stake extending from end of lateral to 24 inches above finished grade. Paint top 6 inches of stake with fluorescent orange paint.

### 3.9 FIELD QUALITY CONTROL

- A. Field inspecting, testing, adjusting, and balancing.
- B. Request inspection prior to and immediately after placing bedding.
- C. Perform test on sanitary sewage system in accordance with in accordance with the CFPUA requirements. Notify Engineer 72 hours in advance of test and have witness test.
  - 1. If tests indicate that Work does not meet specified requirements, remove Work, replace, and retest.
- D. Compaction Testing: In accordance with Section 31 23 16.13 - Trenching.
  - 1. Comply with AASHTO T180, ASTM D698, ASTM D1557 and ASTM D6938.
  - 2. Testing Frequency: One test per lift for every 100 feet of trench.
- E. When tests indicate Work does not meet specified requirements, remove work, replace, and retest.

### 3.10 PROTECTION OF FINISHED WORK

- A. Contractor shall take all precautions to protect the finished Work.
- B. Protect pipe and aggregate cover from damage or displacement until backfilling operation is in progress.
- C. Cap open ends of piping during periods of Work stoppage.

END OF SECTION

# **TECHNICAL SPECIFICATIONS – ELECTRICAL**

**(Prepared by: WE Engineering, PLLC)**

**This Page Intentionally Left Blank**

## ITEM L-100 GENERAL PROVISIONS AND REQUIREMENTS FOR ELECTRICAL WORK

### DESCRIPTION

**100-1.1 Special Requirements For Electrical Work.** These special requirements shall apply for the electrical work. Where the contract special conditions or general provisions also apply, the stricter of the documents shall apply.

**100-1.2 Auxiliaries And Accessories.** Include all auxiliaries and accessories for a complete and properly operating system, to the satisfaction of the Owner and Resident Project Representative (RPR).

Provide and install all electrical systems and any necessary appurtenances as per FAA Advisory Circulars, NEC and local codes whether specified or shown on drawings or not. The content of these specifications and contract documents in general only refers to work required above and beyond the requirements of the NEC and applicable local codes.

**100-1.3 Project Pay Items.** The project pay items are provided to be inclusive of all work to be performed as shown in the contract documents. All work not identified with a specific pay item is to be considered work to complete the project and is to be subsidiary to the cost of project pay items provided.

### 100-1.4 References

- a. ANSI/NFPA 70 - National Electrical Code
- b. NECA - National Electrical Contractors' Association
- c. NEMA - National Electrical Manufacturers' Association
- d. UL - Underwriters' Laboratories, Inc.
- e. FS - Federal Specifications.
- f. NESC - National Electrical Safety Code.
- g. ANSI - American National Standards Institute.
- h. IES - Illuminating Engineering Society.
- i. IEEE - The Institute of Electrical and Electronic Engineers
- j. ICEA - Insulated Cable Engineers Association
- k. National Bureau of Standards
- l. NFPA - National Fire Protection Association
- m. OSHA - Occupational Safety and Health Administration
- n. EPA - U.S. Environmental Protection Agency
- o. International Electrical Testing Association.
- p. AWS – American Welding Society
- q. Other standards as referenced in individual sections

## SUMMARY OF WORK

**100-2.1 Supervision And Attendance.** The Contractor shall provide a resident field superintendent who has had a minimum of four years previous successful experience on projects of comparable sizes and complexity. The Superintendent shall be present at all times that work under this division is being installed or affected.

**100-2.2 Record Documents.** The Contractor shall maintain the contract documents, shop drawings and samples at the site, in good order and annotated daily to show all changes made during the construction process, per Section L-106, Submittals, Record Documents and Maintenance Manuals. These shall be available to the RPR for examination.

**100-2.3 Safety And Protection.** The Contractor shall be solely and completely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work. The Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

a. All employees on the work and other persons (including but not limited to the general public) who may be affected thereby,

b. All the work and all materials or equipment to be incorporated therein, whether in storage on or off the site, and

c. Other property at the site, adjacent thereto, or utilized by the Contractor including but not limited to trees, shrubs, lawns, walks, pavements, structures, underground facilities, and other utilities not designated for removal, relocation or replacement in the course of construction regardless of whether or not such other property is indicated in the Contract Documents.

d. Existing underground utilities and systems both shown on the plans and those not shown. The Contractor shall have all utilities and systems field located by the FAA or appropriate authorities having jurisdiction and shall take whatever measures necessary to protect the utilities and systems from damage.

The Contractor shall comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss.

All hoisting machinery shall be inspected by a competent person or by a government or private agency recognized by the U.S. Department of Labor. A copy of the written inspection report shall be submitted to the RPR prior to the start of work requiring the use of this equipment.

The installation and/or removal of lighting equipment may be critical to airport operations; therefore, the Contractor shall follow work schedules established in the plans and specifications or as directed by the RPR. The system shall be installed in accordance with the National Electrical Code and/or local code requirements.

The Contractor shall provide temporary wiring as required to reconnect existing circuits to provide guidance for aircraft to pass through the construction areas on those taxiways/runways which must remain open. The Contractor shall check all temporary circuits before dark each day to assure that they are operational. In the event of failure, the Contractor shall immediately take steps to restore operation.

The Contractor shall provide all safety rails as required in the performance of the work at building perimeters, at perimeters of floor and/or roof openings and on scaffold systems or platforms in accordance with the above regulations. Maintain safety rails during the duration of the work for this Contract. This Contractor shall be responsible for the removal and replacement of any safety rail necessary for the installation of equipment or materials provided in this work.



Powder-actuated fasteners will not be allowed without express written approval of the RPR. No fasteners shall pierce the structure until approved by the RPR.

Clean up of scrap materials and waste of the Contractor to be completed daily or more frequently as needed.

**100-2.4 Engineering Inspections.** Items noted by the RPR, Owner, or their authorized representative during construction and before final acceptance which do not comply with the contract documents will be listed in accordance with the specifications. These items will be sent to the Contractor for action. The Contractor shall have these items corrected.

Items noted after acceptance during the warranty period shall be checked and corrected by the Contractor in a timely manner acceptable to the Owner.

**100-2.5 Existing Conditions.** Investigate the construction site thoroughly and reroute all conduit and wiring in area of new construction in order to maintain continuity of existing circuitry. Existing conduit shown on plans show approximate locations only. The Contractor must verify and coordinate existing site utilities, conduits and piping. The specifications include hand digging within five (5) feet of all existing utilities and all required rerouting in areas of existing utilities, conduits and/or pipes.

The Contractor shall check the construction site and existing conditions thoroughly before bidding. The Contractor shall advise the RPR of discrepancies or questions noted.

Special attention is called to the fact that work involved in this project is in connection with existing systems/facilities which must remain in operation while work is being performed. Work must be done in accordance with the schedule specified in the contract documents. Schedule work for a minimum outage to the Owner. Request written permission and receive written approval from the Owner a minimum of 72 hours in advance of any shut-down of existing systems. Perform work required at other than standard working hours where outages cannot be approved during regular working hours. Protect existing buildings and equipment during construction as required.

Special attention is called to the fact that there may be piping, fixtures or other items in the existing systems which must be removed or relocated in order to perform the alteration work. All conduit, wiring, boxes, etc. that do not comply with these specifications shall be removed or corrected to comply with these specifications. All unused conduit not removed shall be identified and a pull line shall be installed. Bid shall include all removal and relocation required for completion of the alterations and the new construction.

If any difference is discovered between the existing conditions and the drawings or specifications, the RPR shall be notified in writing immediately.

**100-2.6 Systems Guarantee.** The work required under this specification shall include a one (1) year warranty unless required otherwise by these specifications. This warranty shall be by the Contractor to the Owner for any defective workmanship or material which has been furnished under this contract for a period of one year (1) from the date of final acceptance of the system. This warranty shall not include light bulbs in service after one (1) month from date of final acceptance of the system. Explain the provisions of the warranty to the Owner at the "Demonstration of Completed System."

**100-2.7 Substantial Completion.** All specified work shall be complete prior to final inspection of the work, and all forms and other information requested, including maintenance manuals, shall be submitted to the RPR for approval one (1) week before the request for substantial completion of the work.

**100-2.8 Final Acceptance.** All work specified shall be complete after the substantial completion observation, all repairs made, and all required information approved at which time the Owner shall formally accept the project and take possession of all work on a permanent basis.

**100-2.9 Contractors Responsibilities.** Provide necessary layout, survey, labor, material, equipment,

tools, transportation, full time supervision and services required for the satisfactory and timely completion of the work in accordance with the drawings and specifications and contract documents.

Unload, store, protect and re-handle the materials required for this contract until such time that material is in place. Provide protection of materials required of this contract after installation.

Provide all required transportation, erection, maintenance, dismantling and removal of temporary facilities and equipment required by this contract.

Provide all transportation, unloading, distribution, hoisting, rigging, material handling and scaffolding required to install the work of this contract.

Provide all engineering and layout required to perform the work.

Provide temporary electrical power and temporary water and sanitary sewer for the Contractor's field office, RPR's field office and on-site testing laboratory. Pay all utility company charges. Provide temporary power required for the Contractor's work.

Prior to start of work the Contractor is to inspect work performed by others on which this work is to be placed on or adjacent to, and report in writing to the RPR, any condition found to be unacceptable. Failure to make said report shall constitute acceptance of the conditions found and any claims made thereafter due to the unacceptable conditions will not be considered by the RPR.

Provide all required coordination and supervision where work connects to or is affected by work of others, and comply with all requirements affecting this work. Work required under other sections, specifications or drawings to be performed by this section shall be coordinated with the respective contractor, and such work performed at no additional cost to the Owner including but not limited to electrical work in support of the mechanical division of the specifications and drawings.

It is the responsibility of the Contractor to coordinate the exact required location of any electrical or electronic equipment, system, or cabinets to be installed in or relocated inside an existing electrical or electronic equipment space. No existing equipment may be relocated in any existing electrical or electronic equipment room without prior coordination and with written approval of the Owner.

Provide and pay for all permits, licenses, fees and inspections required for the performance of the work. The Contractor shall pay all sales, consumer, use and other taxes required to be paid in accordance with the laws of the place of the project.

Provide all tests as required, per the drawings and specifications and submit all test reports to the RPR.

Provide all excavation, backfill, compaction, shoring and dewatering required for performance of the work.

Provide sleeves for all conduit required as specified.

Protect all work of this contract from damage and intrusion of dirt and foreign objects. Close off open ends of conduit and sleeves on work which is to be completed at a later date. Remove closure material prior to continuance of work.

Prior to Final Inspection, submit to the RPR, all Record Drawings and Operation and Maintenance Manuals as specified. Instruct Owner's maintenance personnel in the operation and maintenance of the systems as required by the Specifications.

The above is not all inclusive of the work described by the drawings and Specifications, which form the basis for this contract, but is presented for the Contractor's convenience.

**100-2.10 Interpretation Of Drawings And Specifications.** Should anything necessary for the clear

understanding of the electrical work be omitted from the contract documents, or should the requirements appear to be in conflict, the Contractor shall secure written instructions from the RPR before proceeding with the work affected thereby; otherwise the Contractor will be deemed to be proceeding at his own risk and expense. It is understood and agreed that the work shall be performed according to the true intent of the contract documents. Refer to Appendix A Figure 1 for a "Request For Information" (RFI) form.

#### **100-2.11 Work Sequence**

a. Install Work to accommodate Airport's present occupancy requirements during the construction period. Coordinate electrical schedule and operations with Owner, Contractors working on site and other requirements of the specifications. The Airport will remain in operation during construction.

b. Shutdown of existing electrical facilities shall be kept to an absolute minimum and coordinated with the RPR. Shutdown shall be made at hours convenient to the Airport. This includes evening and weekend hours.

c. The cost of any anticipated overtime work shall be included in the Contractor's base bid. Requests for additional compensation for this work after award of contract will be refused.

d. Coordinate all work with all other contractors and subcontractors.

### **BASIC MATERIAL & METHODS**

**100-3.1 Requirements Of Basic Materials And Methods.** The work shall include the furnishing of the systems, equipment and material specified in these specifications and as called for on the drawings, to include: supervision, operations, methods and labor for the fabrication, installation, start-up and tests for the complete electrical installation. Provide the necessary intertrade/Contractor coordination for the installation to be in a neat and workman like manner.

Drawings for the work are diagrammatic, intended to convey the scope of the work and to indicate the general arrangement and locations of the work. The drawings shall not be scaled for exact sizes or locations. Because of the scale of the drawings, certain basic items such as: conduit fittings, access panels, sleeves, pull and junction boxes may not be shown. Where such items are required by Code or by other sections or where they are required for proper installation of the work, such items shall be included. Coordinate final equipment locations with governing architectural and structural drawings. Layout equipment before installation so that all trades may install equipment in the space available.

Equipment Specifications may not deal with minute items such as components, parts, controls and devices which may be required to produce the equipment performance specified or as required to meet the equipment warranties. Where such items are required, they shall be included by the Contractor or the supplier of the equipment, whether or not specifically called for.

Conduit routed through any buildings that interferes with other equipment and construction shall not constitute a reason for an extra charge. Equipment, conduit, and fixtures shall fit into available spaces in the building; do not introduce these into the building at such times or in such manner as to cause damage to the structure. Equipment that requires servicing shall be readily accessible.

Locate all openings required for work performed under this section. Provide sleeves, guards or other approved methods to allow passage of items installed under this section.

Keep cutting and patching to a minimum. Insofar as possible, determine in advance the proper chase size and openings necessary for the work.

Where cutting and patching are required due to an error of the Contractor, or where the Contractor has not given enough advance notice of the need for holes, recesses, and chases, patching shall be performed by those trades skilled in the use of the materials involved and shall be done at the Contractor's expense.

Any cutting of work in place shall be patched and decorated by such mechanics and in such a manner that the quality of workmanship and finish shall be compatible with that of adjacent construction.

The approximate location of building fixtures, wall switches, etc., is indicated on the drawings. Exact locations shall be determined by the RPR as building work progresses. The indicated locations may be changed by ten (10) feet in any direction without additional cost before the items are installed.

The drawings and specifications describe specific sizes of switches, breakers, fuses, conduits, conductors, motor starters and other items of wiring equipment. These sizes are based on specific items of power consuming equipment (heaters), lights, motors for fans, compressors, pumps, etc.) Wherever the Contractor provides power consuming equipment which differs from drawings and specifications, the wiring and associated circuit components for such equipment shall be changed to proper sizes to match at no additional expense to the Owner.

The basis for new design requires that electrical services, switchgear, panelboard and transformers total calculated connected load not be more than 60% of the service size. The total calculated load requirements for alterations shall not be more than 80%.

Furnish to roofer all pitch pans required for electrical items which pierce roof whether or not shown on drawings. Roof penetrations are to be waterproofed in such a manner that roofing guarantees are fully in force. Floor penetrations shall be sealed with fire proof sealant to prevent water from leaking to floor below and to provide a 3 hour fire and smoke barrier. Wall penetrations shall be sealed to provide a 3 hour rated fire seal.

Surface mounted fixtures, outlets, cabinets, conduit, panels, etc., shall have finish or shall be painted as directed by the RPR. Paint shall be in accordance with other applicable sections of these specifications.

All materials utilized shall be suitable for the environment encountered. No combination of materials shall be used that forms an electrolytic coupling of such nature that in the presence of moisture corrosion is accelerated.

In general, all relays, contactors, starters, motor control centers, switchboards, panelboards, dry type transformers, disconnect switches, circuit breakers, and manual motor starter switches are to be supplied and manufactured by the same manufacturer and shall be submitted and approved as equal to that specified.

Make electrical connections to constant current regulators, transformers, motors, instruments, mechanical equipment, controls and at other locations as required with approximately 3 feet (12" minimum) of Sealtight flexible conduit. The sealtight electrical conduit shall utilize strain relief type connectors by adding a T&B wire mesh grip, WMG-LT series, or approval equal to each sealtight connector. Determine the requirements from drawings, these specifications, and the approved manufacturer drawings.

Provide inserts, hangers, supports, braces, and anchor bolts as necessary for all work called for under these specifications.

All conduits shall contain one copper grounding conductor, in accordance with NFPA 70, NEC Article 250. #6 AWG and smaller shall have green insulation. #4 AWG and larger shall have black insulation with green phasing tape. The only exception is the 5KV airfield lighting conduits and ductbanks.

All galvanized materials shall be hot-dip galvanized after fabrication, conforming to ASTM A 123 and/or A 153, unless noted otherwise.

Unless noted otherwise, all panelboards, motor starters, junction boxes, wireways, etc., shall be spaced off the concrete structure by using a Unistrut P-1060 series square washer or approved equal between the mounting surface and the equipment at each mounting point. Equipment as listed above, mounted on Unistrut or approved equal shall have Unistrut P-1060 series square washer or approved equal installed

between the Unistrut channel or approved equal and the equipment at each mounting point. All bolted connections and equipment mountings shall utilize a flat washer, lock washer and hex head A-325 bolting hardware.

Unless noted otherwise, all wire sizes are based on a 135 degrees F (75 degrees C), XHHW 600 volt insulation, copper conductors, not more than three single insulated conductors, in raceway, in free air. The conduit sizes are based on the use of XHHW 600 volt insulated conductors. The Contractor shall make the necessary increase in conduit sizes for other types of wire insulation. In no case shall the conduit size be reduced. The minimum wire size shall be #12 AWG.

All electrical conductors, windings, busbars, etc. shall be high conductivity (98% conductivity) copper.

The Contractor shall furnish and install all required motor overcurrent protection required by the NEC and these drawings and specifications. The overcurrent protection shall be sized according to the motor nameplate data.

**100-3.2 Electrical Reference Symbols.** Symbols used on the plans are defined in the Electrical Legend on the Drawings. Not necessarily will all symbols scheduled be applicable to the project.

**100-3.3 Active Services.** Existing active services i.e., water, gas, sewer, electric, communications, etc. when encountered, shall be protected against damage. Do not prevent or disturb operation of active services which are to remain. If active services are encountered which require relocation, the Contractor shall make a written request to the Owner for determination of procedures. Where existing services are to be abandoned, they shall be terminated in conformance with requirements of the Utility or Municipality or Authority having jurisdiction.

#### **100-3.4 Electric Service Interruptions**

**a.** Electrical service is defined as any electrical, communication, data, fire alarm and any other electrical transmission system. Other services include but are not limited to water, sanitary, gas, HVAC and storm water systems.

**b.** The Contractor shall notify the Owner and the RPR of the intent to perform any Work requiring service interruptions and shall proceed with such work only after receiving a time schedule approved by the Owner and the RPR. The Owner and the RPR shall have the right to cancel or delay the time of any service interruption. The Contractor shall provide personnel and equipment to assist in the proper coordination of service interruptions. The Contractor shall not leave the job site until resumption of normal service is satisfactory to the RPR.

**c.** Coordinate required facility shutdowns through the RPR.

**d.** When service interruptions are required to perform the contract work on transformers, circuit breakers or feeder cables, the Contractor shall arrange the distribution system from dual service to single service. In the event that service interruptions cannot be accomplished by supplying single line utility service, the Contractor shall provide reliable and adequate capacity generators including all temporary connections, secondary distribution equipment, disconnections, cables, safety devices and fuel unless otherwise noted. The use of temporary transformers and substation equipment will be considered by the RPR.

**e.** Shutdown times must be minimized where entire building or sections of buildings are to be shut down. Shut down periods shall occur between 0100 and 0500 hours. On site generators will be necessary in areas where facilities are out of service for more than ½ hour. All switching and change-overs will be performed by the Contractor and witnessed by the RPR. Coordination of all service interruptions will be performed by the RPR.

**f.** Contractor shall perform all work involving service interruptions at times designated by the RPR or at night and/or Saturday or Sunday. No allowances will be made by the Owner for overtime labor

costs.

**g.** Where Contractor interrupts any electrical or other service due to damaging equipment or cable through their negligence, they shall be required to repair or replace the equipment or cable immediately, working continuously to restore service until satisfactory to the RPR. Repair, replacement or both shall be at the discretion of the RPR and at the expense of the Contractor.

**h.** Contractor shall note that the Airport shall be occupied and in use during the construction period. Contractor shall not disturb continuity of service to any area without the written approval and agreement as to time and duration of such interruption. Contractor shall perform any of this work at any time without extra cost to owner.

**i.** Contractor shall fully examine all areas of demolition in this contract. Contractor shall identify all services related to its trades. Contractor shall provide protection of such service to prevent disruption of service. Contractor shall reroute all services to remain as required to approved locations without extra cost to the Owner.

**100-3.5 Codes and Fees.** Install in accordance with latest edition of FAA Advisory Circulars, the National Electrical Code and the regulations of governing Federal, State, County, local and other applicable codes, including the Utilities Company. Where a conflict in code requirements occurs the most stringent requirement shall govern. The Contractor shall be responsible and pay all required licenses, fees and inspections including meter installation fee. The cost for such shall be included in the bid price.

The work shall meet the requirements and recommendations of applicable portions of the latest editions of these standards:

- a.** National Electrical Code (NFPA 70)
- b.** Life Safety Code (NFPA 101)
- c.** National Electrical Safety Code (ANSI C2)
- d.** NEMA Standards (NEMA)
- e.** Underwriter's Laboratories (UL)
- f.** Institute of Electrical and Electronics Engineers (IEEE)
- g.** Lightning Protection Code (NFPA) 780 and UL 96A)
- h.** AWS D1.1
- i.** ANSI
- j.** NFPA
- k.** Federal Aviation Administration Advisory Circulars (AC)
- l.** Applicable Local Building Code
- m.** Certified Ballast Manufacturers (CBM)

The above is not all inclusive of applicable codes and standards, but is presented for the Contractors convenience.

**100-3.6 Standards.** All materials shall be new and free of defects and shall be U.L. listed, bear the U.L. label or be labeled or listed with an approved, nationally recognized Electrical Testing Agency. Where no

labeling or listing service is available for certain types of equipment, test data shall be submitted to prove to the RPR that equipment meets or exceeds available standards. All listed, labeled or approved material shall be used only for the intended purpose.

**100-3.7 Utility Company Fees, Charges, Costs.** It is the Contractor's responsibility to contact the applicable Utility Company(s) to determine if any fees, charges or costs will be due the Utility Company(s) as required by the Utility Company(s) for temporary power, installations, hook-ups, etc. The associated fee, charge or cost for each utility shall be included in the Contractor's bid price.

**100-3.8 Tests.** Systems shall be tested by the Contractor and placed in proper working order prior to demonstrating systems to the Owner. Refer to the requirements in each section for other applicable standards.

After work is completed a load balance test shall be made, as required, to demonstrate that with full lighting and mechanical load the balance between phases is within 5%. Unbalance beyond this limit shall be corrected.

System ground and lightning protection system ground shall be tested, as required, to demonstrate that the ground resistance does not exceed twenty-five (25) ohms per ground rod. All testing shall be done by methods approved by the RPR and prior to the connection of the grounding conductors.

Perform such tests as required by any Authorities having jurisdiction over the site.

Testing methods shall be acceptable to the RPR and shall be submitted to the RPR for review, a minimum of thirty (30) days prior to the scheduled test.

## IDENTIFICATION

**100-3.9 Laminated Phenolic Plastic Nameplates.** The Contractor shall provide nameplates for wiring systems and equipment as called for herein. All nameplates shall have beveled edges and one-half inch (1/2") lettering. If equipment is smaller than ten inches by six inches (10"x 6"), one-quarter inch (1/4") lettering may be used. Smaller lettering may be used with permission of the RPR.

Nameplates shall be laminated phenolic plastic, black front and back with white core, with lettering etched through the outer covering. White engraved letters on black background. Emergency systems shall use red front and back with white core for nameplates. Attach nameplates with 4-40 stainless steel self tapping screws. Where conditions do not warrant piercing the enclosure "LOCTITE" brand adhesive or approved equal may be used with permission of the RPR.

The following items shall be equipped with nameplates: all constant current regulators, pushbutton stations, control panels, system cabinets, terminal cabinets, disconnect switches, panelboards, circuit breakers, contactors or relays in separate enclosures, high voltage boxes and cabinets whether existing or planned by these specifications. Special electrical systems shall be identified at junction and pull boxes, terminal cabinets and equipment racks. Junction boxes shall comply with paragraph 100-3.10, Junction/Pull Box Color Code.

Nameplates shall adequately describe the function of the particular equipment involved. Where nameplates are detailed on the drawings, inscription and size of letters shall be as shown and shop drawing submitted for approval. Nameplates for panelboards and switchboards shall include the panel designation, panel name, circuit designation source of power and voltage and phase of the supply. For example, "Equip YY, Panel A, CKT XX fed from Panel XYZ, 480/277V, 3-phase, 4-wire." The name of the machine on the nameplates for a particular machine shall be the same as the one used on all motor starters, disconnects and pull box station nameplates for that machine. Nameplates shall include as a minimum the following:

- a. Equipment Number
- b. Equipment Name

- c. Power Source w/Circuit Designation
- d. Voltage Level and number of phases

All major pull and junction boxes in service areas, tunnels, above accessible ceilings and in accessible chases shall have nameplates identifying the feeder or system.

Systems with conductors exceeding 100 volts to ground shall have voltage identification nameplates with one-half inch (1/2") high letters on all panels, switches, pull boxes and junction boxes.

**100-3.10 Adhesive Backed Cloth Markers.** All raceways containing conductors exceeding 150 volts to ground shall have adhesive backed cloth/vinyl markers installed at each end and every thirty feet (30') in between identifying the voltage level (Example: "480 VOLTS"). If the conduit is less than ten feet (10') in length one marker is acceptable. The markers shall be installed so they are visible from floors and walkways. Normal power system shall use black letters, emergency systems shall use red letters.

The markers shall be "Brady" brand or approved equal with one-half inch (1/2") letters.

The markers shall be suitable for the environmental conditions encountered.

**100-3.11 Junction/Pull Box Color Code.** Circuit numbers and circuit identification shall be printed on junction box and pull box covers using ink markers and shall be plainly visible after paint is applied. The entire box and cover shall be color coded as listed below:

<u>Color Code for Junction Boxes</u>	<u>Krylon</u>	<u>Color &amp; Paint # Or Approved Equal</u>
Normal Power 480/277 Volt	Brown	2501-6
Normal Power 208/120 Volt	Black	1601-6

**100-3.12 Concrete Work.** Concrete bases and pads for all equipment furnished by the Contractor shall be the responsibility of the Contractor unless noted otherwise.

The Contractor shall furnish all equipment anchor bolts and shall be responsible for their proper installation and accurate location.

**100-3.13 Excavating, Trenching And Backfilling.** The Contractor shall do excavating necessary for light bases, underground wiring, conduit and ductbanks and shall backfill trenches and excavations after work has been inspected. Care shall be taken in excavating that walls and footings and adjacent load bearing soils are not disturbed in any way, except where lines must cross under a wall footing. Where a line must pass under a footing, the crossing shall be made by the smallest possible trench to accommodate the conduit. Excavations shall be kept free from water. No greater length of trench shall be left open in advance of conduit laying than that which is authorized or directed by the RPR.

Roots shall be removed to a level of eighteen (18") below furnished grades and deeper as required for duct runs, manholes and light pole bases. No roots shall be allowed to remain under the work.

Backfill about the structures shall be placed, where practical, as the work of construction progresses. Backfilling on or against concrete work shall be done only when directed. Backfilling of duct lines shall progress as rapidly as the testing and acceptance of the finished sections of the work will permit and shall be carried to a crown approximately six inches (6") above the existing grades. In backfilling around duct lines, selected material shall be compacted firmly around the duct. Fill and backfill shall be clean and free from vegetable matter and refuse.

All trenches and other excavation left open by necessity shall be barricaded and guarded as required by OSHA or applicable codes and regulations.



**100-3.14 Welding.** All welding and weld procedures shall be in accordance with AWS D1.1, Latest Edition. Qualifications of welders and welding operators shall be in accordance with AWS D1.1, Latest Edition. The welder qualification test shall be performed on a 1" A-36 Test Coupon in the 3G and 4G positions. The welder qualification shall be current within 12 months of the work being performed. Weld inspections shall be per the criteria set forth in AWS D1.1 for visual weld inspection.

## **DESIGNATION OF MATERIALS**

**100-4.1 Criterion Designation Of Materials And Equipment.** Where a criterion specification is designated for any material or equipment to be installed by the name or catalog number of one specific manufacturer, such designation is intended only for the purpose of establishing the style, quality, performance characteristics, etc., and is not intended to limit acceptability of competitive products. Products of other manufacturers which are approved by the RPR as similar and equal will be equally acceptable unless specifically otherwise stated.

Where equipment or materials are specified by the use of the name and catalog number of more than one manufacturer, that equipment or material shall be one of those specified. No alternative will be acceptable.

Where no brand name is specified, the source and quality shall be subject to the RPR's review and acceptance.

When a product is specified to be in accordance with a trade association or government standard, at the request of the RPR, the Contractor shall furnish a certificate that the product complies with the referenced standard. Upon request of the RPR, the Contractor shall submit supporting test data to substantiate compliance.

The RPR shall be the sole judge of whether the proposed "or equal" is suitable for use in the work.

Each Bidder represents their bid is based upon the materials and equipment described in these specifications. Substitutions will not be considered unless a written request has been submitted to the RPR in accordance with Item L-106, Submittals, Record Documents and Maintenance Manuals.

If the Contractor desires to use a method or type of equipment other than specified in the contract documents, a written request therefore shall be made to the RPR. If approval is given, the Contractor will not be excused from producing work in conformity with contract requirements. If a trial use establishes that work does not meet the contract requirements, the Contractor shall take such action as the RPR determines necessary to correct any deficiency in the work. No change in contract time will be made as a result of changes made under this Subparagraph. By making a request for substitution, the Contractor:

- a.** Represents that it has personally investigated the proposed substitution and determined the proposed substitution equal or superior in all respects to the specified method or equipment;
- b.** Represents that it will provide a warranty for the substitution identical in all respects to the warranty for the specified method or equipment;
- c.** Represents that it will coordinate the installation of the accepted substitute, making changes as may be required for the work to be complete in all respects at no additional cost to the Owner.

## **PROTECTION OF MATERIALS, EQUIPMENT AND WORK**

**100-5.1 Requirement For The Protection Of Materials, Equipment And Work.** Materials shall be stored so as to assure the preservation of their quality and fitness for the work. Stored materials, even though approved before storage, shall be subject to reinspection prior to their use in the work. The Contractor shall coordinate the storage of all materials with the Owner and the RPR.

Owner-furnished materials, if any, shall be made available to the Contractor at the location specified herein.

All costs of handling, transportation from the specified location to the site of the work, storage and installation of Owner-furnished materials shall be included in the Total Contract Price. All risk of loss or damage to Owner-furnished materials shall pass to the Contractor after delivery of said material to the site of the work. The Owner shall be entitled to deduct from any monies due or to become due to the Contractor any cost incurred by the Owner resulting directly or indirectly from a loss caused in whole or in part by the Contractor's handling, storage or use of Owner-furnished materials.

The Contractor shall protect electrical raceway, cables of any sort, lighting fixtures and associated support systems against damage from movement of equipment and material, welding, flame cutting, and other construction damage. Raceways and supporting structures for raceway and lighting fixtures shall not be used as access scaffolding at any time. Whenever welding or flame cutting operations occur above or near raceways, cables or lighting fixtures not shielded from such operations by concrete floor or other protective covers, the Contractor shall protect the raceways, cables, and lighting fixtures from damage by means of fireproof boards or blankets. Damaged materials shall be repaired or replaced, by and at the Contractor's expense, subject to the RPR's direction and acceptance.

Surfaces of most equipment, such as panels, switchgear, transformers, constant current regulators and circuit breakers, are finished at the factory. Great care shall be exercised to prevent damage to this original finish during installation of the equipment and during construction work.

If the factory finish is damaged during the course of construction, the entire surface of the damaged component shall be refinished or replaced by and at the expense of the Contractor.

The refinished surface shall be equivalent in every respect to the original surface, including color, texture and smoothness. Refinishing paint, if furnished with the equipment, may be used; otherwise, the paint shall be obtained from the equipment manufacturer.

All cut edges of galvanized materials and marred or scratched galvanized surfaces shall be repaired using LPS-1G cold galvanizing compound or approved equal.

All threaded conduit joints shall use T&B Kopr-shield or Aluma-Shield or approved equal for galvanized and aluminum conduits respectively, as joint compound.

## **GENERAL CONSTRUCTION REQUIREMENTS**

**100-6.1 Additional Requirements.** Provide the bracing, shoring, rails, guards, and covers necessary to prevent damage or injury. Do not leave energized electrical items unnecessarily exposed or unprotected. Protect personnel from exposure to contact with electricity. Deliver equipment and materials to the job site in their original, unopened, labeled containers. Store ferrous materials so as to prevent rusting. Store finished materials and equipment so as to prevent staining and discoloring.

All materials stored prior to installation, shall be stored in a bonded and secured facility.

All sheeting, shoring, dewatering and cleaning necessary to keep trenches and their grades in proper condition for the work to be carried on, including the removal of water by mechanical means, shall be the Contractor's responsibility.

## **METHOD OF MEASUREMENT**

**100-7.1** The items described in this section are incidental to other sections and shall not be measured for payment.

## **BASIS OF PAYMENT**

**100-8.1** No direct payment shall be made for the work described in this specification. The work described in this specification is incidental to other items and shall be paid for in the respective bid item of which it is a component part.

**Request for Information  
Supplemental Instruction**

To: \_\_\_\_\_  
From: \_\_\_\_\_

**RFI - 000**

Date: \_\_\_\_\_

Project: \_\_\_\_\_  
\_\_\_\_\_

AEP File No: 000-0000-000

Reference:

Contract Drawing: \_\_\_\_\_

Shop Drawing: \_\_\_\_\_

Specification: \_\_\_\_\_

Other: \_\_\_\_\_

Subject:

Description:

By: \_\_\_\_\_

Reply:

Answered By: \_\_\_\_\_ 0/00/00  
Date

Cc:

**APPENDIX A  
FIGURE 1**

**END OF ITEM L-100**

## ITEM L-104 GENERAL ELECTRICAL SAFETY REQUIREMENTS AND TEMPORARY AIRFIELD LIGHTING

**104-1.1 Purpose.** The purpose of this item is to establish the proper safety guidelines necessary to protect aircraft, passengers, crews, the general public, all workers and vehicles involved in their daily tasks. The Contractor is solely responsible for all issues related to the safety program and guidelines and implementation of such programs and guidelines necessary to protect aircraft, passengers, crews, the general public, all workers and vehicles involved in their daily tasks.

**104-1.2 FAA Advisory Circulars.** All applicable requirements of the below listed Advisory Circulars, latest edition, standards and related reading shall be complied with:

150/5200-18	Airport Safety Self-Inspection (Latest Edition)
150/5210-5	Painting, Marking and Lighting of Vehicles used on an Airport (Latest Edition)
150/5340-18	Standards for Airport Sign Systems (Latest Edition)
150/5340-26	Maintenance of Airport Visual Aid Facilities. (Latest Edition)
150/5340-30	Design and Installation Details for Airport Visual Aids (Latest Edition)
150/5370-2	Operational Safety on Airports during construction (Latest Edition)
Occupational Safety and Health Standards for the construction industry 29 CFR Part 1926/1910	
ANSI C2	National Electrical Safety Code (Latest Edition)
NFPA 70	National Electrical Code (Latest Edition)
NFPA 70E	Standard for Electrical Safety Requirements for Employee Work Places (Latest Edition)

The Contractor is responsible for obtaining and using the latest edition of the referenced FAA Advisory Circulars and related standards. This list is not all inclusive but is offered as a convenience to the Contractor.

**104-1.3 General Safety Provisions.** The Contractor shall take safety and health measures in performing work under this contract. The Contractor shall meet with the Resident Project Representative (RPR) to develop a mutual understanding relative to administration of the safety requirements. The Contractor is subject to applicable federal, state and local laws, regulations, ordinances, codes and orders relating to **safety** and health in effect on the date of this contract. Attention is invited to the regulations issued by the Secretary of Labor pursuant to the Contract Work Hours and Safety Standards Act and the Safety and Health Regulations for construction. The Contractor shall comply with the Secretary's Regulations as applicable and shall comply with specific requirements stated.

As a minimum, work place safety shall comply with NFPA 70E Standard for Electrical Safety Requirements for Employee Work Places, OSHA, federal, state and local requirements. Where a conflict in code requirements occurs the most stringent requirement shall govern.

During the performance of work under this contract, the Contractor shall comply with procedures prescribed

for control and safety of persons visiting the project site.

The Contractor is responsible for his personnel and for familiarizing each of his subcontractors with safety requirements.

The Contractor shall advise the RPR of any special safety restrictions he has established so that the Owner personnel can be notified of these restrictions.

**104-1.4 Fire Prevention And Protection.** All tools producing sparks or heat, open-flame heating devices, or operations utilizing such devices, etc., shall be in accordance with the local Fire Department and the Owner's Burn Permit procedures. Work shall not start until all requirements of the Burn Permit procedures are met.

Open-flame heating devices will not be permitted except by approval in writing. Such permission will not be granted unless the Contractor has taken reasonable precautions to make such devices safe. Burning trash, brush or wood on the project site will not be permitted. Approval for use of open fires and open-flame heating devices will in no way relieve the Contractor from the responsibility for any damage incurred because of fires.

Flammable liquids shall be stored and handled in accordance with the Flammable and Combustible Liquids Code, NFPA 30.

Open fires and salamanders will not be permitted in construction areas.

Smoking will not be permitted within the Air Operations Area (AOA) and in areas such as paint storage, fuel storage, and posted no smoking areas.

Welding, flame cutting, melting and other such operations in all operating areas, shall not be permitted until approved at the beginning of each workday by the RPR. The RPR may approve longer periods of time for welding and burning in some operating areas if the detailed safety procedures are established beforehand. Operating open flame devices shall not be left unattended in any area.

The Contractor shall provide the necessary firefighting equipment and fire prevention methods and, before operations begin, clear all welding and cutting operations with the RPR.

A Contractor's employee shall be assigned as fire watch for every welding and burning operation. He shall be equipped with 2 full 15 pound carbon dioxide fire extinguishers and shall check all areas around and below the welding or burning operation for fires. He shall continue this check for at least 60 minutes after the completion of the welding or burning operation.

The Contractor shall discontinue all burning, welding, or cutting operations, one hour prior to the end of the normal work day. The Contractor shall provide a workman to remain at the site for one hour after discontinuing these operations. This workman shall make a thorough inspection of the area for possible sources of latent combustion. Any unsafe conditions shall be corrected.

During operations involving possible fire hazard, the Contractor shall notify the RPR and not proceed until clearance is obtained in writing. The RPR may request a standby from the Aircraft Rescue and Firefighting (ARFF). However, this does not relieve the Contractor of his responsibility for welding and cutting safety.

**104-1.5 Temporary Exits And Entrances.** Such passageways shall provide adequate fire protection and safety of Owner personnel and representatives.

**104-1.6 Switching.** Electrical switching required for clearance to work on equipment operating from electrical circuits will be performed only by Owner personnel authorized as safety operators for the specific

equipment unless otherwise authorized in writing by the RPR.

**104-1.7 Removal Of Equipment.** When permanently removing equipment, the electrical wiring, conduit and control boxes shall be removed to the source of feed, unless otherwise specified or indicated.

After equipment has been removed, the electrical wiring diagrams, schematics, etc., shall be marked to show the change.

Conduit not removed shall have a pull string installed.

**104-1.8 Other Safety Requirements.** Temporary wiring shall comply with NEC. Indiscriminate use of extension cords, portable cable or junction boxes creating tripping hazards as well as overloaded circuits will not be permitted.

Unplug portable electrical hand tools when not in use. Inadvertent operation of equipment can take place if it is left plugged into an energized receptacle.

Before maintaining or repairing any electrical equipment, it shall be disconnected from the power source.

Do not use any equipment that has frayed cords or three-wire plugs that have had the grounding prongs removed. Faulty equipment and tools shall be repaired by qualified electrical personnel.

Do not use metal ladders when working on electrical equipment.

## EXCAVATION

**104-2.1 Excavation Operations.** Methods of excavation, means of earth support, and manner of backfill shall be conducted with consideration for the safety of persons and work, and prevention of damage to adjacent pavement, utilities, structures and other facilities, due to settlement, lateral movement, undermining and washout. Excavation shall be performed in a manner to prevent surface water and subsurface or ground water from flowing into excavations, and to prevent water from flooding conduit trench and adjacent or surrounding area.

The Contractor and all his subcontractors performing trench excavation on this contract shall comply with the State Trench Safety Act in which the project is occurring and the Occupational Safety and Health Administration's (OSHA) trench excavation safety standards, 29 C.F.R., subpart P, s.1926.650, including all subsequent revisions or updates to these standards as adopted by the Department of Labor and Employment Security (DLES). The Contractor shall consider all available geotechnical information in his design of the trench excavation safety system. Inspections required by OSHA trench excavation safety standards shall be provided by the Contractor.

## PROTECTION OF WORK

**104-3.1 Protection Of Work.** Provide adequate stand-by mechanical equipment for emergency use.

Excavations shall have substantial barricades and be posted with warning signs for the safety of persons. Warning lights shall be provided during hours of darkness.

Barricades shall be erected immediately around manhole openings when covers are removed or opened. For personnel safety and to prevent possible interruption of major utility services encountered during excavation, the following procedures shall be followed:

- a. Prior to performing any excavation work or any surface penetrations 6-inches or deeper (such

as driving stakes more than 6-inches in the ground) on any ground surface, the Contractor shall obtain from the RPR, local utilities, etc., the current up-to-date subsurface utility drawing of the particular area to be worked on.

**b.** All Agencies/Utilities, etc. that may be affected by the excavating shall be contacted by the Contractor so that all lines, pipes, etc., can be marked/staked.

**c.** The Contractor shall stake out all subsurface utilities i.e., high voltage cables, communication cables, pipe lines, etc., indicated within the scope of the work contemplated. All subsurface utilities shall be located by hand digging; hand digging shall extend for 5-feet on both sides of the subsurface utility.

**d.** After hand exposure of cable or pipelines, the Contractor shall obtain agreement from the RPR, Agency/Utility on how much closer to cable or pipe the excavations can be permitted.

**e.** Detectable marker tape, with metalized foil core, printed with the words "CAUTION ELECTRIC LINE BELOW," "CAUTION COMMUNICATIONS LINE BELOW," "CAUTION WATER LINE BELOW," "CAUTION SEWER LINE BELOW," etc., as applicable, shall be installed 8-inches below grade over the underground utility. Tape shall be in accordance with Item L-108, Installation of Underground Cable for Airports.

**f.** The Contractor shall notify the RPR, 72 hours prior to the start of excavation work or surface penetration, to enable the RPR to review measures being taken to prevent hazard to employees and to prevent possible damage to subsurface utilities. Where emergency conditions preclude the 72 hours advance notification, the Contractor shall nevertheless inform the RPR of his intention to initiate work.

**g.** After all existing utilities have been located and marked or staked, the Contractor shall proceed with excavating work, or other surface penetration work. The Contractor however, shall temporarily halt any machine excavation work or other surface penetration when approaching within 5-feet of the staked out subsurface utility until the Contractor has hand excavated down to expose the utility to exactly fix its location.

**h.** No digging, dirt moving, or other heavy equipment shall enter physically any approved construction area before all utilities have been located and properly staked out. It is the Contractor's responsibility to locate all utilities before digging, sawing, coring, boring, etc.. Any damage caused by digging, sawing, boring, coring, etc., is the Contractor's responsibility for repair. Any damage must be reported immediately to the RPR. No repair shall be attempted without approval.

**i.** All high voltage cables shall be disconnected before excavation is attempted.

**j.** To protect subsurface utilities, provide as a minimum, a 1-inch thick steel plate cover over electrical duct, cables and other subsurface utilities when heavy equipment is being used in the area.

**k.** The requirements listed above shall be considered incidental to the item for which the excavation is required.

## **SAFETY TAGGING AND LOCKOUT**

**104-4.1 Safety With Electrical Circuits And Equipment.** No work may be performed on an energized circuit, unless there is no alternative method for accomplishing the work. No one may work on an energized circuit without written permission from the Contractor's project manager. The Contractor's project manager shall review the circumstances and the necessary safety precautions with the RPR prior to giving permission for the "hot" work. The Contractor assumes all liability in connection with any work on energized circuits.



No one may disconnect or cause to be disconnected any electrical circuit before permission is requested from and granted by Airport Operations or their authorized representative through the RPR.

Identification markings on building light and power distribution circuits shall not be relied on for established safe work conditions. Always verify the proper safe "deenergized" conditions with properly operating test equipment.

Before any circuit supplying radar, ILS, weather, VORTAC, airport beacon, runway/taxiway lighting equipment or any other equipment is disconnected, permission must first be granted by Airport Operations or their authorized representative, and, if applicable, FAA Airways Facilities Office.

Work shall not commence on any circuit until:

a. The circuit is correctly identified in the presence of the electrical contractor's superintendent or foreman, the RPR, Airport Operations, or their authorized representative.

b. After identity of the circuit is established, and the circuit disconnected, the time and date shall be recorded by the RPR.

c. The switch shall be locked in the open position or opened in a manner, which will prevent accidental restoration.

d. The circuit shall be tagged with an approved warning tag by the electrical contractor's superintendent. The tag shall state, the company's name, the electrician's name responsible for the disconnection, date and time and the project name and project number.

Restoration shall be accomplished and tags removed only by the electrical contractor's superintendent in the presence of Airport Operations, or their authorized representative.

The RPR shall record time, date and operational status of circuit after restoration.

No circuit shall be disconnected or unplugged before color code identification by taping.

No circuit shall be disconnected at power source before proper safety precautions are taken to prevent accidental restoration.

When possible, circuits shall be restored by the same person who disconnected the circuit. When not possible, Airport Operations or their authorized representative shall perform restoration.

e. As a minimum, the Lock/Tag/Try procedure shall comply with NFPA 70E and the Owner's requirements.

## **TEMPORARY AIRFIELD LIGHTING**

**104-4.2 Temporary Airfield Lighting.** Temporary electrical fixtures and conductors are allowable when necessary, but shall be installed as follows:

a. Where temporary lights are to be installed on a paved surface, temporary lights shall be bolted to the pavement in a manner rendering the light stationery and allowing space for conductors to enter or exit and to be spliced.

b. When the above is not practical, lights shall be fastened to a weighted object adaptable for the

purpose and of sufficient weight to inhibit movement by jet engine blast.

**c.** Temporary conductors supplying temporary lights shall be installed in a rigid galvanized steel conduit system and secured every five feet to prevent movement by jet engine blast.

**d.** All joints or splices in temporary conductors shall have heat shrink tubing with integral sealant applied to secure mechanical and electrical connection and prevent water entry.

**e.** All plug-in connections shall have heat shrink tubing with integral sealant applied to prevent accidental disconnection and shall be color code taped to expedite quick, efficient disconnection and restoration.

**f.** Temporary airfield lighting and signage shall conform as closely as possible to permanent locations normally on the taxiway or runway and that shall guide aircraft in a safe path away from all possible accident-prone areas.

The Contractor shall provide four sets of marked-up, 'As-Built' temporary lighting plans to the RPR prior to final temporary lighting and signage connections.

Closed taxiways and runways shall be so marked in a manner acceptable to FAA and the Owner and said marking shall be kept in acceptable condition. This item shall include, at the RPR's discretion the temporary removal or covering of airfield signage.

**CAUTION:** The series lighting circuit must always be complete before a regulator is energized. Normal circuit voltage is less than 5,000 volts, open circuit voltage can be more than 10,000 volts. All personnel shall be instructed to protect the integrity of the lighting circuit. Turn off, lock out and tag the constant current regulator at the vault before opening the circuit. Continuity of the circuit shall be checked before the regulator is reconnected and reenergized.

The installation and/or removal of lighting equipment may be critical to airport operations; therefore, the Contractor shall follow work schedules established in the plans and specifications or as directed by the RPR. The temporary system shall be installed in accordance with the contract documents, FAA Advisory Circulars and if applicable the National Electrical Code and/or local code requirements.

The Contractor shall provide temporary wiring as required to reconnect existing airfield lighting and signage to provide guidance for aircraft to pass through the construction areas on those taxiways/runways, which must remain open. The temporary cable installations shall be direct earth buried and may be installed by cable plow without counterpoise. The cable plow may be used for temporary jumper cable installations only.

It shall be the Contractor's responsibility to determine that all airfield lighting circuits, except those that are serving closed taxiways or runways, are completely operational, using tower controls (if applicable), at the end of each work shift and shall so certify to the RPR before leaving the work site. Day shift report of system operation shall be at 4 p.m. Second shift report shall be 1 hour before dark. Any other shift shall report 1 hour prior to the need for airfield lighting or as determined by the RPR. Should bad weather cause poor visibility, the RPR may require additional status reports of system operability and may call for the operation of the lighting system at any time. In the event of lighting system failure, the Contractor shall immediately take the necessary steps to restore proper operation.

Whenever the scope of work requires connection to an existing circuit, the circuit's insulation resistance shall be tested, in the presence of the RPR. This test shall be performed prior to any activity affecting the respective circuit. The Contractor shall record the results on the forms included in Item L-131 Demonstrations, Tests and Performance Verification. When the circuit is returned to its final condition, the circuit's insulation resistance shall be checked again in the presence of the RPR. The Contractor shall record the results on the forms included in Item L-131. The second reading shall be equal to or greater

than the first reading or the Contractor shall make the necessary repairs, to the 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, etc. if necessary, shall be borne by the Contractor. All test results shall be submitted in the Operation and Maintenance Manuals, see Item L-106, Submittals, Record Documents and Maintenance Manuals.

## **TEMPORARY AREA/BUILDING LIGHTING**

**104-4.3 Temporary Electrical And Lighting Installation.** Temporary electrical and/or lighting fixtures shall be provided in operational areas of buildings, where required, to maintain public safety and continued airport operations.

Temporary lighting must be installed to ANSI/OSHA standards for impacted area.

Temporary installations shall be approved by Airport Operations or their authorized representative.

The cost of temporary area/building lighting shall be absorbed in and considered incidental to the various work items.

**104-4.4 Miscellaneous Regulations.** Draw-out type breakers, regardless of operating voltage must be drawn completely out to open position and tagged and locked out per 104-4.1.

In hazardous locations, regardless of class, all electrical tools and extension cords shall be of a type approved for use in such areas.

No counterpoise conductors (or any other conductors) may be joined, connected, or affixed to any terminal, grounding electrode, or other point or attachment by any method except those approved by the RPR.

All counterpoise or grounding systems, when severed or damaged, shall be immediately repaired by the Contractor in accordance with Item L-108, Installation of Underground Cable for Airports and inspected by the RPR.

No high voltage switch shall be engaged or disengaged under load.

All backhoes, cranes, etc., shall be enclosed by safety pylons or other approved markers and rope festooned between the pylons, where applicable.

All security gates in use by contractors are the responsibility of the Contractor, and must be used in a fully secure manner. Any damage to a security gate shall be reported immediately to the RPR.

## **METHOD OF MEASUREMENT**

**104-5.1** This item includes all materials, labor, transportation incidentals and services required for the temporary airfield lighting and signage jumper cable installation to maintain continuity of existing circuits outside project limits, as shown on the plans, complete and in place, and accepted by the RPR.

## **BASIS OF PAYMENT**

**104-6.1** Work of this item shall include temporary airfield lighting cables, equipment, and installation, but shall not be limited to, light fixture assemblies with anchor plates, conduit, cabling, sandbags, anchor bolts, connector kits, mounting hardware, tags, ground rods, grounding connections and terminations, phasing and coordination, and all labor, equipment, tools and incidentals necessary to complete in place the item in accordance with these specifications and as indicated on the drawings. Payment shall be made at the contract lump sum price.

Payment will be made under:

Item L-104-1                      Miscellaneous Temporary Airfield Lighting – per lump sum

**END OF ITEM L-104**

## ITEM L-105 ALTERATIONS, REMOVAL AND DEMOLITION

### GENERAL

**105-1.1 Definitions.** Removal shall mean the dismantling of existing materials, components, equipment, and utilities. Removed items shall be handled, prepared for storage, transported to storage areas as specified.

Demolition shall mean the dismantling and disposal of existing materials, components, equipment, and utilities which cannot or will not be reused or which will have no salvage value, or which cannot be reused due to unrepairable damage caused by age, non-demolition related reasons, etc. All demolished items not designated to be turned over to the Owner shall be disposed of in a safe manner and at a location acceptable to the Owner.

All items to be turned over to the Owner shall be properly enclosed or boxed to protect the items from damage and transported by the Contractor to a location on the Owner's property, designated by the Resident Project Representative (RPR).

The installation and/or removal of lighting equipment may be critical to airport operations; therefore, the Contractor shall follow the work schedule established in the plans and specifications or as directed by the RPR. The system shall be installed in accordance with the National Electrical Code and/or local code requirements.

The Contractor shall provide temporary wiring as required to reconnect existing circuits to provide guidance for aircraft to pass through the construction areas on those taxiways/runways which must remain open. The Contractor shall check all temporary circuits before dark each day to assure that they are operational. In the event of failure, the Contractor shall immediately take steps to restore operation.

**105-1.2 Condition Of Existing Facilities.** The Contractor shall verify the areas, conditions, and features necessary to tie into existing construction. This verification shall be done prior to submittal of shop drawings, fabrication or erection, construction or installation. The Contractor shall be responsible for the accurate tie-in of the new work to existing facilities.

Special attention is called to the fact that there may be piping, fixtures or other items in the existing systems which must be removed or relocated in order to perform the alteration work. All conduit, wiring, boxes, etc., that do not comply with these specifications shall be removed or corrected to comply with these specifications. All unused conduit not removed shall be identified and a pull line shall be installed. The work shall include all removal and relocation required for completion of the alterations and the new construction.

Whenever the scope of work require connection to an existing circuit, the circuit's insulation resistance shall be tested, in the presence of the Owner and RPR within 21-days of NTP. The Contractor shall record the results on the forms included in these specifications. When the circuit is returned to its final condition, the circuit's insulation resistance shall be checked again in the presence of the Owner and RPR. The Contractor shall record the results on the forms included in these specifications. The second reading shall be equal to or greater than the first reading or the Contractor shall make the necessary repairs to the circuit to bring the second reading above the first reading. All repair costs including a complete replacement of the cable, if necessary, shall be borne by the Contractor. All test results shall be submitted in the Operation and Maintenance Manuals as described in Item L-106, Submittals, Record Documents and Maintenance Manuals.

**105-1.3 Occupancy And Use Of Existing Facilities.** The Owner will occupy and use the facilities within the areas of work during the entire construction period. The Contractor shall be required to plan and coordinate his activities in order to provide all necessary controls for the abatement of dust, noise, and inconvenience to the Owner personnel during all phases of the work.

**105-1.4 Vacating Occupied Areas.** The Owner will remove all portable items of furniture, equipment, and fixtures prior to the start of work.

**105-1.5 Safety Requirements.** The Contractor shall conduct alterations and removal operations in a manner that will ensure the safety of persons in accordance with the requirements of CFR 29 PART 1926 and 1910.

**105-1.6 Classification Of Removed/Demolished Items.** Existing materials and equipment indicated to be removed will be classified as "salvageable" and shall remain the property of the Owner or will be classified as "debris" and shall be disposed of legally off the airport.

Reusable salvaged items:

Salvaged materials and equipment shall be reused in the work as described on the contract drawings, unless noted otherwise.

Items classified as debris shall be legally disposed of off the airport property. The cost of such disposal shall be included in the cost of other items of work.

Retained salvaged items:

Salvaged materials and equipment to be retained by the Owner but not reused in the work shall be turned over to the Owner at a site at the facility to be determined by the Owner. Retained salvaged items shall be stored on Owner property where indicated by the Owner.

**105-1.7 Temporary Protection.** The Contractor shall provide and maintain the following requirements.

Protection of persons and property shall be provided throughout the progress of the work in accordance with these specifications.

Provide temporary enclosures and partitions prior to starting alterations and removal of work. Such items shall protect existing materials, equipment, and other remaining building or system components from damage by weather and construction operations.

Provide temporary enclosures to isolate space utilized by equipment during construction, from dirt, dust, noise, and unauthorized entry.

Provide temporary exits, entrances, and protected passages where work prevents the use of existing facilities.

Provide weathertight temporary enclosures over and around openings to be made in existing exterior construction prior to the start of work. The Contractor shall maintain such temporary enclosures until new construction will protect the interior of existing facilities from the elements.

Provide temporary exterior wall construction which will be designed and fabricated to resist an applied horizontal wind pressure of not less than 130 mph.

Provide temporary exterior roof construction which will be capable of supporting an applied vertical live load of not less than 200 psf, uniformly distributed over the entire roof area.

Design and fabricate temporary enclosures to maintain temperatures inside the existing facilities within a range of plus-or-minus 5 degrees F of normal operating conditions.

Provide temporary jet blast structures which will withstand the jet blast with a safety factor of 2.

## EXECUTION

**105-2.1 Disconnecting Utilities.** Prior to the start of work, the necessary utilities serving each area of alteration or removal will be shut off by the Owner and shall be disconnected and sealed by the Contractor, as required. Lockout/Tag/Try procedures shall be utilized in accordance with Item L-104, General Electrical Safety Requirements and Temporary Airfield Lighting.

**105-2.2 Temporary Utility Services.** The Contractor shall install temporary utility services in satisfactory operating condition before disconnecting existing utilities. Such temporary services shall be maintained during the period of construction and removed only after new permanent services have been tested and are in operation.

**105-2.3 Removal Work.** The Contractor shall not disturb the existing construction beyond that indicated or necessary for installation of new work. Temporary shoring and bracing for support of building components to prevent settlement or other movement shall be as indicated and as required to protect the work.

The Contractor shall provide protective measures to control accumulation and migration of dust and dirt in all areas of work, particularly those adjacent to occupied areas. The Contractor shall remove dust, dirt, and debris from the areas of work daily.

**105-2.4 Salvageable Materials And Equipment.** The Contractor shall remove all salvageable materials and equipment in a manner that will cause the least possible damage thereto. Removed items which are to be retained by the Owner shall be carefully handled, stored, and protected.

The Contractor shall provide identification tags on all items boxed or placed in containers, indicating the type, size, and quantity of materials.

**105-2.5 Buildings And Structures.** The Contractor shall perform removal operations in existing buildings as indicated and as otherwise required to complete the work.

Existing concrete shall be demolished, removed, and disposed of. Square, straight edges shall be provided where existing concrete adjoins new work and at other locations where indicated. Existing steel reinforcement shall be protected where indicated; otherwise, it shall be cut off flush with face of concrete.

The Contractor shall dismantle steel components at field connections and in a manner that will prevent bending or damage.

The use of flame-cutting torches will be permitted only when other methods of dismantling are not practical, and when approved in writing by the Owner or RPR.

**105-2.6 Electrical Equipment And Fixtures.** Wiring systems and components shall be salvaged. Loose items shall be boxed and tagged for identification.

All unused conduit not removed shall have a pull string installed and shall be noted on the record drawings.

Primary, secondary, control, communication, and signal circuits shall be disconnected at the point of attachment to their distribution system.

The Contractor shall remove and salvage electrical fixtures. Incandescent lamps, mercury-vapor lamps, and fluorescent lamps shall be salvaged, boxed and tagged for identification, and protected from breakage.

The Contractor shall remove and salvage switches, receptacles, fixtures, transformers, constant current regulators, meters, instruments, plates, circuit breakers, panelboards, outlet boxes, and similar items. These items shall be boxed, and tagged for identification according to type and size.

The Contractor shall remove and dispose of conductors and conduits not used in the finished work and shown to be demolished on the plans. The cost of the conduit and cable removal shall be incidental the removal of the edge lights and sign bases.

## DEMOLITION

**105-3.1 Demolition Operations.** Demolition operations shall be conducted to ensure the safe passage of persons to and from facilities occupied and used by the Owner, and to prevent damage by falling debris or other cause to adjacent buildings, structures, and other facilities.

The sequence of operations shall be such that maximum protection from inclement weather will be provided for materials and equipment located in partially dismantled structures.

**105-3.2 Maintaining Traffic.** Demolition operations and removal of debris to disposal areas shall be conducted to ensure minimum interference with runways, taxiways, aprons, roads, streets, walks, and other facilities occupied and used by the Owner.

Streets, walks, runways, taxiways and other facilities occupied and used by the Owner shall not be closed or obstructed without written permission.

**105-3.3 Reference Standards Requirements.** Demolition operations shall be conducted to ensure the safety of persons in accordance with ANSI A 10.6 Safety Requirements for Demolition.

Demolition shall be conducted in accordance with O.S.H.A., State and local requirements.

## DISPOSAL OF DEMOLISHED MATERIALS

**105-4.1 General.** The Contractor shall dispose of debris, rubbish, scrap, and other non-salvageable materials resulting from demolition operations. Demolished materials shall not be stored or disposed of on Airport property.

**105-4.2 Removal From Owner Property.** Materials classified as debris shall be transported from Owner property and legally disposed at no additional cost to the Owner. Permits and fees for disposal shall be paid by the Contractor.

## METHOD OF MEASUREMENT

**105-6.1** The "Remove and Salvage Existing Fixture, Demolish Base Can" item includes all materials, labor, transportation incidentals and services required for the airfield electrical demolition as shown on the plans. It is the intent of the demolition pay item that all equipment, devices, fixtures, wiring, materials, systems and appurtenances, etc. which are no longer required as a result of the project to be removed shall be measured by the per each. All salvaged equipment shall be carefully handled, stored, protected, and turned over to the owner.

**105-6.2** The Miscellaneous Electrical Demolition pay item shall be use for all incidental electrical demolition to include but not be limited to cable(s), conduit, ducts, counterpoise, concrete foundations/encasement, ID tags, cable markers, duct markers, frames, racks, and all other miscellaneous electrical equipment.

## BASIS OF PAYMENT

**105-7.1** Payment will be made at the contract price for required airfield electrical demolition. This item includes all materials, labor, transportation, incidentals and services required for the demolition, removal, and proper storage as shown on the plans. It is the intent of the demolition pay item that all equipment, devices, fixtures, wiring, materials, systems and appurtenances, etc. which are no longer required as a result of the project be removed.



Payment will be made under:

Item L-105-1	Demolish Existing Fixture/Base Can In Turf – per each
Item L-105-2	Miscellaneous Electrical Demolition – per lump sum

**END OF ITEM L-105**

**PAGE INTENTIONALLY LEFT BLANK**

## ITEM L-106 SUBMITTALS, RECORD DOCUMENTS AND MAINTENANCE MANUALS

### DESCRIPTION

**106-1.1 General.** The items described in this section are applicable to all electrical work by the Contractor. Where the contract special conditions or general provisions also apply, the stricter of the documents shall apply.

**106-1.2 Scope.** This section includes the requirements for submittals, record documents operation and maintenance (O&M) manuals. All submittals and O & M Manuals shall be submitted in book form as described in this item.

### SHOP DRAWINGS AND SAMPLES

**106-2.1 Requirements For Shop Drawings And Samples.** Shop drawings are drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are prepared by the Contractor or any subcontractor, manufacturer, supplier or distributor, and which illustrate some portion of the work.

Submittal data for electrical materials and equipment shall consist of shop drawings and/or catalog cuts showing technical data as necessary to evaluate the material or equipment, to include dimensions, wiring diagrams, performance curves, ratings, control sequence and other descriptive data necessary to describe fully the item proposed and its operating characteristics.

Samples are physical examples furnished by the Contractor to illustrate materials, equipment or workmanship, and to establish standards by which the work will be judged. Each sample shall be accompanied by the manufacturer's instructions regarding installation, operation and maintenance and shall be identified by item number, and specification.

The Contractor shall review, stamp with his approval and submit to the Resident Project Representative (RPR), one (1) reproducible and five (5) prints of shop drawings, five (5) copies of submittal books and three (3) sets of samples where required (instead of paper copies of the submittals the contractor may submit one (1)) copy of all documents listed above in a electronic Adobe Acrobat form), as described in this item, within fifteen (15) days of notice to proceed.

If the Contractor desires to deviate from the requirements of the contract documents, the Contractor shall separately submit all deviations from the requirements of the contract documents in shop drawings or samples. The submission shall direct in writing the specific attention of the Engineer to the deviations, and shall contain all required data and supporting documentation necessary for an evaluation of the proposed deviation. Any submission or deviation not identified as heretofore mentioned shall be rejected and require resubmission. Separate written approval of all deviations by the Engineer for all design related deviations and by the Owner for all other deviations is required before the Contractor may perform the work covered by such deviation. By requesting a deviation, the Contractor makes the representations contained in this section.

If approval is given, the Contractor will not be excused from producing work in conformity with contract requirements. If a trial use establishes the work does not meet the contract requirements, the Contractor shall take such action as the RPR determines necessary to meet the contract requirements. No change in contract time will be made as a result of changes made under this subparagraph. By requesting a deviation, the Contractor makes the representations contained in this section.

**106-2.1.1** Substitutions will only be considered after bid date only if the following conditions are met and allowed by other sections of these specifications.

**a.** Request for substitution is submitted no later than 15 days after notice to proceed for construction is awarded to the Contractor.

b. Request for substitution includes appropriate credit to the project cost. This credit must be submitted with request for substitution in order for substitution to receive any consideration.

c. Samples are to be submitted for all substituted light fixtures, wiring devices and other items deemed necessary by the RPR to determine that the substituted item meets all specifications and requirements before approval of substitutions can be made.

d. Samples shall be submitted within 15 days after the award of the contract.

e. Request for substitution shall include the name of the material or equipment for which it is to be substituted, drawings, cuts, performance and that data or any other data or information necessary for the Engineer to determine that the equipment meets all specifications and requirements.

f. Where permitted and approved, the substitution must conform to space requirements. Substitutions that cannot meet space requirements, which is the substitution Installer's responsibility whether approved or not, shall be replaced at the Contractor's expense. Any substitution modifications of related systems, as a result of the substitution, shall be made at the Contractor's expense.

g. The Contractor represents that it has personally investigated the proposed substitution and determined that the proposed substitution is equal or superior in all respects to the specified method or equipment.

h. The Contractor represents that it will provide a warranty for the substitution identical in all respects to the warranty for the specified method or equipment.

i. The Contractor represents that it will coordinate the installation of the accepted substitute, making changes as may be required for the work to be complete in all respects at no additional costs to the Owner.

The Engineer shall be the sole judge of whether the proposed "or equal" is suitable for use in the work.

**106-2.1.2 Substitutions.** Substitutions will be considered prior to bid date only if all the following conditions are met:

a. A written request has been submitted to the RPR for approval at least 10 days prior to the bid date.

b. Samples are to be submitted for all substituted light fixtures, wiring devices and other items deemed necessary by the Engineer to determine that the substituted item meets all specifications and requirements before approval of substitutions can be made.

c. Samples shall be submitted within 15 days after the award of the contract.

d. Request for substitution shall include the name of the material or equipment for which it is to be substituted, drawings, cuts, performance and that data or any other data or information necessary for the Engineer to determine that the equipment meets all specifications and requirements.

e. Substitution is approved and included in an addendum.

By approving and submitting shop drawings and samples, the Contractor thereby represents that he/she has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data and that the Contractor, has checked and coordinated each shop drawing and sample with the requirements of the work of the contract documents.

Unless otherwise stated in the contract documents, the Engineer will review and approve shop drawings

and samples within fifteen (15) days after receipt, but only for conformance with the design concept of the project and with the information given in the contract documents. The Engineer's approval of a separate item shall not indicate approval of an assembly in which the item functions.

The Contractor shall make any corrections required by the Engineer and shall resubmit the required number of corrected shop drawings or new samples until approved. The Contractor shall direct specific attention in writing or on resubmitted shop drawings to revisions other than the corrections requested by the Engineer on previous submissions.

The Engineer's approval of shop drawings or samples shall not relieve the Contractor of responsibility for any deviation from the requirements of the contract documents unless the Contractor has informed the Engineer in writing of such deviation at the time of submission and the Engineer has given written approval to the specific deviation. **The Engineer's approval shall not relieve the Contractor from responsibility for errors or omissions in the shop drawings or samples.**

The submittals will be reviewed for design intent and general compliance with the information contained in the drawings and specifications. The Contractor is responsible for dimensions, quantities, fabrication processes and methods of construction, coordination of the Contractor's work with that of all trades. The Contractor shall be responsible for satisfactory performance of his work and supplying a complete and operational system.

No portion of the work requiring a shop drawing or sample submission shall be commenced until the submission has been approved by the Engineer. All such portions of the work shall be in accordance with approved shop drawings and samples.

Samples, upon request, shall be submitted after written notice of acceptance and approval has been made of each substitution. The Engineer reserves the right to reject the sample should the sample not meet the requirement of the contract documents.

**106-2.2 Submittal Books.** Submittal books shall consist of a hard cover, view type, 3-ring binder sized to hold 8 ½" x 11" sheets.

Each binder is to be adequately sized to comfortably hold required submittals. Minimum spline size to be 1", maximum spline size to be 3" (provide additional binders if 3" size is not sufficient to properly hold submittals). Each binder shall be adequately sized to hold the submittal information plus an additional 25% of the submittal sheet count.

Binder covers to have outer clear vinyl pocket on front and back cover (to hold 8 ½" x 11" sheet) and on spline (to hold spline width x 11" sheet). Binders shall be Wilson Jones Standard Locking D-Ring View Binders or approved equivalent. Provide correct designation of project in each pocket, see "EXAMPLES" Appendix A Figures 1 and 2 included at the end of this section. Description sheet is to be white with black letters, maximum sheet height of 11" high and full width of pocket. Description is to describe project and match project drawing/specification description. Description to include submittal type. One (1) for the Airfield Lighting System materials (black) and one (1) for the Airfield Lighting Control System (blue).

**106-2.3 Submittal Book Contents.** Submittal books to include:

- a. First sheet(s) in book shall be a photocopy of the cover sheet see Appendix A Figure 1.
- b. The second sheet shall be a table of contents.
- c. Third sheet shall be prepared and filled out by the Contractor and shall list project addresses, see Appendix A Figure 3.
- d. Fourth sheet shall also be filled out by Contractor and list project information for project, Appendix A Figure 4.

e. Provide Wilson Jones, reinforced clear, ring binder indexes, 5 tab No. WJ-54125 or approved equivalent with the appropriate specification section number, and a typed index for each section.

f. Submittals consisting of marked catalog sheets or shop drawings shall be inserted in the binder in proper order. Submittal data shall be presented in a clear and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify pertinent products or models applicable to this project. Markings shall be boldly and clearly made with arrows or circles (highlighting is not acceptable). Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be boldly and clearly made with arrows or circles (highlighting is not acceptable).

g. Shop Drawings: Drawings to include identification of project and name of Engineer, Contractor, subcontractors and suppliers, data, number sequentially and indicate the following:

- (1) Fabrication and erection dimensions.
- (2) Arrangements and sectional views.
- (3) Necessary details, including complete information for making connections with other work.
- (4) Kinds of materials and finishes.
- (5) Descriptive names of equipment.
- (6) Modifications and options to standard equipment required by the work.
- (7) Leave blank area, size approximately 4 x 2 ½ inches, near title block (Engineer's stamp imprint).
- (8) Point-to-point wiring diagrams.
- (9) Conduit/raceway rough-in drawings.
- (10) See specific sections of specifications for further requirements.

**106-2.4 Submittal Books Product Data.** Technical data is required for all items as called for in the specifications regardless if item furnished is as specified.

a. Submit technical data verifying that the item submitted complies with the requirements of the specifications. Technical data shall include manufacturer's name and model number, dimensions, weights, electrical characteristics, and clearances required. Indicate all optional equipment and changes from the standard item as called for in the specifications. Furnish drawings, or diagrams, dimensioned and in correct scale, covering equipment, showing arrangement of components and overall coordination.

b. In order to facilitate review of product data, insofar as practicable, they shall be noted, indicating by cross reference the contract drawings, note, and/or specification paragraph numbers where item(s) occur in the contract documents. At the end of each section insert a copy of the applicable specification.

c. When specified in individual specification sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, start-up, adjusting and finishing in quantities specified for product data. Identify conflicts between manufacturers' instructions and contract documents. The Engineer shall make the decision on which procedure will be followed.

d. When specified in individual specification sections, submit manufacturers' certificate to the Engineer for review in quantities specified for product data. Indicate that material or product conforms to or exceeds specified requirements. Submit supporting reference date, affidavits and certifications as appropriate. Certificates may be recent or previous test results on material or product, but must be acceptable to Engineer.

e. See specific sections of specifications for further requirements.

**106-2.5 Processing Submittals.** Submit a minimum of five (5) submittal books with separate tag marking on each copy for the Owner (1), Engineer (4), Contractor and Subcontractor (See other sections of these specifications for additional quantity requirements.) A properly organized electronic submittal as a PDF is acceptable in lieu of the books.

The Contractor shall review the submittal books before submitting to the RPR. No request for payment will be considered until the submittal book has been reviewed and submitted for approval.

Submit under provisions Section 1. of the Special Conditions and this section of the specifications, whichever is the most-strict.

**Product Data:** For standard manufactured materials, products and items, submit one (1) copy or sets of data (per book). If submittal is rejected, resubmittal shall contain same quantity of new data.

**Shop Drawings:** For custom fabricated items and systems shop drawings, initially submit a transparency (suitable for reproduction) together with two (2) prints made therefrom. When submittal is acceptable, furnish one (1) print per book made from the accepted transparency.

**Acceptance:** When returned to Contractor, the front of each submittal section will be marked with the Engineers stamp. If box marked "Submit Specified Item", or "Rejected" or "Revise and Resubmit" is checked, submittal is not accepted and Contractor is to correct and resubmit as noted. Contractor is to comply with notation making necessary corrections on submittal and resubmit for final record. If submittal is marked "Make Correction Noted" Contractor may begin construction utilizing the submitted item with corrections made. However, the corrected submittal must be resubmitted for record keeping purposes. Contractor is to comply with notation making necessary corrections on submittal and resubmit for final record.

If the submittal is marked "No Exception Taken" the Engineer took no exceptions to the submitted.

If the submittal is marked "Furnished as Noted", the Contractor shall make or note any corrections or requirements identified in the comments. Corrections or comments made on the shop drawings during this review do not relieve the Contractor from compliance with requirements of the drawings and specifications. This check is only for review of the general conformance with the design concept of the project and general compliance with the information given in the contract documents. The Contractor is responsible for; confirming and correlating all quantities and dimensions; selecting fabrication processes and techniques of construction; coordinating his or her work with that of all other trades and performing all work in a safe and satisfactory manner.

Note that the approval of shop drawings or other information submitted in accordance with the requirements herein before specified, does not assure that the Engineer, or any other Owner's authorized representative, attests to the dimensional accuracy or dimensional suitability of the material or equipment involved, the ability of the material or equipment involved or the mechanical/electrical performance of equipment. Approval of shop drawings does not invalidate the plans and specifications if in conflict, unless a letter requesting such a change is submitted and approved on the Engineer's letterhead.

**106-2.8 Delays.** The Contractor is responsible for delays in project time accruing directly or indirectly from late submissions or resubmissions of shop drawings, or product data.

**106-2.9 Re-Submittals.** The Engineer shall be reimbursed the cost to review resubmittals subsequent to the second submittal.

## **RECORD DOCUMENTS**

**106-3.1 Progress And Record Drawings.** Keep one set of blue line prints on the job and neatly mark-up design drawings each day as components are installed. Different colored pencils shall be used to differentiate each system of electrical work. All items on progress drawings shall be shown in actual location installed. Drawings shall be inspected weekly for compliance and accuracy. Progress payments shall be withheld if the marked-up drawings are not current.

All underground ducts, conduits, drains, ground grids, force mains, etc., (all underground utilities) installed by the Contractor or located by the Contractor during the construction of this project shall be surveyed. The data shall be sufficient to accurately relocate the utility at a later date. The data shall include North-South and East-West coordinates and an elevation. This data shall be recorded on the as-built drawings.

All manholes and other structures installed by the Contractor shall be surveyed. The center of the structure shall be located by a North-South and East-West coordinate and an elevation. This data shall be recorded on the as-built drawings.

Change the equipment schedules to agree with items actually furnished. At the end of the project, all changes shall be transferred to a set of reproducible transparencies of the design drawings marked "As Built" and dated and stamped by the Contractor.

Prior to request for final payment, furnish a set of "As Built" sepia originals and four sets of prints along with the marked set defined above to the Engineer for approval. The final sepia originals shall be professionally drafted to indicate "As Built" conditions to the Engineer. The prints shall be stamped "As-Built", signed and dated by the electrical contractor.

The Contractor's failure to produce representative "As Built" drawings in accordance with requirements specified herein, shall be cause for the Engineer to produce such "As-built" drawings and the Contractor shall reimburse the Engineer for all costs to produce a set of "Record" drawings to the Owner's satisfaction.

Complete and sign the Progress and Record Document Certification Form in Appendix A Figure 5 and submit with the Operation and Maintenance Manuals. Submit one form for each Contractor/Subcontractor providing as-built information, include a copy of each form in the O & M Manuals.

## **OPERATION AND MAINTENANCE MANUALS**

**106-4.1 Requirements For Operation And Maintenance Manuals.** Within each major division of work, each specification section in the contract documents which require submission of O & M information shall be individually identified by a typed index tab. The Contractor shall provide four (4) copies of manufacturer's manuals for all installed equipment. As a minimum, it shall contain the following:

- a. Safety precautions used while maintaining the equipment.
- b. Theory of circuit and system operation.
- c. Complete schematic and interconnecting wiring diagrams
- d. Complete parts list with each circuit component keyed to designations assigned on schematics and wiring diagrams. Complete information shall be given for each part to permit ordering for replacement purposes. This information shall include the components rating, name of manufacturer and the manufacturer's part number in addition to the following:



e. Recommended preventive maintenance, including care, cleaning, lubrication, service schedules, etc.

f. Troubleshooting procedures.

g. Physical characteristics (weight, size, mounting dimensions, etc.).

h. Installation instructions.

i. Operating instructions.

j. Recommended spare parts and usage for a 1 year period.

k. Submit for checking purposes a specific set of written operating instructions on each item which requires instructions to operate. After approval, provide one copy for insertion in each Operation and Maintenance Manual.

l. Submit for approval maintenance information consisting of manufacturer's printed instructions and parts list for each major item of equipment. After approval, insert information in each Operations and Maintenance Manual. Detailed schematic diagrams shall be furnished for all electrical/electronic equipment.

m. Bill of materials.

n. Physical layout plans.

o. Equipment supplier list.

p. Panel schedules shall be submitted with the respective panel data.

q. Special instructions.

r. Service maintenance contracts including the name, address and 24-hour phone number and contact of manufacturers authorized repair company.

There shall be no "Black Boxes" for which there are no schematic/wiring diagrams.

**106-4.2 Operation And Maintenance Manuals.** O & M Manuals shall consist of hard cover, view type, 3-ring binders sized to hold 8 ½" x 11" sheets.

Each binder is to be adequately sized to comfortably hold required submittals. Minimum spline size to be 1", maximum spline size to be 3" (provide additional binders if 3" size is not sufficient to properly hold submittals). Each binder shall be adequately sized to hold the submittal information plus an additional 25% of the submittal sheet count.

Binder covers to have outer clear vinyl pocket on front and back cover (to hold 8 ½" x 11" sheet) and on spline (to hold spline width x 11" sheet). Binders shall be Wilson Jones Standard Locking D-Ring View Binders or approved equivalent. Provide correct designation of project in each pocket, see "EXAMPLES" Appendix A Figures 6 and 7 included at the end of this section. Description sheet is to be white with black letters, maximum sheet height of 11" high and full width of pocket. Description is to describe project and match pocket drawing/specification description. Description to include submittal type. One (1) for Airfield Lighting System Materials (black) and one (1) for the Airfield Lighting Control System (blue).

**106-4.3 Operation And Maintenance Manual Contents.** O & M Manuals to include:

a. First sheet in binder shall be a photocopy of the cover sheet see Appendix A Figure 6.

- b. The second sheet shall be a table of contents.
- c. The third sheet shall be filled out by the Contractor and shall list project addresses, see Appendix A Figure 3.
- d. The fourth sheet shall also be filled out by the Contractor and list project information for project, see Appendix A Figure 4.
- e. Provide Wilson Jones, reinforced, clear, ring binder indexes, 5 tab No. WJ-54125 or approved equivalent with the appropriate specification section number, and typed index for each section.
- f. Shop Drawings: Shop drawings shall be a copy of the final and approved shop drawings submitted as required in Item L-106-2, Shop Drawings and Samples. These shall be inserted in the binder in proper order. Each catalog sheet shall clearly identify where the product is used and the drawing identification for equipment. Clear vinyl pockets shall be provided for insertion of shop drawings.
- g. Product data and/or catalog sheets shall be a copy of the final and approved submittal submitted as required in Item L-106-2, Shop Drawings and Samples. These shall be inserted in the binder proper order. Each catalog sheet shall clearly identify where the product is used and the drawing identification for equipment.
- h. Warranty/Guarantee: Provide a copy of the warranty/guarantee and letters of certification, in respective locations in the O & M Manual binder. Original warranty/guarantee is to be incorporated into a separate project warranty book with warranty/guarantees provided for other sections and divisions of the specifications and submitted for Engineer approval.
- i. Performance Verification and Demonstration to Owner (See Appendix A Figure 2 form in L-131, Demonstrations, Tests and Performance Verification).
- j. Tabulated Data (as required in L-131, Demonstrations, Tests and Performance Verification).
- k. Required Check-Out Memos (see Appendix A Figure 1 form in L-131, Demonstrations, Tests and Performance Verification).
- l. Progress and Record Drawing Certification (Appendix A Figure 5)
- m. Ground Test Information (See Appendix A Figure 3 form in L-131, Demonstrations, Tests and Performance Verification).

**106-4.4 Processing O & M Manuals.** Submit four (4) sets of O & M Manuals. The Contractor shall review the manuals before submitting them to the RPR.

**106-4.5 Delays.** The Contractor is responsible for delays in project time accruing directly or indirectly from late submissions or resubmissions of the Operation and Maintenance Manuals.

**106-4.6 Re-Submittals.** The Engineer shall be reimbursed the cost to review Operation and Maintenance Manuals, re-submittals subsequent to the second submittal.

## **METHOD OF MEASUREMENT**

**106-5.1** The items described in this section are incidental to other sections and not shall be measured for payment.

## **BASIS OF PAYMENT**

**106-6.1** No direct payment shall be made for the work described in this section. The work described in this section is incidental to other items and shall be paid for in the respective bid item of which it is a component part.

**"EXAMPLE"**

**Albert J. Ellis Airport  
Richlands, North Carolina**

**Taxiway A Rehabilitation**

**AIRFIELD LIGHTING SUBMITTAL BOOK**

September xx, 2021

**APPENDIX A - FIGURE 1**

**"EXAMPLE"**

**Albert J. Ellis Airport  
Richlands, North Carolina**

**Taxiway A Rehabilitation**

**AIRFIELD LIGHTING SUBMITTAL BOOK**

September xx, 2021

**APPENDIX A - FIGURE 2**

## PROJECT ADDRESSES

### OWNER:

Albert J. Ellis Airport  
264 Albert Ellis Airport Road  
Richlands, North Carolina 28574

PHONES: (910) 324-1100

### CONSULTING ENGINEERS:

WK Dickson, an Ardurra Company  
720 Corporate Dr,  
Raleigh, NC 27607  
(919) 782-0495

WE, pllc  
8226 Creedmoor Rd  
Suite 201  
Raleigh, NC 27613  
(919) 522-0628

### GENERAL CONTRACTOR:

### SUBCONTRACTORS:

### SUPPLIERS:

## APPENDIX A - FIGURE 3

## PROJECT INFORMATION

Contractor shall fill in the blanks below and insert in the Submittal Books and the Operating and Maintenance Manuals. Submit one (1) sheet for each major division of Work.

Project Name: Albert J. Ellis Airport – Taxiway A Rehabilitation

Specification Division Number & Name: \_\_\_\_\_

Subcontractor: \_\_\_\_\_

Contact: \_\_\_\_\_ Phone Number: \_\_\_\_\_

Date Project Bid: \_\_\_\_\_

Project Start Date: \_\_\_\_\_

Days Allowed for Construction: \_\_\_\_\_

Target Completion: \_\_\_\_\_

Substantial Completion: \_\_\_\_\_

Certification Date: \_\_\_\_\_

	DATE SUBMITTED	DATE SUBMITTED
Closeout Documentation Manual:	_____	_____
Operating & Maintenance Manual:	_____	_____
Owner Performance Verification and Demonstrations:	_____	_____
Manufacturer's Performance Verification Memos:	_____	_____
Manufacturer's Test Data:	_____	_____
Record Documents:	_____	_____

## APPENDIX A FIGURE 4

### PROGRESS AND RECORD DRAWING CERTIFICATION

This form shall be completed and submitted with the Record Documents. Submit one form for each Contractor/Subcontractor providing as-built information. Include a copy of this form in the Closeout Documentation Manual.

Project Name: Albert J. Ellis Airport – Taxiway A Rehabilitation

Specification Division Number & Name: \_\_\_\_\_

The Contractor's and Subcontractor's signatures below certify that the attached drawings and specifications were marked and revised as items were installed/changed, during the course of construction, and that these documents represent an accurate "Record-As Built" condition of the work as actually installed.

\_\_\_\_\_  
(Name of General Contractor)

\_\_\_\_\_  
(Signature, Title, Date)

\_\_\_\_\_  
(Name of Subcontractor)

\_\_\_\_\_  
(Signature, Title, Date)

### APPENDIX A - FIGURE 5



**"EXAMPLE"**

**Albert J. Ellis Airport  
Richlands, North Carolina**

**Taxiway A Rehabilitation**

**AIRFIELD LIGHTING OPERATION AND  
MAINTENANCE MANUALS**

**APPENDIX A - FIGURE 6**

**"EXAMPLE"**

**Albert J. Ellis Airport  
Richlands, North Carolina**

**Taxiway A Rehabilitation**

**OPERATION AND MAINTENANCE MANUAL**

**APPENDIX A - FIGURE 7**

## ELECTRICAL MATERIALS SUBMITTAL LIST

Submittal list provided for information only.

Spec. Section Number	Submittal Description	Date Received	Date Returned	Status
L-100	<p>Certification of Electrical Contractor's Experience Copy of Electrical Contractor's applicable State Electrical License</p> <p>Certification of Electrical Superintendent's Experience Electrical Superintendent's resume' and copy of Journeyman Electrician License Electrical Superintendent's References, Airport Name, Contact and phone number</p> <p>Copy of each Journeyman Electrician's License Copy of each Apprentice Electrician's License</p> <p>Existing Facilities Investigation Memorandum</p> <p>Phenolic nameplates - 1 to 1 scale detail of each nameplate SS pop rivets and silicone caulk Adhesive backed cloth markers Color code paint Permanent black marker Self-adhesive clear printed labels w/ black typed letters</p> <p>Welder qualifications Welding procedures</p> <p>Written verification providing proof of correspondence with representatives of all utilities/agencies to locate all existing utilities/systems within the project limits</p>			
L-104	<p>Temporary Airfield Lighting Plan and Procedures</p> <p>Temporary Airfield Lighting, Signage and Cabling</p>			
L-108	<p>Each component shall be identified with the specific pay item of which it is a component part.</p> <p>List of proposed Airfield Lighting Cable Splicers Airfield Lighting Cable Splicer Qualifications</p> <p>Cable Installation Plan Cable Installation Reports</p> <p>All wire, conductors and cable assemblies including manufacturer's minimum cold weather installation temperature, minimum bend radius, maximum pull tension</p> <p>L-824 5kV cable L-824 5kV cable Production Test Reports L-823 Connector Kits Counterpoise Wire</p>			

	<p>Ground Wire</p> <p>Compression butt splices Compression lugs C-Taps Compression tooling, calibration certificate, procedures and manufacturer's recommended practices Penciling tool</p> <p>Mechanical lugs and torquing requirements Torque wrench, calibration certificate and manufacturer's recommended practices Wire nuts Terminal blocks</p> <p>Insulation replacement systems, i.e. tapes, heat shrink tubing, etc. Electrical coatings Joint compound Pull ropes Cable pulling lubricant</p> <p>Color coding materials and/or methods Detectable marker tape with message and color Wire/cable markers Brass ID Tags and cable ties Brass ID Tag stamped samples - 3 samples for each circuit impacted</p> <p>Stainless steel wire mesh strain relief baskets for 5 kV cables</p> <p>Copper-clad steel ground rods Ground rod couplings Ground rod driving studs Exothermic connections Electrical coatings Electrical joint compound Grounding conductors Copper bus bar by size, type and use Ground rod inspection pit</p>			
L-110	<p>Rigid galvanized steel (RGS) conduit Weatherproof conduit hubs Locknuts Grounding bushings w/ insulated throat Bushings w/ insulated throat Condulets, covers and gaskets Expansion fittings Conduit thread compound Long radius RGS bends Cold galvanizing compound Asphaltum paint</p> <p>Schedule 40 PVC conduit Schedule 40 PVC end bells, fittings, terminations,</p>			

	<p>cleaner and solvent cement Schedule 40 PVC duct spacers and duct plugs Expansion fittings</p> <p>Split duct and fittings Inner duct and fittings</p> <p>E-LOC Couplings</p> <p>P-610 concrete mix</p> <p>Cable racks, supports, ties and straps detectable marker tape Drain sumps Each item submitted shall include the contractors proposed installation detail</p>			
L-115	<p>Each component shall be identified with the specific pay item of which it is a component part. Complete assemblies shall be submitted for each pay item.</p> <p>Handholes Junction Boxes Junction Box Plazas</p> <p>Each item's submittal shall include the following as required:</p> <ul style="list-style-type: none"> <li>• Signed and sealed shop drawings by a registered structural P.E. in the applicable state</li> <li>• Grounding attachments</li> <li>• Covers, frames, rings, etc.</li> <li>• Spring assist mechanisms</li> <li>• Pulling irons</li> <li>• Cable racks</li> <li>• Section sealant/mastic</li> <li>• Reinforcement bars and wire mesh</li> <li>• All accessories</li> </ul> <p>Each item submitted shall include the contractors proposed installation detail.</p> <p>All other components not previously listed or as requested by the Engineer.</p>			
L-125	<p>Each component shall be identified with the specific pay item of which it is a component part. Complete assemblies shall be submitted for each pay item.</p> <p>Shop drawings of each airfield lighting component, indicating FAA approval, shall be submitted to the Engineer for review and approval and be approved prior to ordering any materials for this item. This submittal shall include the proposed method of installation for all airfield lighting components. The submittal shall include data on all component parts of the item or system, and</p>			

	<p>shall include the manufacturers list of recommended spare parts for one years use.</p> <p>The manufacturer of the signs proposed shall provide data, certification, and five (5) airport references that each type of proposed fixture, as currently designed unless a new design that has not been required in the United States heretofore, has been in operation under normal airfield conditions a minimum of 3 years with a certified repair requirement rate of no more than three (3) percent.</p> <p>Spare parts guarantee</p> <p>Lamp prices and price guarantee</p> <p>Survey of existing fixtures, base cans Airfield lighting fixture manufacturer qualifications</p> <p>Identification/number markers</p> <p>Reinforcing steel SS bolting hardware including anti-rotational devices Anti-seize compound</p> <p><del>L-858Y, R, L Signs</del> including as applicable: signs, light bases (base cans), extensions and top sections, covers, gaskets, ground lugs, load rings, anti-rotational fins, spacer rings, flange rings, sign toethers, SS anchor bolts, SS bolting hardware, L-830 isolation transformers, frangible couplings, lamps, installation detail, all components, accessories and incidentals.</p> <p><del>Replacement Sign Panels</del></p> <p><del>Misc Sign Items</del> <del>L-858 sign message schedule</del> <del>Sign load calculation or test results supporting 200mph requirement per AC 150/5345-44</del> <del>Vinyl die cut labels and sample</del></p> <p><del>L-867B Base Can</del> <del>L-867D Base Can</del> <del>L-858Y, R, L, B sign panels</del></p> <p><b>Anti-Seize lube compound</b></p> <p><b>Spare Parts</b></p> <p>Non-reflective cracking fabric Epoxy bonding compound including pavement compatibility statement Rebar P-610</p> <p>All bolting hardware not previously submitted</p>			
--	--	--	--	--

	<p>Each item submitted shall include the contractors proposed installation detail.</p> <p>All other components not previously listed or as requested by the Engineer.</p>			
L-125	<p>Each component shall be identified with the specific pay item of which it is a component part. Complete assemblies shall be submitted for each pay item.</p> <p>Shop drawings of each airfield lighting component, indicating FAA approval, shall be submitted to the Engineer for review and approval and be approved prior to ordering any materials for this item. This submittal shall include the proposed method of installation for all airfield lighting components. The submittal shall include data on all component parts of the item or system, and shall include the manufacturers list of recommended spare parts for one years use.</p> <p>The manufacturer of the lighting fixtures proposed shall provide data, certification, and five (5) airport references that each type of proposed fixture, as currently designed unless a new design that has not been required in the United States heretofore, has been in operation under normal airfield conditions a minimum of 3 years with a certified repair requirement rate of no more than three (3) percent.</p> <p>Spare parts guarantee</p> <p>Lamp prices and price guarantee</p> <p>Survey of existing fixtures, base cans, etc. Airfield lighting fixture manufacturer qualifications</p> <p>Reinforcing steel SS bolting hardware including anti-rotational devices Anti-seize compound</p> <p><b>L-861T(L) Taxiway Edge Light</b> - including as applicable: light fixture, L-867B light bases (base cans), extensions and top sections, covers, gaskets, ground lugs, load rings, anti-rotational fins, spacer rings, flange rings, adapter rings, SS bolting hardware, L-830 isolation transformers, frangible couplings, lamps, installation detail, all components, accessories and incidentals.</p> <p><del><b>L-861(L) Runway Edge Light</b> - including as applicable: light fixture, L-867B light bases (base cans), extensions and top sections, covers, gaskets, ground lugs, load rings, anti-rotational fins, spacer rings, flange rings, adapter rings, SS bolting hardware, L-830 isolation transformers, frangible couplings, lamps, installation</del></p>			

	<p><del>detail, all components, accessories and incidentals.</del></p> <p><b>L-860(L) Runway Threshold Light</b> – including as applicable: light fixture, L-867B light bases (base cans), extensions and top sections, covers, gaskets, ground lugs, load rings, anti-rotational fins, spacer rings, flange rings, adapter rings, SS bolting hardware, L-830 isolation transformers, frangible couplings, lamps, installation detail, all components, accessories and incidentals.</p> <p><b>Anti-Seize lube compound</b>  <b>Spare Parts</b></p> <p>Non-reflective cracking fabric  Epoxy bonding compound including pavement compatibility statement  Rebar  P-610</p> <p>All bolting hardware not previously submitted</p> <p>Each item submitted shall include the contractors proposed installation detail.</p> <p>All other components not previously listed or as requested by the Engineer.</p>			
L-131	<p>Submit all materials, test equipment, written procedures, forms, and equipment calibration certificates for performing the following tests:  Calibration Lab Qualifications  Equipment dielectric testing  Cable/conductor dielectric testing  Qualifications of firm performing dielectric testing  Insulation resistance (megger) testing</p> <p>Fixture wiring sequence testing procedure  Lighting system burn-in</p> <p>Airfield lighting photometric testing procedure and equipment  Qualifications of firm performing airfield lighting photometric testing</p> <p>Constant current regulator test procedures, test equipment, calibration procedures</p> <p>Airfield Lighting Control System and associated equipment Acceptance Testing</p> <p>Torquing of electrical terminations  Torquing of anchor bolts</p>			



	Earth resistance testing Ground continuity/resistance testing Exothermic weld tests  Equipment and support welding Transformer tests Testing required by equipment manuf.  Welding procedures Welder qualifications  Pavement sensor testing procedure, commissioning procedure and results  All other components not previously listed or as requested by the Engineer.			
--	---	--	--	--

**END OF ITEM L-106**

**PAGE INTENTIONALLY LEFT BLANK**

## 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 Resident Project Representative (RPR). This item shall not include the installation of duct banks or conduit, trenching and backfilling for duct banks or conduit, or furnishing or installation of cable for FAA owned/operated facilities. Requirements and payment for trenching and backfilling for the installation of underground conduit and duct banks is in Item L-110, Airport Underground Electrical Duct Banks and Conduits.

### EQUIPMENT AND MATERIALS

#### 108-2.1 General.

- a. Airport lighting equipment and materials covered by advisory circulars (AC) shall be approved under the Airport Lighting Equipment Certification Program per AC 150/5345-53, current version.
- b. All other equipment and materials covered by other referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification, when requested by the RPR.
- c. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications. Materials supplied and/or installed that do not comply with these specifications shall be removed (when directed by the RPR) and replaced with materials that comply with these specifications at the Contractor's cost.
- d. All materials and equipment used to construct this item shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete any non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment to which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in the project that may accrue directly or indirectly from late submissions or resubmissions of submittals.
- e. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The RPR reserves the right to reject any and all equipment, materials, or procedures that do not meet the system design and the standards and codes, specified in this document.
- f. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for at least twelve (12) months from the date of final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner. The Contractor shall be responsible to maintain a minimum insulation resistance per AC 150/5340-26B, Maintenance Airport Visual Aid Facilities, Table 5-1 and paragraph 5.1.3.1, with isolation transformers connected in new circuits and new segments of existing circuits through the end of the contract warranty period.

**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 or #6 American wire gauge AWG, L-824 Type C, 5,000 volts, nonshielded, with cross-linked polyethylene insulation. L-824 conductors for use on the L-830 secondary of airfield lighting series circuits shall be sized in accordance with the manufacturer's recommendations. All other conductors shall comply with FAA and National Electric Code (NEC) requirements. Conductor sizes noted above shall not apply to leads furnished by manufacturers on airfield lighting transformers and fixtures.

Wire for electrical circuits up to 600 volts shall comply with Specification L-824 and/or Commercial Item Description A-A-59544A and shall be type XHHW, 75°C. Conductors for parallel (voltage) circuits shall be type and size and installed in accordance with NFPA-70, National Electrical Code.

Unless noted otherwise, all 600-volt and less non-airfield lighting conductor sizes are based on a 75°C, XHHW, 600 volt insulation, copper conductors, not more than three single insulated conductors, in raceway, in free air. The conduit/duct sizes are based on the use of XHHW, 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 ground wire per ASTM B3 and ASTM B8, and shall be bare copper wire per ASTM B33. See AC 150/5340-30 for additional details about counterpoise and ground wire types and installation. For voltage powered circuits, the equipment ground conductor shall be minimum No. 6 AWG, 600V rated, Type XHHW insulated, green color, stranded copper equipment ground conductor.

Ground rods shall be copper clad, sectional ground rods. The ground rods shall be of the length and diameter specified on the plans, but in no case be less than 10 feet (2.54 m) long and 3/4 inch (19 mm) in diameter.

**108-2.4 Cable Connections.** In-line connections or splices of underground primary cables shall be of the type called for on the plans, and shall be one of the types listed below. No separate payment will be made for cable connections.

- a. **The cast splice.** A cast splice, employing a plastic mold and using epoxy resin equivalent to that manufactured by 3M™ Company, "Scotchcast" Kit No. 82-B, or as manufactured by Hysol® Corporation, "Hyseal Epoxy Splice" Kit No. E1135, or an approved equivalent, used for potting the splice is acceptable.
- b. **The field-attached plug-in splice.** Figure 3 of AC 150/5345-26, Specification for L-823 Plug and Receptacle, Cable Connectors, employing connector kits, is acceptable for field attachment to single conductor cable. It shall be the Contractor's responsibility to determine the outside diameter of the cable to be spliced and to furnish appropriately sized connector kits and/or adapters and heat shrink tubing with integral sealant.

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. See AC 150/5340-30 for additional information about methods of attaching a ground to a galvanized light base. All exothermic connections shall be made per the manufacturer's recommendations and listings.

**108-2.5 Splicer qualifications.** Every airfield lighting cable splicer shall be qualified in making airport cable splices and terminations on cables rated at or above 5,000 volts AC. The Contractor shall submit to the RPR proof of the qualifications of each proposed cable splicer for the airport cable type and voltage level to be worked on. Cable splicing/terminating personnel shall have a minimum of three (3) years continuous experience in terminating/splicing medium voltage cable.

**108-2.6 Concrete.** Concrete for cable markers shall be per Specification Item P-610, Structural Portland Cement Concrete.

**108-2.7 Flowable backfill.** Not Used. ~~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 circuit's insulation resistance shall be tested, in the presence of the RPR. The test shall be performed per this item and prior to any activity that will affect the respective circuit. The Contractor shall record the results on forms acceptable to the RPR. When the work affecting the circuit is complete, the circuit's insulation resistance shall be checked again, in the presence of the RPR. The Contractor shall record the results on forms acceptable to the RPR. The second reading shall be equal to or greater than the first reading or the

Contractor shall make the necessary repairs to the 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 magnetic tape shall be polyethylene film with a metalized foil core and shall be 4-6 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. Wherever possible, cable shall be run without splices, from fixture to fixture.

Cable connections between lights will be permitted only at the light locations for connecting the underground cable to the primary leads of the individual isolation transformers. The Contractor shall be responsible for providing cable in continuous lengths for home runs or other long cable runs without connections unless otherwise authorized in writing by the RPR or shown on the plans.

In addition to connectors being installed at individual isolation transformers, L-823 cable connectors for maintenance and test points shall be installed at locations shown on the plans. Cable circuit identification markers shall be installed on both sides of the L-823 connectors installed or at both sides of slack loops in each access point where L-823 connectors are not installed.

Provide not less than 3 feet (1 m) of cable slack on each side of all connections, isolation transformers, light units, and at points where cable is connected to field equipment. Where provisions must be made for testing or for future above grade connections, provide enough slack to allow the cable to be extended at least one foot (30 cm) vertically above the top of the access structure. This requirement also applies where primary cable passes through empty light bases, junction boxes, and access structures to allow for future connections, or as designated by the RPR.

Primary airfield lighting cables installed shall have cable circuit identification markers attached on both sides of each L-823 connector and on each airport lighting cable entering or leaving cable access points, such as manholes, hand holes, pull boxes, junction boxes, etc. Markers shall be of sufficient length for imprinting the cable circuit identification legend on one line, using letters not less than 1/4 inch (6 mm) in size. The cable circuit identification shall match the circuits noted on the construction plans.

**108-3.2 Installation in duct banks or conduits.** This item includes the installation of the cable in duct banks or conduit per the following paragraphs. The maximum number and voltage ratings of cables installed in each single duct or conduit, and the current-carrying capacity of each cable shall be per the latest version of the National Electric Code, or the code of the local agency or authority having jurisdiction.

The Contractor shall make no connections or splices of any kind in cables installed in conduits or duct banks.

Unless otherwise designated in the plans, where ducts are in tiers, use the lowest ducts to receive the cable first, with spare ducts left in the upper levels. Check duct routes prior to construction to obtain assurance that the shortest routes are selected and that any potential interference is avoided.

Duct banks or conduits shall be installed as a separate item per Item L-110, Airport Underground Electrical Duct Banks and Conduit. The Contractor shall run a mandrel through duct banks or conduit prior to

installation of cable to ensure that the duct bank or conduit is open, continuous and clear of debris. The mandrel size shall be compatible with the conduit size. The Contractor shall swab out all conduits/ducts and clean light bases, manholes, etc., interiors immediately prior to pulling cable. Once cleaned and swabbed, the light bases and all accessible points of entry to the duct/conduit system shall be kept closed except when installing cables. Cleaning of ducts, light bases, manholes, etc., is incidental to the pay item of the item being cleaned or installed. All raceway systems left open, after initial cleaning, for any reason shall be re-cleaned at the Contractor's expense. The Contractor shall verify existing ducts proposed for use in this project as clear and open. The Contractor shall notify the RPR of any blockage in the existing ducts.

The cable shall be installed in a manner that prevents harmful stretching of the conductor, damage to the insulation, or damage to the outer protective covering. The ends of all cables shall be sealed with moisture-seal tape providing moisture-tight mechanical protection with minimum bulk, or alternately, heat shrinkable tubing before pulling into the conduit and it shall be left sealed until connections are made. Where more than one cable is to be installed in a conduit, all cable shall be pulled in the conduit at the same time. The pulling of a cable through duct banks or conduits may be accomplished by hand winch or power winch with the use of cable grips or pulling eyes. Maximum pulling tensions shall not exceed the cable manufacturer's recommendations. A non-hardening cable-pulling lubricant recommended for the type of cable being installed shall be used where required.

The Contractor shall submit the recommended pulling tension values to the RPR prior to any cable installation. If required by the RPR, pulling tension values for cable pulls shall be monitored by a dynamometer in the presence of the RPR. Cable pull tensions shall be recorded by the Contractor and reviewed by the RPR. Cables exceeding the maximum allowable pulling tension values shall be removed and replaced by the Contractor at the Contractor's expense.

The manufacturer's minimum bend radius or NEC requirements (whichever is more restrictive) shall apply. Cable installation, handling and storage shall be per manufacturer's recommendations. During cold weather, particular attention shall be paid to the manufacturer's minimum installation temperature. Cable shall not be installed when the temperature is at or below the manufacturer's minimum installation temperature. At the Contractor's option, the Contractor may submit a plan, for review by the RPR, for heated storage of the cable and maintenance of an acceptable cable temperature during installation when temperatures are below the manufacturer's minimum cable installation temperature.

Cable shall not be dragged across base can or manhole edges, pavement or earth. When cable must be coiled, lay cable out on a canvas tarp or use other appropriate means to prevent abrasion to the cable jacket.

**108-3.3 Installation of direct-buried cable in trenches.** Unless otherwise specified, the Contractor shall not use a cable plow for installing the cable. Cable shall be unreeled uniformly in place alongside or in the trench and shall be carefully placed along the bottom of the trench. The cable shall not be unreeled and pulled into the trench from one end. Slack cable sufficient to provide strain relief shall be placed in the trench in a series of S curves. Sharp bends or kinks in the cable shall not be permitted.

Where cables must cross over each other, a minimum of 3 inches (75 mm) vertical displacement shall be provided with the topmost cable depth at or below the minimum required depth below finished grade.

- a. **Trenching.** Where turf is well established and the sod can be removed, it shall be carefully stripped and properly stored. Trenches for cables may be excavated manually or with mechanical trenching equipment. Walls of trenches shall be essentially vertical so that a minimum of surface is disturbed. Graders shall not be used to excavate the trench with their blades. The bottom surface of trenches shall be essentially smooth and free from coarse aggregate. Unless otherwise specified, cable trenches shall be excavated to a minimum depth of 18 inches (0.5 m) below finished grade per NEC Table 300.5, except as follows:

- (1) When off the airport or crossing under a roadway or driveway, the minimum depth shall be 36 inches (91 cm) unless otherwise specified.
- (2) Minimum cable depth when crossing under a railroad track, shall be 42 inches (1 m) unless otherwise specified.

Dewatering necessary for cable installation, erosion and turbidity control, per Federal, state, and local requirements is incidental to its respective pay items as part of Item L-108. The cost of all excavation regardless of type of material encountered, shall be included in the unit price bid for the L-108 Item.

The Contractor shall excavate all cable trenches to a width not less than 6 inches (150 mm). Unless otherwise specified on the plans, all cables in the same location and running in the same general direction shall be installed in the same trench.

When rock is encountered, the rock shall be removed to a depth of at least 3 inches (75 mm) below the required cable depth and it shall be replaced with bedding material of earth or sand containing no mineral aggregate particles that would be retained on a 1/4 inch (6.3 mm) sieve. Flowable backfill material may alternatively be used. The Contractor shall ascertain the type of soil or rock to be excavated before bidding. All such rock removal shall be performed and paid for under Item P-152.

Duct bank or conduit markers temporarily removed for trench excavations shall be replaced as required.

It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Where existing active cables cross proposed installations, the Contractor shall ensure that these cables are adequately protected. Where crossings are unavoidable, no splices will be allowed in the existing cables, except as specified on the plans. Installation of new cable where such crossings must occur shall proceed as follows:

- (1) Existing cables shall be located manually. Unearthed cables shall be inspected to assure absolutely no damage has occurred.
- (2) Trenching, etc., in cable areas shall then proceed, with approval of the RPR, with care taken to minimize possible damage or disruption of existing cable, including careful backfilling in area of cable.

In the event that any previously identified cable is damaged during the course of construction, the Contractor shall be responsible for the complete repair or replacement.

- b. Backfilling.** After the cable has been installed, the trench shall be backfilled. The first layer of backfill in the trench shall 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 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 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 undisturbed soil, and to the satisfaction of the RPR. If necessary to obtain the desired compaction, the backfill material shall be moistened or aerated as required.



If the cable is to be installed in locations or areas where other compaction requirements are specified (under pavements, embankments, etc.) the compaction requirements per Item P-152 for that area shall be followed.

Trenches shall not contain pools of water during backfilling operations. The trench shall be completely backfilled and tamped level with the adjacent surface, except that when turf is to be established over the trench, the backfilling shall be stopped at an appropriate depth consistent with the type of turfing operation to be accommodated. A proper allowance for settlement shall also be provided. Any excess excavated material shall be removed and disposed of per the plans and specifications.

Underground electrical warning (caution) tape shall be installed in the trench above all direct-buried cable. Contractor shall submit a sample of the proposed warning tape for acceptance by the RPR. If not shown on the plans, the warning tape shall be located 6 inches (150 mm) above the direct-buried cable or the counterpoise wire if present. A 4-6 inch (100 - 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 inch (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 seeding and sodding 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 and compaction shall meet the requirements of Item P-152. 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 and conduit.** The location of direct buried circuits and conduit 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" or "CONDUIT" 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.

At the location of each underground cable connection, except at lighting units, or isolation transformers, or power a concrete marker slab must mark adapters placed above the connection. The Contractor shall impress the word "SPLICE" on each slab. The Contractor also shall impress additional circuit identification symbols on each slab as directed by the RPR. All cable markers and splice markers shall be painted international orange. Paint shall be specifically manufactured for uncured exterior concrete. After placement, all cable or splice markers shall be given one coat of high-visibility aviation orange paint as approved by the RPR. Furnishing and installation of cable markers is incidental to the respective cable pay item.

**108-3.5 Splicing.** Connections of the type shown on the plans shall be made by experienced personnel regularly engaged in this type of work and shall be made as follows:

- a. **Cast splices.** These shall be made by using crimp connectors for jointing conductors. Molds shall be assembled, and the compound shall be mixed and poured per the manufacturer's instructions and to the satisfaction of the RPR.

- b. **Field-attached plug-in splices.** These shall be assembled per the manufacturer's instructions. These splices shall be made by plugging directly into mating connectors. In all cases the joint where the connectors come together shall be 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.
- c. **Factory-molded plug-in splices.** These shall be made by plugging directly into mating connectors. In all cases, the joint where the connectors come together shall be 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.
- 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. Throughout the rest of the splice less tension should be used. 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.

Surfaces of equipment or conductors being terminated or connected shall be prepared in accordance with industry standard practice and manufacturer's recommendations. All surfaces to be connected shall be thoroughly cleaned to remove all dirt, grease, oxides, nonconductive films, or other foreign material. Paints and other nonconductive coatings shall be removed to expose base metal. Clean all surfaces at least 1/4 inch (6.4 mm) beyond all sides of the larger bonded area on all mating surfaces. Use a joint compound suitable for the materials used in the connection. Repair painted/coated surface to original condition after completing the connection.

**108-3.6 Bare counterpoise wire installation for lightning protection and grounding.** If shown on the plans or included in the job specifications, bare solid#6 AWG copper counterpoise wire shall be installed for lightning protection of the underground cables.

~~a. **Equipotential.** – [Not Used.] 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.

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 Electric 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 cone of protection measured 45 degrees each side of vertical.

Where duct banks pass under pavement to be constructed in the project, the counterpoise shall be placed above the duct bank. Reference details on the construction plans.

**108-3.8 Counterpoise installation at existing duct banks.** When airfield lighting cables are indicated on the plans to be routed through existing duct banks, the new counterpoise wiring shall be terminated at ground rods at each end of the existing duct bank where the cables being protected enter and exit the duct bank. The new counterpoise conductor shall be bonded to the existing counterpoise system.

**108-3.9 Exothermic bonding.** Bonding of counterpoise wire shall be by the exothermic welding process or equivalent method accepted by the RPR. Only personnel experienced in and regularly engaged in this type of work shall make these connections.

Contractor shall demonstrate to the satisfaction of the RPR, the welding kits, materials and procedures to be used for welded connections prior to any installations in the field. The installations shall comply with the manufacturer's recommendations and the following:

- a. All slag shall be removed from welds.
- b. Using an exothermic weld to bond the counterpoise to a lug on a galvanized light base is not recommended unless the base has been specially modified. Consult the manufacturer's installation directions for proper methods of bonding copper wire to the light base. See also AC 150/5340-30 for galvanized light base exception.

- c. If called for in the plans, all buried copper and weld material at weld connections shall be thoroughly coated with 6 mm of 3M™ Scotchkote™, or approved equivalent, or coated with coal tar Bitumastic® material to prevent surface exposure to corrosive soil or moisture.

**108-3.10 Testing.** The Contractor shall furnish all necessary equipment and appliances for testing the airport electrical systems and underground cable circuits before and after installation. The Contractor shall perform all tests in the presence of the RPR. The Contractor shall demonstrate the electrical characteristics to the satisfaction of the RPR. All costs for testing are incidental to the respective item being tested. For phased projects, the tests must be completed by phase. The Contractor must maintain the test results throughout the entire project as well as during the warranty period that meet the following:

- a. Earth resistance testing methods shall be submitted to the RPR for approval. Earth resistance testing results shall be recorded on an approved form and testing shall be performed in the presence of the RPR. All such testing shall be at the sole expense of the Contractor.
- b. Should the counterpoise or ground grid conductors be damaged or suspected of being damaged by construction activities the Contractor shall test the conductors for continuity with a low resistance ohmmeter. The conductors shall be isolated such that no parallel path exists and tested for continuity. The RPR shall approve of the test method selected. All such testing shall be at the sole expense of the Contractor.

After installation, the Contractor shall test and demonstrate to the satisfaction of the RPR the following:

- c. That all affected lighting power and control circuits (existing and new) are continuous and free from short circuits.
- d. That all affected circuits (existing and new) are free from unspecified grounds.
- e. That the insulation resistance to ground of all new non-grounded high voltage series circuits or cable segments is not less than **100** megohms.
- 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. Test equipment and its calibration sheets shall be submitted for review and approval by the RPR prior to performing the testing.

Two copies of tabulated results of all cable tests performed shall be supplied by the Contractor to the RPR. Where connecting new cable to existing cable, insulation resistance tests shall be performed on the new cable prior to connection to the existing circuit.

There are no approved "repair" procedures for items that have failed testing other than complete replacement.

## METHOD OF MEASUREMENT

**108-4.1** The cost of all excavation, backfill, dewatering and restoration regardless of the type of material encountered shall be included in the unit price bid for the work.

**108-4.2** Cable or counterpoise wire installed in trench, duct bank or conduit shall be measured by the number of linear feet (meters) 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.

**108-4.3** The cost of ground rods and their installation shall be included in the unit price of the counterpoise pay item. Supplemental ground rod shall be measured by each additional 3/4" x 10' ground rod installed to obtain requirements shown in plans. If more than 1 additional supplemental ground rod is required, the contractor must notify the RPR and Owner for approval prior to installation.

## BASIS OF PAYMENT

**108-5.1** Payment will be made at the contract unit price for trenching, cable and bare counterpoise wire installed in trench (direct-buried), or cable and equipment ground installed in duct bank or conduit, in place by the Contractor and accepted by the RPR. This price shall be full compensation for furnishing all materials and for all preparation and installation of these materials, and for all labor, equipment, tools, and incidentals, including ground rods and ground connectors and trench marking tape, and any required connector kits, cable id tags, or splices to existing cable, and any other ancillary items necessary to complete this item.

Payment will be made under:

Item L-108-1	No. 8 AWG, 5 kV, L-824, Type C Cable – per linear foot
Item L-108-2	No. 6 AWG, Solid, Bare Counterpoise Wire, Installed in Trench, Above the Duct Bank or Conduit, Including Ground Rods and Ground Connectors – per linear foot
Item L-108-3	3/4" x 10' Copper Clad Ground Rod – Supplemental – per each

## MATERIAL REQUIREMENTS

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-59544	Cable and Wire, Electrical (Power, Fixed Installation) Commercial Item Description
A-A-55809	Insulation Tape, Electrical, Pressure-Sensitive Adhesive, Plastic
ASTM B3	Standard Specification for Soft or Annealed Copper Wire

ASTM B8	Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
ASTM B33	Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes
ASTM D4388	Standard Specification for Nonmetallic Semi-Conducting and Electrically Insulating Rubber Tapes
FED SPEC J-C-30	Cable and Wire, Electrical (Power, Fixed Installation)
MIL-I-24391	Insulation Tape, Electrical, Plastic, Pressure Sensitive

#### **REFERENCE DOCUMENTS**

NFPA-70	National Electrical Code (NEC)
NFPA-780	Standard for the Installation of Lightning Protection Systems
MIL-S-23586F	Performance Specification: Sealing Compound (with Accelerator), Silicone Rubber, Electrical
ANSI/IEEE STD 81	IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System

**END OF ITEM L-108**

**PAGE INTENTIONALLY LEFT BLANK**



## 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 Resident Project Representative (RPR).
- b. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications and acceptable to the RPR. Materials supplied and/or installed that do not comply with these specifications shall be removed, when directed by the RPR and replaced with materials, that comply with these specifications, at the Contractor's cost.
- c. All materials and equipment used to construct this item shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in project that accrue directly or indirectly from late submissions or resubmissions of submittals.
- d. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The 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 mil 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 RPR approved third party certification program. Precast concrete structures shall conform to ASTM C478.

**110-2.8 Flowable backfill.** Not Used. ~~Flowable material used to back fill conduit and duct bank trenches shall conform to the requirements of Item P-153, Controlled Low Strength Material. Fill shall be designed to achieve a 28-day compressive strength of 200 psi (1.4 MPa) under pavement.~~

**110-2.9 Detectable warning tape.** 4 to 6-inch plastic, detectable, American Public Works Association (APWA) Red (electrical power lines, cables, conduit and lighting cable), orange (communications/telephone/fiber optic cabling) with continuous legend magnetic tape shall be polyethylene film with a metallized foil core and shall be 4-6 inches (75-150 mm) wide. Detectable tape is incidental to the respective bid item.

## CONSTRUCTION METHODS

**110-3.1 General.** The Contractor shall install underground duct banks and conduits at the approximate locations indicated on the plans. The RPR shall indicate specific locations as the work progresses, if required to differ from the plans. Duct banks and conduits shall be of the size, material, and type indicated on the plans or specifications. Where no size is indicated on the plans or in the specifications, conduits shall be not less than 2 inches (50 mm) inside diameter or comply with the National Electrical Code based on cable to be installed, whichever is larger. All duct bank and conduit lines shall be laid so as to grade toward access points and duct or conduit ends for drainage. Unless shown otherwise on the plans, grades shall be at least 3 inches (75 mm) per 100 feet (30 m). On runs where it is not practicable to maintain the grade all one way, the duct bank and conduit lines shall be graded from the center in both directions toward access points or conduit ends, with a drain into the storm drainage system. Pockets or traps where moisture may accumulate shall be avoided. Under pavement, the top of the duct bank shall not be less than 18 inches (0.5 m) below the subgrade; in other locations, the top of the duct bank or underground conduit shall be not less than 18 inches (0.5 m) below finished grade.

The Contractor shall mandrel each individual conduit whether the conduit is direct-buried or part of a duct bank. An iron-shod mandrel, not more than 1/4 inch (6 mm) smaller than the bore of the conduit shall be pulled or pushed through each conduit. The mandrel shall have a leather or rubber gasket slightly larger than the conduit hole.

The Contractor shall swab out all conduits/ducts and clean base can, manhole, pull boxes, etc., interiors IMMEDIATELY prior to pulling cable. Once cleaned and swabbed the light bases, manholes, pull boxes, etc., and all accessible points of entry to the duct/conduit system shall be kept closed except when installing cables. Cleaning of ducts, base cans, manholes, etc., is incidental to the pay item of the item being cleaned. All raceway systems left open, after initial cleaning, for any reason shall be recleaned at the Contractor's expense. All accessible points shall be kept closed when not installing cable. The Contractor shall verify existing ducts proposed for use in this project as clear and open. The Contractor shall notify the RPR of any blockage in the existing ducts.

For pulling the permanent wiring, each individual conduit, whether the conduit is direct-buried or part of a duct bank, shall be provided with a 200 pound (90 kg) test polypropylene pull rope. The ends shall be secured and sufficient length shall be left in access points to prevent it from slipping back into the conduit. Where spare conduits are installed, as indicated on the plans, the open ends shall be plugged with removable tapered plugs, designed for this purpose.

All conduits shall be securely fastened in place during construction and shall be plugged to prevent contaminants from entering the conduits. Any conduit section having a defective joint shall not be installed. Ducts shall be supported and spaced apart using approved spacers at intervals not to exceed 5 feet (1.5 m).

Unless otherwise shown on the plans, concrete encased duct banks shall be used when crossing under pavements expected to carry aircraft loads, such as runways, taxiways, taxilanes, ramps and aprons. When under paved shoulders and other paved areas, conduit and duct banks shall be encased using flowable fill for protection.

All conduits within concrete encasement of the duct banks shall terminate with female ends for ease in current and future use. Install factory plugs in all unused ends. Do not cover the ends or plugs with concrete.

Where turf is well established and the sod can be removed, it shall be carefully stripped and properly stored.

Trenches for conduits and duct banks may be excavated manually or with mechanical trenching equipment unless in pavement, in which case they shall be excavated with mechanical trenching equipment. Walls of trenches shall be essentially vertical so that a minimum of shoulder surface is disturbed. Blades of graders shall not be used to excavate the trench.

When rock is encountered, the rock shall be removed to a depth of at least 3 inches (75 mm) below the required conduit or duct bank depth and it shall be replaced with bedding material of earth or sand containing no mineral aggregate particles that would be retained on a 1/4 inch (6 mm) sieve. Flowable backfill may alternatively be used. The Contractor shall ascertain the type of soil or rock to be excavated before bidding.

Underground electrical warning (Caution) tape shall be installed in the trench above all underground duct banks and conduits in unpaved areas. Contractor shall submit a sample of the proposed warning tape for approval by the RPR. If not shown on the plans, the warning tape shall be located 6 inches above the duct/conduit or the counterpoise wire if present.

Joints in plastic conduit shall be prepared per the manufacturer's recommendations for the particular type of conduit. Plastic conduit shall be prepared by application of a plastic cleaner and brushing a plastic solvent on the outside of the conduit ends and on the inside of the couplings. The conduit fitting shall then be slipped together with a quick one-quarter turn twist to set the joint tightly. Where more than one conduit is placed in a single trench, or in duct banks, joints in the conduit shall be staggered a minimum of 2 feet (60 cm).

Changes in direction of runs exceeding 10 degrees, either vertical or horizontal, shall be accomplished using manufactured sweep bends.

Whether or not specifically indicated on the drawings, where the soil encountered at established duct bank grade is an unsuitable material, as determined by the RPR, the unsuitable material shall be removed per Item P-152 and replaced with suitable material. Additional duct bank supports that are adequate and stable shall be installed, as approved by the RPR.

All excavation shall be unclassified and shall be considered incidental to the respective L-110 pay item of which it is a component part. Dewatering necessary for duct installation, erosion and turbidity control, per Federal, state, and local requirements is incidental to its respective pay item as a part of Item L-110. The cost of all excavation regardless of type of material encountered, shall be included in the unit price bid for the L-110 Item.

Unless otherwise specified, excavated materials that are deemed by the RPR to be unsuitable for use in backfill or embankments shall be removed and disposed of offsite.

Any excess excavation shall be filled with suitable material approved by the RPR and compacted per Item P-152.

It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Where existing active cables cross proposed installations, the Contractor shall ensure that these cables are adequately protected. Where crossings are unavoidable, no splices will be allowed in the existing cables, except as specified on the plans. Installation of new cable where such crossings must occur shall proceed as follows:

- a. Existing cables shall be located manually. Unearthed cables shall be inspected to assure absolutely no damage has occurred

- b. Trenching, etc., in cable areas shall then proceed with approval of the RPR, with care taken to minimize possible damage or disruption of existing cable, including careful backfilling in area of cable. In the event that any previously identified cable is damaged during the course of construction, the Contractor shall be responsible for the complete repair.

**110-3.2 Duct banks.** Unless otherwise shown in the plans, duct banks shall be installed so that the top of the concrete envelope is not less than 18 inches (0.5 m) below the bottom of the base or stabilized base course layers where installed under runways, taxiways, aprons, or other paved areas, and not less than 18 inches (0.5 m) below finished grade where installed in unpaved areas.

Unless otherwise shown on the plans, duct banks under paved areas shall extend at least 3 feet (1 m) beyond the edges of the pavement or 3 feet (1 m) beyond any under drains that may be installed alongside the paved area. Trenches for duct banks shall be opened the complete length before concrete is placed so that if any obstructions are encountered, provisions can be made to avoid them. Unless otherwise shown on the plans, all duct banks shall be placed on a layer of concrete not less than 3 inches (75 mm) thick prior to its initial set. The Contractor shall space the conduits not less than 3 inches (75 mm) apart (measured from outside wall to outside wall). All such multiple conduits shall be placed using conduit spacers applicable to the type of conduit. As the conduit laying progresses, concrete shall be placed around and on top of the conduits not less than 3 inches (75 mm) thick unless otherwise shown on the plans. All conduits shall terminate with female ends for ease of access in current and future use. Install factory plugs in all unused ends. Do not cover the ends or plugs with concrete.

Conduits forming the duct bank shall be installed using conduit spacers. No. 4 reinforcing bars shall be driven vertically into the soil a minimum of 6 inches (150 mm) to anchor the assembly into the earth prior to placing the concrete encasement. For this purpose, the spacers shall be fastened down with locking collars attached to the vertical bars. Spacers shall be installed at 5-foot (1.5-m) intervals. Spacers shall be in the proper sizes and configurations to fit the conduits. Locking collars and spacers shall be submitted to the RPR for review prior to use.

When specified, the Contractor shall reinforce the bottom side and top of encasements with steel reinforcing mesh or fabric or other approved metal reinforcement. When directed, the Contractor shall supply additional supports where the ground is soft and boggy, where ducts cross under roadways, or where shown on the plans. Under such conditions, the complete duct structure shall be supported on reinforced concrete footings, piers, or piles located at approximately 5-foot (1.5-m) intervals.

All pavement surfaces that are to have ducts installed therein shall be neatly saw cut to form a vertical face. All excavation shall be included in the contract with price for the duct.

Install a plastic, detectable, color as noted, 4 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 4-inch (75-mm) wide tape only for single conduit runs. Utilize the 6-inch (150-mm) wide tape for multiple conduits and duct banks, unless otherwise noted in plans. 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, unless otherwise noted in plans.

When existing cables are to be placed in split duct, encased in concrete, the cable shall be carefully located and exposed by hand tools. Prior to being placed in duct, the RPR shall be notified so that he may inspect the cable and determine that it is in good condition. Where required, split duct shall be installed as shown on the drawings or as required by the RPR.

**110-3.3 Conduits without concrete encasement.** Trenches for single-conduit lines shall be not less than 6 inches (150 mm) nor more than 12 inches (300 mm) wide. The trench for 2 or more conduits installed at the same level shall be proportionately wider. Trench bottoms for conduits without concrete encasement shall be made to conform accurately to grade so as to provide uniform support for the conduit along its entire length.

Unless otherwise shown on the plans, a layer of fine earth material, at least 4 inches (100 mm) thick (loose measurement) shall be placed in the bottom of the trench as bedding for the conduit. The bedding material shall consist of soft dirt, sand or other fine fill, and it shall contain no particles that would be retained on a 1/4 inch (6.3 mm) sieve. The bedding material shall be tamped until firm. 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 RPR for review prior to use.

**110-3.4 Markers.** The location of each end and of each change of direction of conduits and duct banks shall be marked by a concrete slab marker 2 feet (60 cm) square and 4 - 6 inches (100 - 150 mm) thick extending approximately one inch (25 mm) above the surface. The markers shall also be located directly above the ends of all conduits or duct banks, except where they terminate in a junction/access structure or building. Each cable or duct run from a line of lights and signs to the equipment vault must be marked at approximately every 200 feet (61 m) along the cable or duct run, with an additional marker at each change of direction of cable or duct run.

The Contractor shall impress the word "DUCT" or "CONDUIT" on each marker slab. Impression of letters shall be done in a manner, approved by the RPR, for a neat, professional appearance. All letters and words must be neatly stenciled. After placement, all markers shall be given one coat of high-visibility orange paint, as approved by the RPR. The Contractor shall also impress on the slab the number and size of conduits beneath the marker along with all other necessary information as determined by the RPR. The letters shall be 4 inches (100 mm) high and 3 inches (75 mm) wide with width of stroke 1/2 inch (12 mm) and 1/4 inch (6 mm) deep or as large as the available space permits. Furnishing and installation of duct markers is incidental to the respective duct pay item.

**110-3.5 Backfilling for conduits.** For conduits, 8 inches (200 mm) of sand, soft earth, or other fine fill (loose measurement) shall be placed around the conduits ducts and carefully tamped around and over them with hand tampers. The remaining trench shall then be backfilled and compacted per Item P-152 except that material used for back fill shall be select material not larger than 4 inches (100 mm) in diameter ~~compacted to 95% maximum density as determined by ASTM D698.~~

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 RPR.

**110-3.6 Backfilling for duct banks.** After the concrete has cured, the remaining trench shall be backfilled and compacted per Item P-152 "Excavation and Embankment" except that material used for backfill shall be select material not larger than 4 inches (100 mm) in diameter ~~backfilled and compacted to 95% maximum density as determined by ASTM D698.~~ 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 RPR.

**110-3.7 Restoration.** Where sod has been removed, it shall be replaced as soon as possible after the backfilling is completed. All areas disturbed by the work shall be restored to its original condition. The restoration shall include seeding or sodding as 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.

## METHOD OF MEASUREMENT

**110-4.1** Underground conduits and duct banks shall be measured by the linear feet (meter) of conduits and duct banks installed, including encasement, locator tape, trenching and backfill with designated material, 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 furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item per the provisions and intent of the plans and specifications.

Payment will be made under:

Item L-110-1	1 Way 2-inch Direct Earth Buried – per linear foot
Item L-110-2	2 Way 2-inch Concrete Encased – per linear foot

## MATERIAL REQUIREMENTS

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 A615      Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

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 <sup>3</sup> (2,700 kN-m/m <sup>3</sup> ))
ASTM D2167	Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D2922	Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
NFPA-70	National Electrical Code (NEC)
Underwriters Laboratories (UL)	
UL Standard 6	Electrical Rigid Metal Conduit - Steel
UL Standard 514B	Conduit, Tubing, and Cable Fittings
UL Standard 514C	Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
UL Standard 1242	Electrical Intermediate Metal Conduit Steel
UL Standard 651	Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings
UL Standard 651A	Type EB and A Rigid PVC Conduit and HDPE Conduit

**END OF ITEM L-110**



## ITEM L-115 ELECTRICAL MANHOLES AND JUNCTION STRUCTURES

### DESCRIPTION

**115-1.1** This item shall consist of electrical manholes and junction structures (handholes, pull boxes, junction cans, etc.) installed in accordance with this specification, at the indicated locations and conforming to the lines, grades and dimensions shown on the plans or as required by the Engineer. This item shall include the installation of each electrical manhole and/or junction structures with all associated excavation, backfilling, sheeting and bracing, concrete, reinforcing steel, ladders, appurtenances, testing, dewatering and restoration of surfaces to the satisfaction of the Engineer.

### EQUIPMENT AND MATERIALS

#### 115-2.1 GENERAL.

- a. All equipment and materials covered by referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when so requested by the Engineer.
- b. Manufacturer's certifications shall not relieve the Contractor of the Contractor's responsibility to provide materials in accordance with these specifications and acceptable to the Engineer. Materials supplied and/or installed that do not materially 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 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 pertinent products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be boldly and clearly made with arrows or circles (highlighting is not acceptable). Contractor is solely responsible for delays in 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 neatly bound in a properly sized 3-ring binder, tabbed by specification section. The Engineer reserves the right to reject any and 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. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

**115-2.2 CONCRETE STRUCTURES.** Cast-in-place concrete structures shall conform to the details and dimensions shown on the plans.

Provide precast concrete structures where shown on the plans. Precast concrete structures shall be an approved standard design of the manufacturer. Precast units shall have mortar or Bitumastic sealer placed between all joints to make them watertight. The structure shall be designed to withstand 70,600 lb aircraft

loads, unless otherwise shown on the plans. Openings or knockouts shall be provided in the structure as detailed on the plans.

Threaded inserts and pulling eyes shall be cast in as shown.

If the Contractor chooses to propose a different structural design, signed and sealed shop drawings, design calculations, and other information requested by the Engineer shall be submitted by the Contractor to allow for a full evaluation by the Engineer. The Engineer shall review in accordance with the process defined in the General Provisions.

**115-2.3 JUNCTION CANS.** Junction Cans shall be L-867 Class 1 (non-load bearing) or L-868 Class 1 (load bearing) cans encased in concrete. The cans shall have a galvanized steel blank cover, gasket, and stainless steel hardware. Covers shall be 3/8" thickness for L-867 and 3/4" thickness for L-868.

**115-2.4 MORTAR.** The mortar shall be composed of one part of Portland cement and two parts of mortar sand, by volume. The Portland cement shall conform to the requirements of ASTM C 150, Type I. The sand shall conform to the requirements of ASTM C 144. Hydrated lime may be added to the mixture of sand and cement in an amount not to exceed 15 percent of the weight of cement used. The hydrated lime shall meet the requirements of ASTM C 6. The water shall be clean and free of deleterious amounts of acid, alkalis or organic material. If the water is of questionable quality, it shall be tested in accordance with AASHTO T-26.

**115-2.5 CONCRETE.** All concrete used in structures shall conform to the requirements of Item P-610, Structural Portland Cement Concrete.

**115-2.6 FRAMES AND COVERS.** The frames shall conform to one of the following requirements.

- |    |                     |  |
|----|---------------------|--|
| a. | ASTM A 48           | Gray iron castings                     |
| b. | ASTM A 47           | Malleable iron castings                |
| c. | ASTM A 27           | Steel castings                         |
| d. | ASTM A 283, Grade D | Structural steel for grates and frames |
| e. | ASTM A 536          | Ductile iron castings                  |
| f. | ASTM A 897          | Austempered ductile iron castings      |

All castings specified shall withstand a maximum tire pressure of 167 psi and maximum load of 35,300 lb.

All castings or structural steel units shall conform to the dimensions shown on the plans and shall be designed to support the loadings specified.

Each frame and cover unit shall be provided with fastening members to prevent it from being dislodged by traffic, but which will allow easy removal for access to the structure.

All castings shall be thoroughly cleaned. After fabrication, structural steel units shall be galvanized to meet the requirements of ASTM A 123.

Each cover shall have the word "ELECTRIC" or other approved designation cast on it. Each frame and cover shall be as shown on the plans or approved equivalent. No cable notches are required.

**115-2.7 LADDERS.** Not Used. ~~Ladders, if specified, shall be galvanized steel or as shown on the plans.~~

**115-2.8 REINFORCING STEEL.** All reinforcing steel shall be deformed bars of new billet steel meeting the requirements of ASTM A 615, Grade 60.

**115-2.9 BEDDING/SPECIAL BACKFILL.** Bedding or special backfill shall be as shown on the plans.

**115-2.10 FLOWABLE BACKFILL.** Flowable material used to backfill shall conform to the requirements of Item P-153 "Controlled Low Strength Material".

**115-2.11 CABLE TRAYS.** Cable trays shall be of galvanized steel. Cable trays shall be located as shown on the plans.

**115-2.12 PLASTIC CONDUIT.** Plastic conduit shall comply with Item L-110 - Airport Underground Electrical Duct Banks and Conduits.

**115-2.13 CONDUIT TERMINATORS.** Conduit terminators shall be pre-manufactured for the specific purpose and sized as required or as shown on the plans.

**115-2.14 PULLING-IN IRONS.** Pulling-in irons shall be manufactured with 7/8 in (22 mm) diameter hot-dipped galvanized steel or stress-relieved carbon steel roping designed for concrete applications (7 strand, 1/2 in diameter with an ultimate strength of 270,000 psi). Where stress-relieved carbon steel roping is used, a rustproof sleeve shall be installed at the hooking point and all exposed surfaces shall be encapsulated with a polyester coating to prevent corrosion.

**115-2.15 GROUND RODS.** Ground rods shall be one piece, copper clad. The ground rods shall be of the length and diameter specified on the plans, but in no case shall they be less than 8-feet (240 cm) long nor less than 5/8 in (15 mm) in diameter.

## **CONSTRUCTION METHODS**

**115-3.1 UNCLASSIFIED EXCAVATION.** It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Damage to utility lines, through lack of care in excavating, shall be repaired or replaced to the satisfaction of the Engineer without additional expense to the Owner.

The Contractor shall perform excavation for structures and structure footings to the lines and grades or elevations shown on the plans or as staked by the 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.

All excavation shall be unclassified and shall be considered incidental to the respective L-115 pay item of which it is a component part. Dewatering necessary for L-115 structure installation, erosion and turbidity control, in accordance with Federal, State, and Local requirements is incidental to its respective pay item as a part of Item L-115. The cost of all excavation regardless of type of material encountered, shall be included in the unit price bid for the L-115 Item.

Boulders, logs and all other objectionable material encountered in excavation shall be removed. All rock and other hard foundation material shall be cleaned of all loose material and cut to a firm surface either level, stepped or serrated, as directed by the Engineer. All seams, crevices, disintegrated rock and thin strata shall be removed. When concrete is to rest on a surface other than rock, special care shall be taken not to disturb the bottom of the excavation. Excavation to final grade shall not be made until just before the concrete or reinforcing is to be placed.

The Contractor shall provide all bracing, sheeting and shoring necessary to implement and protect the excavation and the structure as required for safety or conformance to governing laws. The cost of bracing, sheeting and shoring shall be included in the unit price bid for the structure.

Unless otherwise provided, bracing, sheeting and shoring involved in the construction of this item shall be removed by the Contractor after the completion of the structure. Removal shall be effected in a manner that will not disturb or mar finished masonry. The cost of removal shall be included in the unit price bid for the structure.

After each excavation is completed, the Contractor shall notify the Engineer. Structures shall be placed after the Engineer has approved the depth of the excavation and the suitability of the foundation material.

Prior to installation the Contractor shall provide a minimum of 6 in of sand or a material approved by the Engineer as a suitable base to receive the structure. The base material shall be compacted and graded level and at proper elevation to receive the structure in proper relation to the conduit grade or ground cover requirements, as indicated on the plans.

**115-3.2 CONCRETE STRUCTURES.** Concrete structures shall be built on prepared foundations conforming to the dimensions and form indicated on the plans. The concrete and construction methods shall conform to the requirements specified in Item P-610. Any reinforcement required shall be placed as indicated on the plans and shall be approved by the Engineer before the concrete is placed.

**115-3.3 PRECAST UNIT INSTALLATIONS.** Precast units shall be installed plumb and true. Joints shall be made watertight by use of sealant at each tongue-and-groove joint and at roof of manhole. Excess sealant shall be removed and severe surface projections on exterior of neck shall be removed.

**115-3.4 PLACEMENT AND TREATMENT OF CASTINGS, FRAMES AND FITTINGS.** All castings, frames and fittings shall be placed in the positions indicated on the Plans or as directed by the Engineer and shall be set true to line and to correct elevation. If frames or fittings are to be set in concrete or cement mortar, all anchors or bolts shall be in place and position before the concrete or mortar is placed. The unit shall not be disturbed until the mortar or concrete has set.

Field connections shall be made with bolts, unless indicated otherwise. Welding will not be permitted unless shown otherwise on the approved shop drawings and written permission is granted by the casting manufacturer. Erection equipment shall be suitable and safe for the workman. Errors in shop fabrication or deformation resulting from handling and transportation that prevent the proper assembly and fitting of parts shall be reported immediately to the Engineer and approval of the method of correction shall be obtained. Approved corrections shall be made at Contractor's expense.

Anchor bolts and anchors shall be properly located and built into connection work. Bolts and anchors shall be preset by the use of templates or such other methods as may be required to locate the anchors and anchor bolts accurately.

Pulling-in irons shall be located opposite all conduit entrances into structures to provide a strong, convenient attachment for pulling-in blocks when installing cables. Pulling-in irons shall be set directly into the concrete walls of the structure.

**115-3.5 INSTALLATION OF LADDERS.** Ladders shall be installed such that they may be removed if necessary. Mounting brackets shall be supplied top and bottom and shall be cast in place during fabrication of the structure or drilled and grouted in place after erection of the structure.

**115-3.6 REMOVAL OF SHEETING AND BRACING.** In general, all sheeting and bracing used to support the sides of trenches or other open excavations shall be withdrawn as the trenches or other open excavations are being refilled. That portion of the sheeting extending below the top of a structure shall be

withdrawn, unless otherwise directed, before more than six (6) in of material is placed above the top of the structure and before any bracing is removed. Voids left by the sheeting shall be carefully refilled with selected material and rammed tight with tools especially adapted for the purpose or otherwise as may be approved.

The Engineer may order the Contractor to delay the removal of sheeting and bracing if, in his judgment, the installed work has not attained the necessary strength to permit placing of backfill.

**115-3.7 BACKFILLING.** After a structure has been completed, the area around it shall be backfilled in horizontal layers not to exceed 6 in in thickness measured after compaction to the density requirements in Item P-152. Each layer shall be deposited all around the structure to approximately the same elevation. The top of the fill shall meet the elevation shown on the plans or as directed by the Engineer.

Backfill shall not be placed against any structure until permission is given by the Engineer. In the case of concrete, such permission shall not be given until tests made by the laboratory under supervision of the Engineer establish that the concrete has attained sufficient strength to provide a factor of safety against damage or strain in withstanding any pressure created by the backfill or the methods used in placing it.

Where required, the Engineer may direct the Contractor to add, at his own expense, sufficient water during compaction to assure a complete consolidation of the backfill. The Contractor shall be responsible for all damage or injury done to conduits, duct banks, structures, property or persons due to improper placing or compacting of backfill.

**115-3.8 CONNECTION OF DUCT BANKS.** To relieve stress of joint between concrete-encased duct banks and structure walls, reinforcement rods shall be placed in the structure wall and shall be formed and tied into duct bank reinforcement at the time the duct bank is installed.

**115-3.9 GROUNDING.** A ground rod shall be installed in the floor of all concrete structures so that the top of rod extends 6 in (154 mm) above the floor. The ground rod shall be installed within 1 ft of a corner of the concrete structure. Ground rods shall be installed prior to casting the bottom slab. Where the soil condition does not permit driving the ground rod into the earth without damage to the ground rod, the Contractor shall drill a 4 in diameter hole into the earth to receive the ground rod. The hole around the ground rod shall be filled throughout its length, below slab, with Portland cement grout. Ground rods shall be installed in precast bottom slab of structures by drilling a hole through bottom slab and installing the ground rod. Bottom slab penetration shall be sealed watertight with Portland cement grout around the ground rod.

A grounding bus of 4/0 bare stranded copper shall be exothermically bonded to the ground rod and loop the concrete structure walls. The ground bus shall be a minimum of 1 ft above the floor of the structure and separate from other cables. No. 2 AWG bare copper pigtailed shall bond the grounding bus to all cable trays and other metal hardware within the concrete structure. Connections to the grounding bus shall be exothermic. Hardware connections may be mechanical, using a lug designed for that purpose.

**115-3.10 CLEANUP AND REPAIR.** After erection of all galvanized items, damaged areas shall be repaired by applying a liquid cold-galvanizing compound conforming MIL-P-21035. Surfaces shall be prepared and compound applied in accordance with manufacturer's recommendations.

Prior to acceptance, the entire structure shall be cleaned of all dirt and debris.

**115-3.11 RESTORATION.** After the backfill is completed, the Contractor shall dispose of all surplus material, dirt and rubbish from the site. The Contractor shall restore all disturbed areas equivalent to or better than their original condition. All sodding, grading and restoration shall be considered incidental to the respective L-115 pay item.

The Contractor shall grade around structures as required to provide positive drainage away from the structure.

Areas with special surface treatment, such as roads, sidewalks, or other paved areas shall have backfill compacted to match surrounding areas, and surfaces shall be repaired using materials comparable to original materials.

After all work is completed, the Contractor shall remove all tools and other equipment, leaving the entire site free, clear and in good condition.

**115-3.12 INSPECTION.** Prior to final approval, the electrical structures shall be thoroughly inspected for conformance with the plans and this specification. Any indication of defects in materials or workmanship shall be further investigated and corrected. The earth resistance to ground of each ground rod shall not exceed 25 ohms. Each ground rod shall be tested using the fall-of-potential ground impedance test as described by ANSI IEEE Standard 81. This test shall be performed prior to establishing connections to other ground electrodes.

~~**115-3.13 Manhole Elevation Adjustments.** The Contractor shall adjust the tops of existing manholes in areas designated in the Contract Documents to the new elevations shown. The Contractor shall be responsible for determining the exact height adjustment required to raise the top of each manhole to the new elevations. The existing top elevation of each manhole to be adjusted shall be determined in the field and subtracted/added from the proposed top elevation.~~

~~The Contractor shall remove/extend the existing top section or ring and cover on the manhole structure or manhole access. The Contractor shall then install precast concrete sections or grade rings of the required dimensions to adjust the manhole top to the new proposed elevation or shall cut the existing manhole walls to shorten the existing structure, as required by final grades. Finally, the Contractor shall reinstall the manhole top section or ring and cover on top and check the new top elevation.~~

~~The Contractor shall construct a concrete slab around the top of adjusted structures located in graded areas that are not to be paved. The concrete slab shall conform to the dimensions shown on the plans.~~

**115-3.14 Duct Extension to Existing Ducts.** Where existing concrete encased ducts are to be extended, the duct extension shall be concrete encased plastic conduit. The fittings to connect the ducts together shall be standard manufactured connectors designed and approved for the purpose. The duct extensions shall be installed according to the concrete encased duct detail and as shown on the plans.

## METHOD OF MEASUREMENT

**115-4.1** Electrical manholes and junction structures shall be measured by each unit completed in place and accepted. The following additional items are specifically included in each unit.

- All Required Excavation, Dewatering
- Sheeting and Bracing
- All Required Backfilling with On-Site Materials
- Restoration of All Surfaces and Finished Grading, Sodding
- All Required Connections
- Dewatering If Required
- Temporary Cables and Connections
- Ground Rod Testing

~~115-4.2 Manhole elevation adjustments shall be measured by the completed unit installed, in place, completed, and accepted. Separate measurement shall not be made for the various types and sizes.~~

#### **BASIS OF PAYMENT**

**115-5.1** The accepted quantity of electrical manholes and junction structures will be paid for at the Contract unit price per each, complete and in place. This price shall be full compensation for furnishing all materials and for all preparation, excavation, backfilling and placing of the materials, furnishing and installation of appurtenances and connections to duct banks and other structures as may be required to complete the item as shown on the plans and for all labor, equipment, tools and incidentals necessary to complete the structure.

~~115-5.2 Payment shall be made at the contract unit price for manhole elevation adjustments. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary, including but not limited to, spacers, concrete, rebar, dewatering, excavating, backfill, topsoil, sodding and pavement restoration, where required, to complete this item as shown in the plans and to the satisfaction of the Engineer.~~

Payment will be made under:

L-115-1	Electrical Junction Can Plaza - 2 L-867D Cans	per each
---------	---	----------

#### **MATERIAL REQUIREMENTS**

ANSI/IEEE Std 81	IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System
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
FED SPEC J-C-30	Cable and Wire, Electrical Power, Fixed Installation (cancelled; replaced by AA-59544 Cable and Wire, Electrical (Power, Fixed Installation))
ASTM B.3	Soft or Annealed Copper Wire
ASTM B.8	Concentric-Lay-Stranded Copper Conductor, Hard, Medium-Hard, or Soft

#### **END OF ITEM L-115**

This Page Intentionally Left Blank



## 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. The systems are 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 Resident Project Representative (RPR).

### EQUIPMENT AND MATERIALS

#### **125-2.1 General.**

**a.** Airport lighting equipment and materials covered by Federal Aviation Administration (FAA) specifications shall be as approved under the Airport Lighting Equipment Certification Program described in the current version of Appendix 3 to Advisory Circular (AC) 150/5345-53. 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 the Contractor's responsibility to provide materials in accordance with these specifications, Appendix 3 to AC 150/5345-53 and as deemed acceptable to the RPR. Materials supplied and/or installed that do not materially comply with these specifications shall be removed, when directed by the RPR and replaced with materials, which do comply with these specifications, at the sole cost of the Contractor.

**c.** All materials and equipment used to construct this item shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify pertinent products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be boldly and clearly made with arrows or circles (highlighting is not acceptable). Contractor is solely responsible for delays in project accruing directly or indirectly from late submissions or resubmissions of submittals.

**d.** The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications and AC 150/5345-53. 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, which, in the RPR's opinion, does not meet the system design and the standards and codes, specified herein.

**e.** All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

### EQUIPMENT AND MATERIALS

**125-2.2 Concrete.** Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures.

**125-2.3 Conduit/Duct.** Conduit shall conform to Item L-110 - Installation of Airport Underground Electrical Duct.

**125-2.4 Cable and Counterpoise.** Cable and Counterpoise shall conform to Item L-108 Installation of Underground Cable for Airports.

**125-2.5 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.

**125-2.6 Cable Connections.** Cable Connections shall conform to Item L-108 Installation of Underground Cable for Airports.

**125-2.7 Retroreflective markers.** Not Used. ~~Retroreflective markers shall be type L-853 and shall conform to the requirements of 150/5345-39 and be listed in appendix 3 to AC 150/5345-53.~~

**125-2.8 Light Base And Transformer Housings.** Light Base and Transformer Housings shall conform to the requirements of 150/5345-42 and be listed in appendix 3 to AC 150/5345-53. Light bases shall be Type L-867, Class 1A, Size B shall be provided as indicated or as required to accommodate the fixture or device installed thereon. Base plates, cover plates, and adapter plates shall be provided to accommodate various sizes of fixtures.

**125-2.9 Isolation Transformers.** Isolation transformers shall be Type L-830, size as required for each installation. Transformer shall conform to AC 150/5345-47 and be listed in appendix 3 to AC 150/5345-53.

**125-2.10 Runway And Taxiway Lights.** ~~Runway and Taxiway Edge Lights shall conform to the requirements of 150/5345-46 and be listed in appendix 3 to AC 150/5345-53.~~ 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.

**a. Taxiway Elevated Lights.**

- (1) L-861T Taxiway Edge, LED

**b. Lamps and Filters.** 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.

**125-2.11 Runway And Taxiway Signs.** ~~Runway and Taxiway Signs shall conform to the requirements of 150/5345-44 and be listed in the current version of Appendix 3 to AC 150/5345-53.~~

- a. L-858Y(L) Direction Sign; Size 2, Style 2, Class 2, Mode 2, LED type

~~b. L-858R(L) Mandatory Sign; Size 2, Style 2, Class 2, Mode 2, LED Type~~

**125-2.12 Runway End Identifier Light (REIL).** Not Used. ~~The REIL fixtures shall meet the requirements of FAA AC 150/5345-51, Type L-849I, Style C and be listed in the current version of Appendix 3 to AC 150/5345-53.~~

**125-2.13 Precision Approach Path Indicator (PAPI).** Not Used. ~~The light units for the PAPI shall meet the requirements of FAA AC 150/5345-28, Type L-881 or L-881(L), Style B, Class I and be listed in the current version of Appendix 3 to AC 150/5345-53~~

**125-2.14 Constant Current Regulator.** Not Used. ~~The constant current regulator shall be FAA AC 150/5345-10, Type L-828, Class 1, Style 1, 6.6A, 7.5kW Ferroresonant with internal S1 cutout and be listed in the current version of Appendix 3 to AC 150/5345-53.~~

**125-2.15 Spare parts.** The following table lists the electrical spare parts required to be furnished by the Contractor. All spare parts shall be identical to the parts approved and installed in the project.

SPARE PARTS LIST		
Category	Description	Quantity
	L-861T(L) Taxiway Edge Light Fixture	3

### INSTALLATION

**125-3.1 Installation.** The Contractor shall furnish, install, connect and test all equipment, accessories, conduit, cables, wires, buses, grounds and support items necessary to ensure a complete and operable airport lighting system as specified here and shown in the plans.

The equipment installation and mounting shall comply with the requirements of the National Electrical Code and state and local code agencies having jurisdiction.

The Contractor shall install the specified equipment in accordance with the applicable advisory circulars and the details shown on the plans.

**125-3.2 Testing.** All lights shall be fully tested by continuous operation for not less than 24 hours as a completed system prior to acceptance. The test shall include operating the constant current regulator in each step not less than 10 times at the beginning and end of the 24-hour test. The fixtures shall illuminate properly during each portion of the test.

**125-3.3 Shipping And Storage** Equipment shall be shipped in suitable packing material to prevent damage during shipping. Store and maintain equipment and materials in areas protected from weather and physical damage. Any equipment and materials, in the opinion of the RPR, damaged during construction or storage shall be replaced by the Contractor at no additional cost to the owner. Painted or galvanized surfaces that are damaged shall be repaired in accordance with the manufacturer's recommendations.

### 125-3.4 Elevated and In-pavement lights

a. Water, debris, and other foreign substances shall be removed prior to installing light base and light.

b. 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 fixture shall be oriented with the light beams parallel to the runway or taxiway centerline and facing in the required direction. 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.** Edge lights will be measured by the number of each type installed as completed units in place, ready for operation, and accepted by the RPR. Each airfield light unit shall include the installation of an identification plate or tag as detailed in the plans.

The measurement of furnished spare parts shall be per lump sum for all spare parts furnished and accepted by the RPR.

The gate motor and electric rack, modifications to existing power panel, and modifications to Airfield Lighting Control System will be measured per lump sum of each type installed as completed units, in place, ready for operation, and accepted by the RPR.

**BASIS OF PAYMENT**

**125-5.1.** Payment will be made at the Contract unit price for each complete light fixture installed by the Contractor and accepted by the RPR. This payment will be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools and incidentals necessary to complete this item.

Payment will be made under:

Item L-125-1	L-861T(L) LED Taxiway Elevated Edge Light – Installed in Turf – per each
Item L-125-2	L858(L) LED Sign, 3-Module
Item L-125-3	Airport Lighting Control System Modifications – per lump sum
Item L-125-4	Spare Parts – per lump sum

**MATERIAL REQUIREMENTS**

AC 150/5345-5	Circuit Selector Switch
AC 150/5345-26	L-823 Plug and Receptacle, Cable Connectors
AC 150/5345-28	Precision Approach Path Indicator (PAPI) Systems
AC 150/5345-42	Airport Light Bases, Transformer Houses, Junction Boxes and Accessories
AC 150/5345-44	Taxiway and Runway Signs
AC 150/5345-46	Runway and Taxiway Light Fixtures
AC 150/5345-47	Isolation Transformers for Airport Lighting Systems
AC 150/5345-51	Discharge-Type Flasher Equipment

**END OF SECTION L-125**

## ITEM L-131 DEMONSTRATIONS, TESTS AND PERFORMANCE VERIFICATION

### DESCRIPTION

**131-1.1 General.** This item includes the furnishing of all labor, materials, equipment and services necessary to provide demonstrations, testing and performance verification necessary to show electrical system compliance to these specifications.

### DEMONSTRATIONS

**131-2.1 Check-Out Memo.** Where required by the plans and specifications, provide manufacturer assistance during the testing, start-up, performance verification, demonstrations and Owner training. Complete the Check-Out Memo contained in Appendix A, Figure 1.

**131-2.2** Demonstrate the essential features of the following electrical systems as related to this project:

- Electrical systems control and equipment
- Electrical power equipment
- Panelboards
- Distribution panels
- Main panels, power panels
- Circuit Breakers
- Wiring systems
- Grounding systems
- Low-voltage controls
- Airfield lighting fixtures
- Constant Current Regulators
- Local Control Panel
- Pavement Sensor

**131-2.3** The demonstration shall be held upon completion of all systems, including testing, at a date to be agreed upon in writing by the Owner or his designated representative. The demonstration shall be held by the Contractor in the presence of the Owner and the Manufacturer's Representative.

**131-2.4** Prior to acceptance of the work, the Contractor shall demonstrate to the Owner, or his designated representative, all features and functions of all systems and shall instruct the Owner in the proper operation of the systems. After testing is completed satisfactorily, each system shall be demonstrated once.

The demonstration shall consist of not less than the following:

**a.** Point out the actual location of each component of the system and demonstrate its function and its relationship to other components within the system.

**b.** Demonstrate the electrical systems by actual "start-stop" operation showing how to work controls, how to reset protective devices, how to replace fuses, and what to do in an emergency. Indicate each item's relationship to the riser diagrams and drawings.

**c.** Demonstrate communication, signal, alarm and detection systems by actual operation of the systems and show how to reset signal, alarm and detection devices.

The Contractor shall furnish the necessary trained personnel to perform the demonstration and instructions, and shall arrange to have the manufacturer's representatives present to assist with the demonstrations.

All functional and operational testing of protective interlocking, automatic controls, instrumentation, alarm systems, and all other field testing of the main systems will be completed before the systems are demonstrated.

**131-2.5** Submit six (6) copies of the Performance Verification and Demonstration to Owner Form (Appendix A, Figure 2), signed by the Contractor, subcontractor and Owner and insert one copy in each Operation and Maintenance Manual and the original shall be inserted in the Project Closeout Documentation Manual.

## **TESTS AND PERFORMANCE**

**131-3.1 Tests And Performance Verification.** Operate system for a 3-day period. Do performance verification work as required to show that the system is operating correctly in accordance with design. Supply instruments required to read data. Adjust system to operate at the required performance levels. Tabulate data for submission. Submit data on 8-1/2-inch x 11-inch sheets with time and name of checker. Where specific performance verification information is called for in the specifications, use copies of the sheets provided for recording readings. Data shall be submitted and approved before Check-Out Memos are signed or a request for final inspection is made. Submit data in Operation and Maintenance Manuals.

At completion of construction after all performance verification and testing information has been gathered, submitted, and approved, provide one copy of this information to the Manufacturer's representative of the equipment. Work required under this section shall include having the representative examine the performance verification information, check the equipment in the field while it is operating, and sign a Check-Out Memo for a record. Submit six (6) copies of the Check-Out Memo on each major item of equipment. Approved memos shall be inserted in each Operation and Maintenance Manual with the performance verification information. Memos shall be submitted and approved before instruction to Owner or a request for final inspection.

**131-3.2 Tests.** After cables are in place, but before being connected to devices and equipment, the system shall be tested for shorts, opens, intentional and unintentional grounds by means of an approved type of "megger." Airfield lighting cables shall be tested in accordance with Item L-108 Installation of Underground Cable for Airports.

The tests shall be performed and recorded in the presence of the Resident Project Representative (RPR) and the Owner and the test results shall be placed in the Operation and Maintenance Manuals. All wires in conduit that are shorted or unintentionally grounded shall be replaced.

Take readings of voltage and amperage at building main disconnect switch and at main for each panel, at primary side of each lighting transformer and at the end of the longest branch circuit at each panel. The above readings shall be taken (1) "no load" conditions and (2) at "full load" conditions with all equipment using electricity. Tabulate readings, complete "Voltage and Amperage Readings/Tabulated Data" form (see Appendix A, Figure 3) and submit in the O&M Manuals.

The resistance between ground and absolute earth shall be measured by the Contractor before equipment is placed in operation. Testing shall be performed on all ground rod installations before connecting the grounding conductor. The resistance between each ground rod and absolute earth shall not exceed twenty-five (25) ohms. Testing shall be three (3) point method in accordance with IEEE recommended practice and witnessed by the RPR and Owner. Record data on the Ground Test Information form contained in Appendix A, Figure 4. All ground rods shall be tested.

Perform such tests as required by authorities having jurisdiction over the site, or other tests/inspections as required by other sections of this specification.

There are no approved "repair" procedures for items that have failed testing other than complete replacement. Any other corrective measures shall be approved by the RPR. The addition of ground rod sections to the ground rods shall be considered replacement for this item.

**131-3.3 Correction Of Errors.** The Contractor shall immediately correct any errors or omissions in his work which are discovered during testing. This shall include but not be limited to, improper phasing resulting in reverse rotation, misinterpretations, incomplete grounding, damaged equipment or materials, or incomplete work the Contractor has already verified as being complete. The Contractor shall immediately replace, repair, or complete these errors and omissions as soon as they are brought to his attention, even if this requires disruption of his scheduled construction activities or work on an overtime basis. Failure to take immediate action or an excessive number of errors or omissions shall make the Contractor liable for the time lost by the Owner's operating forces, and any other personnel.

#### **METHOD OF MEASUREMENT**

**131-4.1** The items described in this section are incidental to other sections and shall not be measured for payment.

#### **BASIS OF PAYMENT**

**131-5.1** No direct payment shall be made for the work described in this section. The work described in this section is incidental to other items and shall be paid for in the respective bid item of which it is a component part.

### CHECK-OUT MEMO

This form shall be completed and a copy provided to the Owner at the Owner's Performance Verification and Demonstration meeting. A copy shall also be included in the specification section of the O & M Manual for the equipment checked.

Project Name: Albert J. Ellis Airport – Taxiway A Rehabilitation  
Type of Equipment Checked: \_\_\_\_\_  
Equipment Number: \_\_\_\_\_  
Name of Manufacturer: \_\_\_\_\_

Signature below by the manufacturer's authorized representative signifies that the equipment has been satisfactorily tested and checked out on the job by the manufacturer.

1. The attached Test Data and Performance Verification information was used to evaluate the equipment installation and operation.
2. The equipment is properly installed, has been tested by the manufacturer's authorized representative, and is operating satisfactorily in accordance with all requirements, except for items noted below.\*
3. Written operating and maintenance information has been presented to the Contractor, and gone over with him in detail.
4. Sufficient copies of all applicable operating and maintenance information, parts lists, lubrication checklists, and warranties have been furnished to the Contractor for insertion in the Operating and Maintenance Manuals.

Checked By: \_\_\_\_\_  
(Print or Type Name of Manufacturer's Representative)  
  
\_\_\_\_\_  
(Address and Phone No. of Representative)  
  
\_\_\_\_\_  
(Signature and Title of Representative)  
  
\_\_\_\_\_  
(Date Checked)

Witnessed By: \_\_\_\_\_  
(Signature and Title of Contractor Representative)

\* Exceptions noted at time of check-out (use additional page if necessary):

### APPENDIX A, FIGURE 1



### PERFORMANCE VERIFICATION AND DEMONSTRATION TO OWNER

This form verifies that the Owner has been given a demonstration of the proper operation on the equipment or systems noted below:

Project Name: Albert J. Ellis Airport – Taxiway A Rehabilitation

Specification Division Number & Name: \_\_\_\_\_

Equipment/System Demonstrated: \_\_\_\_\_

Along with a complete demonstration of the equipment/system, these items have been reviewed at this demonstration and shall be included in the Operating and Maintenance Manuals, under the appropriate specification section:

- 1) Written operating instructions.
- 2) Test data and performance verification information as required by the installer and/or manufacturer.
- 3) Maintenance information published by manufacturer or equipment.
- 4) Check-out Memo signed by manufacturer's representative.
- 5) Printed warranties by manufacturer of equipment.
- 6) Explanation of the warranty/guarantee on the system.
- 7) Prints showing actual "As Built" conditions.

\_\_\_\_\_  
(Name of Contractor)

\_\_\_\_\_  
(Signature, Title, Date)

\_\_\_\_\_  
(Name of Subcontractor)

\_\_\_\_\_  
(Signature, Title, Date)

Demonstration of the system/equipment in operation and of the maintenance procedures has been successfully completed.

### OWNER

\_\_\_\_\_  
(Signature, Date)

\_\_\_\_\_  
(Owner's Department)

### APPENDIX A, FIGURE 2

### VOLTAGE AND AMPERAGE READINGS/TABULATED DATA

This form may be used to record voltage and amperage readings (within the panel and from the farthest point, please check the appropriate item below). Copy of this completed form shall be included in the specification section of the O & M Manual for the equipment from which readings are taken.

Project Name: Albert J. Ellis Airport – Taxiway A Rehabilitation

Specification Division Number & Name: \_\_\_\_\_

Switchgear/Panel Number: \_\_\_\_\_

Readings taken within panel: \_\_\_\_\_ from farthest point: \_\_\_\_\_

Full Load Amperage Readings:

Date: \_\_\_\_\_ Time: \_\_\_\_\_

Phase: A \_\_\_\_\_ B \_\_\_\_\_

C \_\_\_\_\_ N \_\_\_\_\_

Full Load Voltage Readings:

Date: \_\_\_\_\_ Time: \_\_\_\_\_

Phase: A to N \_\_\_\_\_ A to B \_\_\_\_\_

B to N \_\_\_\_\_ A to C \_\_\_\_\_

C to N \_\_\_\_\_ B to C \_\_\_\_\_

No Load Voltage Readings:

Date: \_\_\_\_\_ Time: \_\_\_\_\_

Phase: A to N \_\_\_\_\_ A to B \_\_\_\_\_

B to N \_\_\_\_\_ A to C \_\_\_\_\_

C to N \_\_\_\_\_ B to C \_\_\_\_\_

Contractor's Representative: \_\_\_\_\_

Resident Project Representative: \_\_\_\_\_

Owner's Representative: \_\_\_\_\_

### APPENDIX A, FIGURE 3

### GROUND TEST INFORMATION

GROUND LOCATION: \_\_\_\_\_

\_\_\_\_\_

PRIOR TO CONNECTION TO SYSTEM:

GROUND: \_\_\_\_\_ (OHMS)

WEATHER CONDITIONS FOR PREVIOUS WEEK: \_\_\_\_\_

\_\_\_\_\_

AFTER CONNECTION TO SYSTEM:

GROUND: \_\_\_\_\_ (OHMS)

CONTRACTOR'S REPRESENTATIVE: \_\_\_\_\_

DATE: \_\_\_\_\_

### APPENDIX A, FIGURE 4

### CABLE INSULATION RESISTANCE TEST RECORD

Circuit Description: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Date: \_\_\_\_\_ Time: \_\_\_\_\_

Phase A to Ground \_\_\_\_\_ Megohms

Phase B to Ground \_\_\_\_\_ Megohms

Phase C to Ground \_\_\_\_\_ Megohms

Neutral to Ground \_\_\_\_\_ Megohms

Phase A to B \_\_\_\_\_ Megohms Phase A to Neutral \_\_\_\_\_ Megohms

Phase A to C \_\_\_\_\_ Megohms Phase B to Neutral \_\_\_\_\_ Megohms

Phase B to C \_\_\_\_\_ Megohms Phase C to Neutral \_\_\_\_\_ Megohms

Weather Conditions: \_\_\_\_\_  
\_\_\_\_\_

Temperature: \_\_\_\_\_

Circuit Condition Prior to Test: \_\_\_\_\_  
\_\_\_\_\_

Tested By: \_\_\_\_\_ Date: \_\_\_\_\_

Witnessed By: \_\_\_\_\_

Owner's Authorized Representative: \_\_\_\_\_

Date: \_\_\_\_\_

**APPENDIX A, FIGURE 5**

**END OF ITEM L-131**

# **Appendix A**

Construction Safety and Phasing Plan (CSPP)

This Page Intentionally Left Blank

**CONSTRUCTION SAFETY AND PHASING PLAN (CSPP)  
for the**

**SOUTH GA EXPANSION  
at  
ALBERT J. ELLIS AIRPORT**



**February 21, 2025  
BID NO. 101-25C  
WKD PROJ. NO. 20240074.00.WK**

Prepared for:

Onslow County  
234 NW Corridor Blvd.  
Jacksonville, NC 28540

Prepared by:

W.K. Dickson & Co., LLC  
720 Corporate Center Drive  
Raleigh, North Carolina 27607  
919-782-0495  
NC. LICENSE NO. F-0374



This Page Intentionally Left Blank



## **TABLE OF CONTENTS**

Purpose	1
Project Scope	1
Plan Requirements	
1. Coordination	2
2. Phasing	4
3. Areas and Operations Affected by Construction Activity	6
4. Navigational Aid (NAVAID) Protection	8
5. Contractor Access	8
6. Wildlife Management	11
7. Foreign Object Debris (FOD) Management	12
8. Hazardous Material (HAZMAT) Management	13
9. Notification of Construction Activities	13
10. Inspection Requirements	15
11. Underground Utilities	15
12. Penalties	16
13. Special Conditions	16
14. Runway and Taxiway Visual Aids	16
15. Marking and Signs for Access Routes	17
16. Hazard Marking, Lighting and Signing	17
17. Work Zone Lighting for Nighttime Construction	19
18. Protection of Runway and Taxiway Safety Areas	19
19. Other Limitations on Construction	22

## **LIST OF TABLES**

<b>Table 1:</b> Points of Contact	2
<b>Table 2:</b> Milestone Dates	3
<b>Table 3:</b> Project Phasing	5
<b>Table 4:</b> Operation Impacts	6
<b>Table 5:</b> RSA Dimensions	20
<b>Table 6:</b> ROFA Dimensions	20
<b>Table 7:</b> TSA Dimensions	21
<b>Table 8:</b> TOFA Dimensions	22

## **APPENDICES**

<b>Appendix A:</b> Construction Safety and Phasing Plan Drawings	
<b>Appendix B:</b> Safety and Phasing Plan Checklist	
<b>Appendix C:</b> Definition of Terms	
<b>Appendix D:</b> Related Reading Material	
<b>Appendix E:</b> Construction Project Daily Safety Inspection Checklist	

This Page Intentionally Left Blank

**CONSTRUCTION SAFETY AND PHASING PLAN (CSPP)**  
**ALBERT J. ELLIS AIRPORT (OAJ)**  
**SOUTH GA EXPANSION**

**PURPOSE**

Aviation safety is the primary consideration at airports, especially during construction. This Construction Safety and Phasing Plan (CSPP) and the Contractor's Safety Plan Compliance Document (SPCD) will serve as a companion document to the project plans and specifications for the South GA Expansion project at the Albert J. Ellis Airport (OAJ) and has been written in compliance with *FAA Advisory Circular (AC) 150-5370-2G, Operational Safety on Airports During Construction*. The phasing developed for this project is intended to minimize the impact the project will have on airport operations while providing a logical sequence of construction activities. The subsequent sections of this document will address scheduling, coordination, and airfield safety precautions as they relate to the Project.

The CSPP is a standalone document, written to correspond and comply with the safety and security requirements set forth in FAA AC 150/5370-2G, the airport safety and security requirements, and local codes and requirements. The CSPP is to be used by all personnel involved in the project and covers the actions of not only the construction personnel and equipment, but also the action of inspection personnel and airport staff.

The Contractor shall be required to submit a SPCD to the Airport, describing how the Contractor will comply with the requirements set forth in this CSPP. The SPCD must be submitted to the Airport and approved prior to issuance of the Notice to Proceed. In the event the Contractor's activities are found in non-compliance with the provisions of the CSPP or the SPCD, the Airport will direct the Contractor, in writing, to immediately cease those operations in violation. In addition, a safety meeting will be conducted for the purpose of reviewing those provisions in the CSPP / SPCD which were violated. The Contractor will not be allowed to resume any construction operations until conclusion of the safety meeting and all corrective actions required by the Contractor have been implemented.

**PROJECT SCOPE**

This project is the first phase of expansion of the General Aviation (GA) area located southwest of the Executive Terminal at OAJ. The project includes the following work elements:

- Demolition of existing access roads, drainage pipes, taxiway edge lights, existing manual access gate, and miscellaneous items.
- Construction of a new connector taxiway and taxilanes for aircraft access to the site.
- Construction of new apron space for use by future hangars.

- Installation of new airfield edge lighting and signage for the new taxiway connector.
- Site preparation for two future corporate hangars to be installed by others.
- Construction of two (2) new hangar buildings to include 8 t-hangar units and one 60'x60' jet pod each.
- Construction of a new asphalt access road and vehicle parking, as well as a new gravel road to tie into the existing perimeter road.
- Installation of new electric gate with operator for keypad or card reader.
- Grading, drainage and, erosion control.
- Extension of utilities to the site.

The overall project layout and impacts of work to Airport Operations Areas (AOA) is graphically shown on Plan Sheet G-101, Project Layout and Phasing Plan, as provided in Appendix A. Additional safety and phasing information is contained on Plan Sheet G-100, General Notes, and Plan Sheet G-102, Runway 5-23 Part 77 Airspace.

## PLAN REQUIREMENTS

**1. Coordination:** Project stakeholders potentially impacted during construction have had the opportunity to pose questions at pre-design meetings, pre-bid, and pre-construction conferences, during which the subject of airport operation safety during construction is introduced. In addition, construction progress meetings, scope or schedule changes, and meetings with the Federal Aviation Administration (FAA) Air Traffic Organization (ATO) will be coordinated as required throughout the performance of the contract.

**a. Project Contacts.** Below is a comprehensive list of parties involved during the design of the Project.

**Table 1: Points of Contact**

Organization	Role	Point of Contact	Contact Information
WK Dickson	Engineer/PM	Jason Elliott	919-412-7235
WK Dickson	Engineer	Alex Adekoya	910-442-1831
Albert J. Ellis Airport	Airport Director	Mitch Sprunger	910-989-5796
Albert J. Ellis Airport	Manager of Finance & Administration	Sandra Janssen	910-989-3161
FAA	Program Manager	Jeremy Reno	901-322-8160

**b. Design Submittals.** Throughout design, coordination between WK Dickson, the Sponsor, and FAA was required. Project documents were reviewed by the Sponsor and FAA at

schematic design, 60% design and 90% design intervals. Below is a summary of the project schedule. Airport operations and safety during construction, as well as other design elements, were discussed during meetings with airport personnel prior to and during the design process.

**Table 2: Milestone Dates**

<b>Milestone</b>	<b>Date</b>
60% Construction Documents	November 11, 2024
90% Construction Documents	January 21, 2025
Advertisement/Issued for Bid Documents	February 22, 2025
Pre-Bid Meeting	March 5, 2025
Bid Opening	March 27, 2025
Contract Execution	TBD
Pre-Construction Meeting	TBD
Notice to Proceed	TBD

- c. **Pre-Bid Meeting.** A pre-bid conference will be held. The meeting will provide bidding firms the opportunity to ask project specific questions. A general outline of topics covered are:

- ➔ Project Overview / Scope of work
- ➔ Construction Duration and Liquidated Damages
- ➔ Insurance and Contract Requirements
- ➔ Proposal Requirements
- ➔ DBE Goals and Requirements
- ➔ Safety Requirements (CSPP and SPCD)
- ➔ Phasing Requirements
- ➔ Quality Assurance and Quality Control Testing Requirements
- ➔ Questions and Answers
- ➔ Site Tour

- d. **Pre-Construction Conference.** A pre-construction conference will be held prior to issuance of Notice to Proceed. At a minimum, required attendees will include the Airport Engineer, Airport operations staff, Resident Project Representative (RPR), QA testing firm representative, project superintendent and foreman of prime Contractor, as well as the project foreman for each subcontractor employed by the prime Contractor. Agenda of preconstruction conference will introduce the subject of airport operation safety during

construction and will include a review of this CSPP and the Safety Plan Compliance Documents (SPCD).

- e. **Construction Progress Meetings.** Regular construction progress meetings will be held throughout the duration of the project. At a minimum, required attendees will include the Airport Engineer, Airport operations staff, RPR, QA Testing firm representative (when needed), project superintendent and foreman of prime Contractor, as well as the project foreman for each subcontractor with work occurring during the current period. Construction phasing and operation safety will be a standing agenda item at the construction progress meetings.
  - f. **FAA ATO Coordination.** Early coordination with FAA Air Traffic Organization (ATO) is required to schedule airway facility shutdowns and restarts. Relocation or adjustments to NAVAIDs, or changes to final grades in critical areas, may require an FAA flight inspection prior to restarting the facility. Flight inspections shall be coordinated and scheduled well in advance of the intended facility restart. Flight inspections shall be as required by technical specifications or special provisions.
  - g. **Scope or Schedule Changes.** Changes in the scope or duration of any of the project stages may require revisions to the CSPP and review and approval by the airport operator and FAA.
  - h. **Daily Coordination.** At all times when construction activities are being performed on this project the prime Contractor must have a foreman on-site or immediately available who is authorized to make decisions regarding the operations and safety of all personnel employed by the Contractor and Subcontractors. Contractor must provide 48-hour notice to the Owner before accessing any work area.
2. **Phasing:** Construction phasing for this project has been coordinated with Airport staff and stakeholders. The sequenced construction phases established in this CSPP have been incorporated into the project design and are reflected in the contract drawings and specifications.
- a. **Phase Elements.** The Project includes two overall phases with one subphase within Phase 1 (Phase 1A). Phase 1A includes a partial closure of Taxiway A and will be completed concurrently with the rest of the work in Phase 1. All work should be completed during normal daylight hours.

**Table 3: Project Phasing**

Phase	Duration	Work Hours	Work Elements
1	180 Days	Daytime Work	<p>All work except the construction of the hangar buildings, utility connections to the buildings, and permanent pavement markings, including:</p> <ul style="list-style-type: none"> <li>• Erosion control installation &amp; upkeep</li> <li>• Site Earthwork</li> <li>• Gravel access road construction</li> <li>• Drainage infrastructure installation</li> <li>• Utility installation</li> <li>• Proof-roll &amp; undercut where necessary</li> <li>• Subgrade installation</li> <li>• P-209 stone installation</li> <li>• Hangar slab &amp; foundation installation</li> <li>• Apron milling for tie-in</li> <li>• Asphalt paving (4-inches of P-401)</li> <li>• Landside site work and paving</li> <li>• Airfield electrical work</li> </ul>
1A	40 Days (within Phase 1 duration)	Daytime Work	<p>All work on the proposed Taxiway B2 connector within the Taxiway A Object Free Area (TOFA), including:</p> <ul style="list-style-type: none"> <li>• Install barricades to close Taxiway A from Taxiway A2 to Taxiway A3</li> <li>• Remove existing taxiway edge lights &amp; install new edge lights &amp; signs</li> <li>• Taxiway milling for tie-in</li> <li>• Proof-roll &amp; undercut where necessary</li> <li>• Subgrade installation</li> <li>• P-209 stone installation</li> <li>• Asphalt paving (4-inches of P-401)</li> <li>• Gravel road removal &amp; fine grading</li> </ul>
2	90 Days	Daytime Work	<p>Construction of hangar buildings, including:</p> <ul style="list-style-type: none"> <li>• Hangar building construction</li> <li>• Utility connections</li> <li>• Permanent pavement markings on new asphalt pavement (entire project)</li> </ul>

- b. Construction Safety Drawings.** Drawings specifically indicating operational safety procedures and methods in areas affected by construction activities associated with this project (by phase) have been provided with this CSPP and incorporated into the project drawing set.

The Construction Safety and Phasing Plan drawings can be found in Appendix A.

- 3. Areas and Operations Affected by Construction Activity.** Runways, taxiways, and other airfield surfaces shall remain in use by aircraft or airport support vehicles to the maximum extent possible without compromising safety. The affected areas for each phase are graphically illustrated in the attached drawings in Appendix A.

The operational impacts for each phase are detailed in the tables below.

**Table 4: Operation Impacts**

Impacted Area	Normal (Existing)	Phase 1 Impacts	Phase 1A Impacts	Phase 2 Impacts
Taxiway A	ADG III	None outside Phase 1A	TW A closed from TW A2 to TW A3 (40 calendar days)	None

- a. Identification of Affected Areas.** Reference Appendix A for graphical identification of areas affected by construction operations. Of particular concern are the following:
- i. Closing or partial closing of runways, taxiways, and aprons, and displaced thresholds.** The project includes a temporary partial taxiway closure. Airfield closures are identified in the tables above and are graphically represented in the drawings included in Appendix A.
  - ii. Closing of Aircraft Rescue and Fire Fighting (ARFF) access routes.** ARFF routes will remain open.
  - iii. Closing of access routes used by airport and airline support vehicles.** Airport staff will have access to the airfield at all times.
  - iv. Interruption of utilities, including water supplies for firefighting.** There will be no impact to utilities during this project. Requirements are included in the plans for the contractor to test dig in the vicinity of the existing sewer line within the



project limits to locate and protect the line during construction. There are no water lines within the project limits.

- v. **Approach / departure surfaces affected by heights of objects.** There will be no impacts to the approach / departure surfaces.
  - vi. **Construction areas.** These areas include the project work area, storage/stockpile areas, staging areas, and contractor haul routes near active airfield surfaces. These areas are identified graphically in attached drawings in Appendix A. The project has been phased with partial airfield closures as described above to ensure the project work areas will not be within active airfield movement areas.
- b. **Mitigation of Effects.** This CSPP has established specific requirements and operational procedures necessary to maintain the safety and efficiency of airport operations during the construction of this project.

All coordination pertaining to airport operations during construction will go through the Engineer and the Airport Manager. All NOTAM requests will be reviewed by the Engineer and submitted to the Airport for issuance.

- i. **Temporary changes to runway and/or taxiway operations.** Low profile, lighted barricades and temporary circuit jumpers will be used to notify users of the taxiway closure identified above and as shown in the drawings provided in Appendix A. NOTAMs will be put in place for all closures and shall be coordinated 72 hours in advance with the Airport through the Engineer.
- ii. **Detours for ARFF and other airport vehicles.** N/A
- iii. **Maintenance of essential utilities.** Special attention shall be given to preventing unscheduled interruption of utility services and facilities. Where required due to construction purposes, the FAA shall locate all of their underground utilities. The Contractor shall locate and/or arrange for the location of all the underground utilities. When an underground cable or utility is damaged due to the Contractor's negligence the Contractor shall immediately repair the affected cable or utility at his/her own expense. Full coordination between the Airport, Engineer, and Contractor will be exercised to ensure that all airport power and control cables are fully protected prior to any excavation. Locations of cabling and other

underground utilities will be marked prior to beginning excavation. Contractor should anticipate the need to hand dig around utilities.

4. **Navigation Aid (NAVAID) Protection.** Contractor shall protect all NAVAIDS during construction activities. This includes, but is not limited to, protection of landing lighting systems, guidance and approach systems, etc. Construction activities and materials/equipment storage near a NAVAID must not obstruct access to the equipment and instruments for maintenance. Submittal of a 7460-1 form is required for construction vehicles operating near FAA NAVAIDs. While the runway is open, all construction shall be routed outside of NAVAID critical areas. There are no NAVAID impacts anticipated with this project.
5. **Contractor Access.** All construction personnel shall be regularly reminded that an aircraft always has “Right of Way”. This CSPP details those areas to which the Contractor must have access, and how contractor personnel will access those project work areas.
  - a. **Location of Stockpiled Construction Materials.** Stockpiled materials and equipment storage are not permitted within the Runway Safety Area (RSA), Runway Protection Zone (RPZ), Taxiway Safety Area (TSA), Obstacle Free Zone (OFZ), Object Free Area (OFA) of an operational runway or taxiway, critical area of an electronic NAVAID, or blocking a visual NAVAID. Stockpiled materials and equipment adjacent to these areas are to be prominently marked and lighted during hours of restricted visibility or darkness. Stockpiled material shall be constrained in a manner to prevent movement resulting from either aircraft jet blast or wind conditions in excess of ten miles per hour. In addition, stockpiled material shall have silt fence located around the material to prevent Foreign Object Debris (FOD) from moving onto the airfield pavements or polluting watercourses.

Open trenches exceeding 3 inches in depth and 5 inches in width or stockpiled material are not permitted within the limits of safety areas of operational runways or taxiways. In addition, unclassified excavation materials shall be removed and legally disposed of off airport property and not stockpiled on airport property.

Reference Section 7 *Foreign Object Debris (FOD) Management*, Section 8 *Hazardous Materials (HAZMAT) Management*, and Section 18 *Protection of Runway and Taxiway Safety Areas (RSA/TSA)* for additional information regarding stockpile management

- b. **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 onto the AOA. The Airport will coordinate requirements for vehicle operations with the affected airport tenants, contractors, and FAA air traffic manager. Specific vehicle and pedestrian requirements for this project are as follows:

- i. **Construction Site and Equipment Parking.** All construction vehicles and personnel shall be restricted to the immediate work areas specified by the contract for this project. These areas include the haul routes into the work area, the designated contractor staging area(s) and the area under construction. Use of alternate haul routes or staging areas by the Contractor shall not be permitted without prior notification and approval by Airport Operations.
- ii. **Access and Haul Routes.** Access or haul routes used by contractor vehicles must be clearly marked to prevent inadvertent entry to areas open to airport operations. Construction traffic must remain on the haul road, never straying from the approved paths. Maintenance and upkeep of the haul roads are the responsibility of the Contractor. Dust must be removed from the haul roads by mechanical sweeping. Application of water on dirt or gravel haul routes must be provided as often as necessary. Haul roads in any airport traffic areas must be especially monitored for dust and debris to prevent any potential FOD situations. The Contractor is responsible for any damage caused by construction traffic on the haul roads, regardless of whether in an approved or un-approved traffic area. Following construction completion, the Contractor shall repair, repave, patch, grade, reseed, clean, or otherwise restore the haul route areas to their original conditions prior to construction activities.

Special attention must be given to ensure that if construction traffic is to share or cross any ARFF routes that ARFF right of way is not impeded at any time, and that construction traffic on haul roads do not interfere with NAVAIDs or approach surfaces of operational runways. Work necessary in maintaining the haul roads and compliance with safety and security requirements is considered incidental to the project, and therefore, shall not be directly paid for.

At no time shall vehicles or personnel enter portions of the secure AOA outside the contract area unless permitted and accompanied by an airport approved escort. Any vehicle operators must successfully complete the Albert J. Ellis Driver Training Course prior to operating a vehicle on the airfield and operate in accordance with AC 150/5210-20, Ground Vehicle Operations on Airports.

**iii. Marking and Lighting of Vehicles.** All vehicles used on the airport must be provided with marking and lighting in accordance with FAA Advisory Circular 150/5210-5.

- 1) Each contractor licensed vehicle must display a company logo on both sides of sufficient size to be recognizable to personnel. Signs shall be approved by the Airport. The company name on the signs must be at least 4 inches in height. Specialized construction equipment does not require signs.
- 2) Each contractor licensed vehicle must have a yellow/amber rotating beacon affixed to the uppermost part of the vehicle. Light must be visible from any direction, day and night, including the air. Specialized construction equipment does not require rotating beacon lights.
- 3) All vehicles and equipment operating on the airport and in the general vicinity of the safety area or in aircraft movement areas must be marked with orange and white flags during daylight hours. Flags shall be 3' by 3' with alternating 1' by 1' international orange and white squares and shall be replaced by the Contractor if they become faded, discolored, or ragged as determined by the Airport or Engineer.
- 4) Contractor vehicle marking and lighting is the sole responsibility of the contractor. The airport will not provide markings or lights.

**iv. Description of Proper Vehicle Operations.** Contractor shall adhere to the following:

- 1) All persons operating motor vehicles or equipment must possess a valid operator's license as required by the State of North Carolina.
- 2) No person shall operate a motor vehicle or other motorized equipment of any kind on the airport in a reckless or negligent manner or without caution or in any manner that endangers or is likely to endanger persons or property.
- 3) All speed limits established by the Owner shall be obeyed at all times.
- 4) No person shall fail to give pedestrians the right of way over vehicular traffic.
- 5) No person operating a motor vehicle on the airport shall fail to give proper signals or fail to observe the directions of posted traffic signs or traffic lanes.
- 6) No person under the influence of alcohol or drugs shall operate a motor vehicle on the airport property.
- 7) Contractor will not be allowed to operate motor vehicles outside of the designated work areas as shown on the plans.
- 8) Driving privileges to operate in movement areas are limited to vehicles with an operational necessity who have been approved by the Airport Operations Staff.

- 9) The airport staff shall have the authority to tow or otherwise move motor vehicles that are parked by their owners or operators on the airport in violation of the regulations of the airport, at the operator's expense and without liability for damage that may result in the course of or by reason of such moving.
- 10) All vehicles operating on the airport must have their head/taillights turned on during darkness and low visibility conditions.

**v. 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. Aircraft have the right of way at all times.

**vi. Two-Way Radio Communication Procedures.**

- 1) **General.** Prior to entering any movement area, Airport Operator must be notified.
- 2) **Areas Requiring Two-Way Radio Communication with the Airport Operations Staff.** Vehicular traffic crossing active movement areas must be controlled either by two-way radio with the Airport Operations Staff, escort, flagman, signal light, or other means as designated by the Owner.
- 3) **Frequencies to be Used.** Ground Control frequency 125.4 shall be closely monitored during operational hours (7 am - 10 pm). Common Traffic Advisory Frequency (CTAF) 132.65 shall be monitored outside operational hours.

**vii. Maintenance of the secured area of the airfield**

- 1) Contractor shall be required to maintain security at the access gate used for construction. Gate shall be equipped with code locks provided by the Owner. Contractor shall maintain strict control over access code and shall limit their distribution. Contractor shall wait for gate to close behind them, insuring they are not providing airfield access to any unauthorized individuals.
- 2) Contractor must establish, and submit for review and approval, procedures for ensuring that only authorized persons and vehicles enter the AOA through the access gate.

**6. Wildlife Management.** Construction contractors must carefully control and continuously remove waste or loose materials that might attract wildlife. Contractor personnel must be aware of and avoid construction activities that can create wildlife hazards on airports.

- a. **Trash.** The Contractor shall perform trash clean-up, including food scraps from construction personnel activity, daily.
  - b. **Standing Water.** Standing water is a potential wildlife hazard that can be created from construction activity or rainfall events. For this project, standing water due to construction activities will not be allowed to stand after a rain event for more than 48 hours. The Contractor will take precautions and have ready, at no additional cost to the Owner, a pump to remove standing water from the project area by pumping it to the nearest stormwater inlet.
  - c. **Tall Grass and Seeds.** Tall grass and seeds represent another wildlife attractant on airfields. The Contractor is responsible for maintaining its staging and parking areas free from tall stands of grass. The Contractor shall adhere to the requirements of sections T-901 of the specifications. The use of millet seed in turfing and seeding operations shall not be permitted.
  - d. **Poorly Maintained Fencing and Gates.** The Contractor, Engineer, and Airport representative shall perform inspections of the site daily. The contractor shall immediately report any damage to gates or fence. The contractor will be responsible for repairs caused by negligence by the contractor.
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. Construction contractors must not leave or place FOD on or near active aircraft movement areas. Materials capable of creating FOD must be continuously removed during the construction project. Fencing (other than security fencing) may be necessary to contain material that can be carried by wind into areas where aircraft operate. See AC 150/5210-24, Foreign Object Debris (FOD) Management.

Special care and measures shall be taken to prevent FOD when working in an airport environment. The Contractor shall be held responsible for implementing an approved FOD Management Plan as a part of the SPCD. The FOD Management Plan will have procedures for prevention, regular cleanup, and containment of construction material and debris. The Contractor will ensure all vehicles related to the construction project using paved surfaces in the AOA shall be free of any debris that could create a FOD hazard. All taxiways, taxilanes, security perimeter roads, aprons, and runways must remain clean. Waste containers with attached lids shall be required on construction sites.

Special attention should be given to securing lightweight construction material (concrete insulating blankets, tarps, insulation, etc.). Specific securing procedures and/or chain-link enclosures may be required.

Contractors will provide their own equipment for vehicle and equipment washing and clean up. The Contractor shall clean the necessary vehicles within the Contractor staging area as to prevent tracking of mud and debris onto the AOA. The Contractor shall be responsible for a containment area as to prevent pollution onto and into adjacent conveyance systems. All personnel will be responsible for picking up FOD or reporting spills/hazards.

Immediate access to a power sweeper and vacuum truck is required when construction occurs on any pavement area inside the AOA, unless an appropriate alternative has been approved by the Engineer and Operations Supervisor.

Reference Section 10 INSPECTION REQUIREMENTS for additional information regarding daily inspection requirements.

8. **Hazardous Materials (HAZMAT) Management.** Contractors operating construction vehicles and equipment on the airport must be prepared to expeditiously contain and clean-up spills resulting from fuel, hydraulic fluid, or other chemical fluid leaks. Transport and handling of other hazardous materials on an airport also requires special procedures. To that end, the Contractor is required to develop and implement spill prevention and response procedures for vehicle operations. The Contractor shall incorporate these procedures into the SPCD. This includes maintenance of appropriate MSDS data and appropriate prevention and response equipment on-site. Refer to FAA AC 150/5320-15 *Management of Airport Industrial Waste* for more information.
9. **Notification of Construction Activities.** The following is information and procedures for immediate notification of airport stakeholders and the FAA of any conditions adversely affecting the operational safety of the airport.

- a. **Points of Contact / List of Responsible Representatives.**

Emergency Telephone Number (Police/Fire/Rescue): 911

Airport Operations: Operations Manager Coleman Cannon - (910) 989-3169

ARFF: Fire Captain Geoffrey Horne – (910) 989-3167

Airport Police: Chief Ben Jones – (910) 989-3164



Airport Information and Assistance:

Airport Director: Mitch Sprunger - (910) 989-5796

Manager of Finance & Administration: Sandra Janssen – (910) 989-3161

- b. **NOTAMs.** The Airport will coordinate and issue NOTAMs to reflect construction related impacts. NOTAMs about airport conditions resulting from construction activities with tenants and the local air traffic facility and must provide information on closed or hazardous conditions on airport movement areas to the FAA Flight Service Station (FSS) so it can issue a NOTAM. The Airport must file and maintain a list of authorized representatives with the FSS. NOTAMs are to be kept current and reflect the actual conditions with respect to construction situations. Active NOTAMs will be reviewed periodically and revised to reflect the current conditions.
- c. **Emergency Notification Procedures.** In the event of a life-threatening emergency, the contractor shall be required to contact emergency services by calling 911. Additional emergency contacts can be found above in Section 9.a.

In the event of an aircraft emergency, severe weather conditions, or any issue as determined by the airport that may affect aircraft operations, the Contractor's personnel and/or equipment may be required to immediately vacate the area(s) affected. Points of contact for the various parties involved with the project shall be identified and shared at the pre-construction meeting among the various parties, reference Section 1.D *Pre-construction Conference*. *Specific emergency notification procedures shall be incorporated into the Contractor's SPCD.*

- d. **Coordination with ARFF Personnel.** ARFF personnel shall be familiar with the project. Procedures and methods for addressing any planned or emergency response actions on the airfield concerning this project shall be established and implemented prior to the start of construction.
- e. **Notification to FAA.**
  - i. **Part 77.** Any person proposing construction or alteration of objects that affect navigable airspace, as defined in Part 77, must notify the FAA. This includes construction equipment and proposed parking areas for this equipment (i.e. cranes, graders, other equipment) on airports. FAA Form 7460-1, Notice of Proposed Construction or Alteration, can be used for this purpose and submitted to the appropriated FAA Airports Regional or District Office.



- ii. **Part 157.** With exceptions, Title 14CFR Part 157, Notice of Construction, Alteration, Activation, and Deactivation of Airports, requires that the Operations Supervisor notify the FAA in writing whenever a non-Federally funded project involves the construction of a new airport; the construction, realigning, altering, activating, or abandoning of a runway, landing strip, or associated taxiway; or the deactivation or abandoning of an entire airport. Notification involves submitting FAA Form 7480-1, Notice of Landing Area Proposal, to the nearest FAA Airports Regional or District Office. It is not anticipated that Part 157 notifications will be required for this project.
- iii. **NAVAIDS.** For emergency (short-notice) notification about impacts to NAVAIDS, contact Airport personnel. It is not anticipated that NAVAID notifications will be required for this project.

## 10. Inspection Requirements.

- a. **Daily (or More Frequent) Inspections.** Inspections shall be conducted by the Contractor at least daily, but more frequently, if necessary, to ensure conformance with the CSPP. A sample checklist is provided in Appendix E of this document. In addition to contractor's required inspections, the Airport will inspect the construction site prior to the reopening of any closed active taxiway, runway, and apron. WK Dickson will have full-time inspectors monitoring activity throughout construction. The contractor is required to immediately remedy and correct any deficiencies to the satisfaction of the Engineer or Airport.
- b. **Final Inspections.** A final inspection with the Airport will take place prior to allowing aircraft operations to resume.

- 11. **Underground Utilities.** Special attention shall be given to preventing unscheduled interruption of utility services and facilities. Where required due to construction purposes, the FAA shall locate all their underground cables. The Contractor shall locate and/or arrange for the location of all the underground cables. When an underground cable is damaged due to the Contractor's negligence the Contractor shall immediately notify the Operations Supervisor, as referenced in Section 9 *Notification of Construction Activities* within this document, to repair including possible replacement of the cable affected at his/her own expense. Full coordination between airport staff, field inspectors, and construction personnel will be exercised to ensure that all airport power and control cables are fully protected prior to any excavation. Locations of cabling will be marked prior to beginning excavation. This

may involve coordinating with public utilities and FAA ATO/Technical Operations. Note that “NC811” or services do not include FAA ATO/Technical Operations and may not locate utilities within the airfield fence.

- 12. Penalties.** Failure on the part of the Contractor to adhere to prescribed requirements may have consequences that jeopardize the health, safety or lives of customers and employees at the airport. Operations Supervisor may issue warnings on the first offense based upon the circumstances of the incident. Individuals involved in non-compliance violations may be required to surrender their driving privilege, access to the AOA, and/or be prohibited from working at the airport, pending an investigation of the matter.

Penalties for violations related to airport safety and security procedures will be established by the Airport and may be assessed by the FAA, TSA, or a court of competent jurisdiction.

Note: Project shutdown or misdemeanor citations may be issued on a first offense. When construction operations are suspended, activity shall not resume until all deficiencies are rectified.

- 13. Special Conditions.** In the event of an aircraft emergency, the Contractor’s personnel and/or equipment may be required to immediately vacate the area. The Contractor will receive notification from Airport when special conditions require the construction site to be vacated. In any event, extreme care should be exercised should construction personnel identify any ARFF (Airport Rescue and Fire-Fighting) vehicle moving toward the Runway with emergency lights displayed. This will generally mean that an emergency situation is imminent. Reference Sections 3.B.II and 9.D.
- 14. Runway and Taxiway Visual Aids.** Markings, lighting, signs, and visual NAVAIDs. Those areas where aircraft will be operating shall be clearly and visibly separated from construction areas, including closed runways. Throughout the duration of the construction project, the Contractor shall inspect and verify that these areas remain clearly marked and visible at all times and that marking, lighting, signs and visual NAVAIDs remain in place and operational.
  - a. General.** Airport markings, lighting, signs, and visual NAVAIDs must be clearly visible to pilots, not misleading, confusing, or deceptive. All must be secured in place to prevent movement by prop wash, jet blast, wing vortices, or other wind currents and constructed of materials that would minimize damage to an aircraft in the event of inadvertent contact.

Any visual aid within the ROFA or ROFZ that is more than 3 inches above ground must be frangible.

- b. Markings.** Markings shall be in accordance with AC 150/5340-1 Standards for Airport Markings. The application rate of paint to mark short-term temporary taxiway markings may deviate from the standard (see Item P-620, "Runway and Taxiway Painting," in AC 150/5370-10), but the dimensions must meet the existing standards.
- c. Lighting.** Runway and taxiway lights in closed sections shall be either de-energized, removed from the circuit by use of jumpers, or covered during the closure period. Airfield lighting shall conform to AC 150/5340-30, Design and Installation Details for Airport Visual Aids, AC 150/5345-50, Specification for Portable Runway and Taxiway Lights, and AC 150/5345-53, Airport Lighting Certification Program.
- d. Signs.** Signs directing aircraft into closed areas shall be de-energized or covered during the closure period. All signs within the AOA shall conform to AC 150/5345-44, Specification for Runway and Taxiway Signs, AC 150/5340-18, Standards for Airport Sign Systems, and AC 150/5345-53, Airport Lighting Certification Program.

**15. Marking and Signs for Access Routes.** Pavement markings and signs intended for construction personnel shall conform to AC 150/5340-18 and, to the extent practical, the Federal Highway Administration Manual on Uniform Traffic Control Devices (MUTCD) and/or state highway specifications.

**16. Hazard Marking, Lighting, and Signing.** Low profile barricades with flashing red lights for taxiway closures shall be used. Barricades shall be as specified on the plans. Barricades shall be placed no further than 4 feet apart.

- a. Purpose:** Hazard marking and lighting is a visual aid to help prevent pilots from entering areas closed to aircraft, and prevents construction personnel from entering areas open to aircraft. To that end, comprehensible warning indicators for any area affected by construction that is normally accessible to aircraft, personnel, or vehicles must be installed and maintained by the Contractor for the duration of construction operations. Hazard marking and lighting may also be used for the identification of open manholes, small areas under repair, stockpiled material, waste areas, and taxiway object free areas (TOFA's).

**b. Equipment:**

- i. **Barricades.** Type 1-Low profile barricades of the type detailed in the project drawings shall be placed at the edge of existing taxiway safety areas. Layout locations for this equipment are shown in the project drawing set and attached exhibits, reference Appendix A. Barricade spacing shall be such that a breach is physically prevented barring a deliberate act. The Contractor shall have a person on call 24 hours a day for emergency maintenance of airport hazard lighting and barricades. The Contractor must file the contact person's information with the Operations Supervisor. Lighting should be checked for proper operation at least once per day, preferably at dusk.
- ii. **Barricade Lights.** Barricade lights must be red, either steady burning or flashing, and must meet the luminance requirements of the State Highway Department. Batteries powering lights will last longer if lights flash. Lights must be mounted on barricades and spaced at no more than 10 ft. Lights must be operated between sunset and sunrise and during periods of low visibility whenever the airport is open for operations. They may be operated by photocell, but this may require that the Contractor turn them on manually during periods of low visibility during daytime hours.
- iii. **Supplement barricades with signs** (for example "No Entry," "No Vehicles") as necessary.
- iv. **Air Operations Area (AOA) – General.** Barricades are not permitted in any active safety areas. Within a runway or taxiway object free area, Type 1-Low profile lighted barricades with flashing red lights as noted above, may be used to separate all construction/maintenance areas from the movement area. All barricades adjacent to any open runway or taxiway safety area, or apron must be as low as possible to the ground, and no more than 18 inches high, exclusive of supplementary lights and flags. Barricades must be of low mass; easily collapsible upon contact with an 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. If affixed to the surface, they must be frangible at grade level or as low as possible, but not to exceed 3 in (7.6 cm) above the ground.
- v. **Air Operations Area (AOA) – Runway/Taxiway Intersections.** Use highly reflective barricades with red lights to close taxiways leading to closed runways. The Operations Supervisor shall evaluate all operating factors when determining how to mark temporary closures that can last from 10 to 15 minutes to a much longer period

of time. However, even for closures of relatively short duration, close all taxiway/runway intersections with barricades. The use of traffic cones may be appropriate for short duration closures if approved by the Engineer and Airport.

- vi. **Air Operations Area (AOA) – Other.** Outside runway and taxiway object free areas and aprons, barricades intended for construction vehicles and personnel may be many different shapes and made from various materials, including jersey barriers, or barrels, as determined by the Engineer and Airport.
- vii. **Maintenance.** The construction specifications include a provision requiring the Contractor to have a person on call 24 hours a day for emergency maintenance of airport hazard lighting and barricades. The Contractor must file the contact person's information with the Operations Supervisor and other notifications shall be in accordance with Section 9 *Notification of Construction Activities*. Lighting should be checked for proper operation at least once per day, preferably at dusk.

**17. Work Zone lighting for Nighttime Construction.** The Contractor must provide lighting equipment to adequately illuminate the work area if the construction is to be performed during nighttime hours. Additionally, all support equipment, except haul trucks, shall be equipped with artificial illumination to safely illuminate the area immediately surrounding their work areas. The lights shall be positioned to provide the most natural color illumination and contrast with a minimum of shadows. The spacing must be determined by trial. Light towers should be positioned and adjusted to aim away from active runways to prevent blinding effects. Shielding may be necessary. Light towers should be removed from the construction site when the area is reopened to aircraft operations. A plan for placement of necessary construction lighting units shall be developed by the Contractor and provided to the Owner for approval prior to beginning nighttime operations.

**18. Protection of Runway and Taxiway Safety Areas.** Safety area encroachments, improper ground vehicle operations and unmarked or uncovered holes and trenches in the vicinity of aircraft operation surfaces and construction areas are the three most recurring threats to safety during construction. Protection of runway and taxiway safety areas, object free areas, obstacle free zones, and approach/departure surfaces shall be a standing requirement for the duration of construction operations.

- a. **Runway Safety Area (RSA).** A runway safety area is the defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway. No construction may occur

within the RSA while the runway is open for aircraft operations. The RSA dimensions may be temporarily adjusted if the runway is restricted to aircraft operations requiring an RSA that is equal to the RSA width and length beyond the runway ends available during construction (see AC 150/5300-13).

**Table 5: RSA Dimensions**

Runway Design Code (RDC)	RSA Distance from Centerline (ft)	RSA Width (ft)	RSA Length from RW End (ft)
C-III-2,400 (RW 5) C-III-4,000 (RW 23)	250	500	1,000

Open trenches and excavations are not permitted within the RSA while the runway is open. All trenches and excavations must be backfilled prior to opening the runway. If the runway must be opened before excavations are backfilled, cover the excavations appropriately to the satisfaction of the Engineer and Airport. Covering for open trenches must be designed to allow the safe operation of the heaviest aircraft operating on the runway across the trench without damage to the aircraft.

Construction contractors must prominently mark and barricade open trenches and excavations at the construction site by using lighted low-profile barricades with flashing red lights during hours of restricted visibility or darkness.

Soil erosion must be controlled to maintain RSA standards, that is, the RSA must be cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations, and capable, under dry conditions, of supporting snow removal equipment, aircraft rescue and firefighting equipment, and the occasional passage of aircraft without causing structural damage to the aircraft.

- b. Runway Object Free Area (ROFA).** Construction, including excavations, may be permitted in the ROFA. However, equipment must be removed from the ROFA when not in use, and material should not be stockpiled in the ROFA if not necessary. Stockpiling material in the OFA requires submittal of a 7460-1 form and justification provided to the appropriate FAA Airports Regional or District Office for approval.

**Table 6: ROFA Dimensions**

Runway Design Code (RDC)	ROFA Distance from Centerline (ft)	ROFA Width (ft)	ROFA Length from RW End (ft)
C-III-2,400 (RW 5) C-III-4,000 (RW 23)	400	800	1,000

- c. **Taxiway Safety Area (TSA).** The taxiway safety area is a defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway. No construction may occur within the TSA while the taxiway is open for aircraft operations. Adjustment of TSA dimensions shall be coordinated with the Airport and the appropriate FAA Airports Regional or District Office; issuing a NOTAM will be required.

**Table 7: TSA Dimensions**

<b>Taxiway (ADG)</b>	<b>TSA Distance from Centerline (ft)</b>	<b>TSA Width (ft)</b>
ADG III (Taxiway A)	59	118

Open trenches and excavations are not permitted within the TSA while the taxiway is open. All trenches and excavations must be backfilled prior to opening taxiway. If backfilling excavations before the taxiway must be opened is impracticable, cover the excavations appropriately. Covering for open trenches must be designed to allow the safe operation of the heaviest aircraft operating on the taxiway across the trench without damage to the aircraft.

After a taxiway has been closed, Contractors must prominently mark and barricade open trenches and excavations at the construction site with red or orange flags, as approved by the Engineer or Airport, and light them with red lights during hours of restricted visibility or darkness.

Soil erosion must be controlled by the Contractor as to maintain TSA standards, that is, the TSA must be cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations, and capable, under dry conditions, of supporting snow removal equipment, aircraft rescue and firefighting equipment, and the occasional passage of aircraft without causing structural damage to the aircraft.

- d. **Taxiway Object Free Area (TOFA).** Unlike the Runway Object Free Area, aircraft wings regularly penetrate the taxiway object free area during normal operations. Thus, the restrictions are more stringent than for Runway Object Free Areas. No construction may occur within the TOFA while the taxiway is open for aircraft operations. Aircraft



operations may be restricted to reduced ADG to provide adequate wingtip clearance near construction operations.

**Table 8: TOFA Dimensions**

<b>Taxiway (ADG)</b>	<b>TOFA Distance from Centerline (ft)</b>	<b>TOFA Width (ft)</b>
ADG III (Taxiway A)	93	186

- e. **Obstacle Free Zone (OFZ).** The OFZ is a defined volume of airspace centered about and above the runway centerline. Personnel, material, and/or equipment may not penetrate the OFZ while the runway is open for aircraft operations. No work will be performed within an active OFZ during this project.
- f. **Runway Approach/Departure Areas and Clearways.** All personnel, materials, and/or equipment must remain clear of the applicable threshold siting surfaces. Objects that do not penetrate these surfaces may still be obstructions to air navigation and may affect standard instrument approach procedures.

Construction activity in a runway approach/departure area may result in the need to partially close a runway or displace the existing runway threshold. Partial runway closure, displacement of the runway threshold, as well as closure of the complete runway and other portions of the movement area also require coordination through the airport operator with the appropriate FAA air traffic manager and ATO/Technical Operations (for affected NAVAIDS) and airport users.

## **19. Other Limitations on Construction.**

- a. **Prohibitions.** The following prohibitions are in effect for the duration of this project:
  - i. No use of tall equipment (cranes, concrete pumps, and so on) unless a 7460-1 determination letter is issued for such equipment.
  - ii. Use of open flame welding or torches is not allowed, unless fire safety precautions are provided, and the Airport has approved their use.
  - iii. Use of electrical blasting caps or explosives of any kind on or within 1,000 ft of the Airport Property is prohibited.



- iv. The use of flare pots within the AOA is prohibited.

**b. Restrictions.**

- i. Construction suspension required during specific airport operations. – N/A
- ii. Areas that cannot be worked on simultaneously. – See phasing plans.
- iii. Day or night construction restrictions. – None
- iv. Seasonal construction restrictions. – N/A

This Page Intentionally Left Blank

## **Appendix A**

Construction Safety and Phasing Plan Drawings

(See plan sheets G-100, G-101 & G-102)

This Page Intentionally Left Blank

## **Appendix B**

### Safety and Phasing Plan Checklist

This Page Intentionally Left Blank

## Appendix B: Safety and Phasing Plan Checklist

This appendix is keyed to Chapter 2. Plan Requirements. 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 as a required submittal.

Coordination	Reference	Addressed			Remarks
General Considerations					
Requirements for predesign, prebid, and preconstruction conferences to introduce the subject of airport operation safety during construction are specified.	2.5	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 1 (pgs. 2-4)
Operation safety is a standing agenda item for construction progress meetings.	2.5	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 1.e (pg. 4)
Scheduling of the construction phases is properly addressed.	2.6	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 2 (pgs.4-6) & Appendix A
Any formal agreements are established.	2.5.3	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 1.f (pg. 4)
Areas and Operations Affected by Construction Activity					
Drawings showing affected areas are included.	2.7.1	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	See Appendix A
Closed or partially closed runways, taxiways, and aprons are depicted on drawings.	2.7.1.1	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	See Appendix A
Access routes used by ARFF vehicles affected by the project are addressed.	2.7.1.2	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 3.a.ii (pg. 6)
Access routes used by airport and airline support vehicles affected by the project are addressed.	2.7.1.3	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 3.a.iii (pg. 6)
Underground utilities, including water supplies for firefighting and drainage.	2.7.1.4	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 3.a.iv (pg. 6-7)
Approach/departure surfaces affected by heights of temporary objects are addressed.	2.7.1.5	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 3.a.v (pg. 7)

Coordination	Reference	Addressed			Remarks
Construction areas, storage areas, and access routes near runways, taxiways, aprons, or helipads are properly depicted on drawings.	2.7.1	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	See Appendix A
Temporary changes to taxi operations are addressed.	2.7.2.1	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 3.b.i (pg. 7)
Detours for ARFF and other airport vehicles are identified	2.7.2.2	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A	
Maintenance of essential utilities and underground infrastructure is addressed.	2.7.2.3	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 3.b.iii (pg. 7-8)
Temporary changes to air traffic control procedures are addressed.	2.7.2.4	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A	
NAVAIDS					
Critical areas for NAVAIDS are depicted on drawings.	2.8	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A	
Effects of construction activity on the performance of NAVAIDS, including unanticipated power outages, are addressed.	2.8	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 4 (pg.8)
Protection of NAVAID facilities is addressed.	2.8	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 4 (pg.8)
The required distance and direction from each NAVAID to any construction activity is depicted on drawings.	2.8	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A	Construction activities do not occur near NAVAIDS
Procedures for coordination with FAA ATO/Technical Operations, including identification of points of contact, are included.	2.8, 2.13.1, 2.13.5.3.1, 2.18.1	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	
Contractor Access					
The CSPP addressed areas to which contractor will have access and how the areas will be accessed.	2.9	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 5 (pgs. 8-11) & Appendix A
The application of 49 CFR Part 1542 Airport Security, where appropriate, is addressed.	2.9	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 5 (pgs. 8-11)



Coordination	Reference	Addressed			Remarks
The location of stockpiled construction materials is depicted on drawings.	2.9.1	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	See Appendix A
The requirement for stockpiles in the ROFA to be approved by FAA is included.	2.9.1	Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A	No stockpiles will be allowed within the active ROFA.
Requirements for proper stockpiling of materials are included.	2.9.1	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 5.a (pg.8)
Construction site parking is addressed.	2.9.2.1	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 5.b-i (pg. 9)
Construction equipment parking is addressed.	2.9.2.2	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 5.b-i (pg. 9)
Access and haul roads are addressed.	2.9.2.3	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 5.b-ii (pg. 9)
A requirement for marking and lighting of vehicles to comply with AC 150/5210-5, Painting, Marking and Lighting of Vehicles Used on an Airport, is included.	2.9.2.4	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 5.b-iii (pg. 10)
Proper vehicle operations, including requirements for escorts, are described.	2.9.2.5, 2.9.2.6	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 5.b-iv (pgs. 10-11)
Training requirements for vehicle drivers are addressed.	2.9.2.7	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 5.b-ii (pg. 9)
Two-way radio communications procedures are described.	2.9.2.9	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 5.b-vi (pg. 11)
Maintenance of the secured area of the airport is addressed.	2.9.2.10	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 5.b-vii (pg. 11)
Wildlife Management					
The airport operator's wildlife management procedures are addressed.	2.10	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 6 (pgs. 11-12)
Foreign Object Debris Management					
The airport operator's FOD management procedures are addressed.	2.11	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 7 (pgs. 12-13)

Coordination	Reference	Addressed			Remarks
Hazardous Materials Management					
The airport operator’s hazardous materials management procedures are addressed.	2.12	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 8 (pg. 13)
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.	2.13	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 9 (pgs. 13-15)
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.	2.13.1	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 9.c (pg. 14)
A list of local ATO/Technical Operations personnel is included.	2.13.1	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Emergency notification information is contained in section 9.
A list of ATC managers on duty is included.	2.13.2	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 9.b (pg. 14)
A list of authorized representatives to the OCC is included.	2.13.2	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 9.a (pg. 13-14)
Procedures for coordinating, issuing, maintaining, and cancelling by the airport operator of NOTAMS about airport conditions resulting from construction are included.	2.8, 2.13.2, 2.18.3.3.9	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 10.b (pg. 15)
Provision of information on closed or hazardous conditions on airport movement areas by the airport operator to the OCC is specified.	2.13.2	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 9.b (pg. 14)
Emergency notification procedures for medical, firefighting, and police response are addressed.	2.13.3	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 9.c (pgs. 14)
Coordination with ARFF personnel for non-emergency issues is addressed.	2.13.4	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 9.d (pgs. 14)
Notification to the FAA under 14 CFR parts 77 and 157 is addressed.	2.13.5	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 9.e (pgs. 14-15)

Coordination	Reference	Addressed			Remarks
Reimbursable agreements for flight checks and/or design and construction for FAA owned NAVAIDs are addressed.	2.13.5.3.2	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 1.f (pg. 4)
Inspection Requirements					
Daily inspections by both the airport operator and contractor are specified.	2.14.1, 2.14.2	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 10.a (pg. 15)
Final inspections at certificated airports are specified when required.	2.14.3	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 10.b (pg. 15)
Underground Utilities					
Procedures for protecting existing underground facilities in excavation areas are described.	2.15	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 11 (pg. 15-16)
Penalties					
Penalty provisions for noncompliance with airport rules and regulations and the safety plans are detailed.	2.16	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 12 (pgs. 16)
Special Conditions					
Any special conditions that affect the operation of the airport or require the activation of special procedures are addressed.	2.17	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 13 (pg. 16)
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.	2.18.1	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 14 (pgs. 16-17)
Frangibility of airport markings, lighting, signs, and visual NAVAIDs is specified.	2.18.1, 2.18.3, 2.18.4.2, 2.20.2.4	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 14.a (pg. 16-17)
The requirement for markings to be in compliance with AC 150/5340-1, Standards for Airport Markings is specified.	2.18.2	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 14.b (pg. 17)
Detailed specifications for materials and methods for temporary markings are provided.	2.18.2	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Detailed specifications are referenced (14.b) and referred to in the contract plans and specifications.

Coordination	Reference	Addressed			Remarks
The requirement for lighting to conform to AC 150/5340-30, Design and Installation Details for Airport Visual Aids, AC 150/5345-50, Specification for Portable Runway and Taxiway Lights, and AC 150/5345-53, Airport Lighting Certification Program, is specified.	2.18.3	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 14.c (pg. 17)
The use of a lighted X is specified where appropriate.	2.18.2.1.2, 2.18.3.2	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A	
The requirement for signs to conform to AC 150/5345-44, Specification for Runway and Taxiway Signs, AC 150/5340-18, Standards for Airport Sign Systems, and AC 150/5345-53, Airport Lighting Certification Program, is specified.	2.18.4	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 14.d (pg. 17)
Marking and Signs for Access Routes					
The CSPP specifies that pavement markings and signs intended for construction personnel should conform to AC 150/5340-18 and, to the extent practicable, with the MUTCD and/or State highway specifications.	2.18.4.2	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 15 (pg. 17)
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.	2.20.1	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 16 (pg. 17-19)
Hazard marking and lighting are specified to identify open manholes, small areas under repair, stockpiled material, and waste areas.	2.20.1	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 16.a (pg. 17)
The CSPP considers less obvious construction-related hazards.	2.20.1	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 16.a (pg. 17)
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.	2.20.2.1	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 16.b (pg. 18-19)
The spacing of barricades is specified such that a breach is physically prevented barring a deliberate act.	2.20.2.1	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 16.b-i (pg. 18)
Red lights meeting the luminance requirements of the State Highway Department are specified.	2.20.2.1	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 16.b-ii (pg. 18)

Coordination	Reference	Addressed			Remarks
Barricades, temporary markers, and other objects placed and left in areas adjacent to any open runway, taxiway, taxilane, or apron are specified to be as low as possible to the ground, and no more than 18 high.	2.20.2.3	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 16.b-iv (pg. 18)
Barricades are specified to indicate construction locations in which no part of an aircraft may enter.	2.20.2.3	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 16.b (pgs. 18-19) & Appendix A
Highly reflective barriers with lights are specified to barricade taxiways leading to closed runways	2.20.2.5	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 16.b-v (pg. 18-19)
Markings for temporary closures are specified.	2.20.2.5	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 16.b (pg. 18-19)
The provision of a contractor's representative on call 24 hours a day for emergency maintenance of airport hazard lighting and barricades is specified.	2.20.2.7	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 16.b-vii (pg. 19)
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	2.21	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 17 (pg. 19)
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.	2.22.1.1, 2.22.3.1	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 18.a & 18.c (pgs. 19-21)
The CSPP specifies that the airport operator coordinates the adjustment of RSA or TSA dimensions with the ATCT and appropriate FAA Airports Regional or District Office and issues a local NOTAM.	2.22.1.2, 2.22.3.2	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 18.a & 18.c (pgs. 19-21)
Procedures for ensuring adequate distance for protection from blasting operations, if required by operations considerations, are detailed.	2.22.3.3	Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A	
The CSPP specifies that open trenches or excavations are not permitted within a safety area while the associated runway or taxiway is open.	2.22.1.4	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 18.a & 18.c (pgs. 19-21)

Coordination	Reference	Addressed			Remarks
Appropriate covering of excavations in the RSA or TSA that cannot be backfilled before the associated runway or taxiway is open is detailed.	2.22.1.4	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 18.a & 18.c (pgs. 19-21)
The CSPP includes provisions for prominent marking of open trenches and excavations at the construction site.	2.22.1.4	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 18.a & 18.c (pgs. 19-21)
Grading and soil erosion control to maintain RSA/TSA standards are addressed.	2.22.3.5	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 18.a & 18.c (pgs. 19-21)
The CSPP specifies that equipment is to be removed from the ROFA when not in use.	2.22.2	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 18.b (pg. 20)
The CSPP clearly states that no construction may occur within a taxiway safety area while the taxiway is open for aircraft operations	2.22.3	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 18.c (pg. 21)
Appropriate details are specified for any construction work to be accomplished in a taxiway object free area.	2.22.4	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 18.d (pg. 21-22)
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.	2.22.4.3.6	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 18.e (pg. 22)
Provisions for protection of runway approach/departure areas and clearways are included.	2.22.6	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 18.f (pg. 22)
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.	2.23.1.2	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 19.a (pg. 22)
The CSPP prohibits the use of electrical blasting caps on or within 1,000 ft of the airport property.	2.23.1.3	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	Reference Section 19.a (pg. 22)

## **Appendix C**

### Definition of Terms

This Page Intentionally Left Blank



### Appendix C: Definition of Terms

Term	Definition
7460-1	Notice Of Proposed Construction Or Alteration. For on-airport projects, the form submitted to the FAA regional or airports division office as formal written notification of any kind of construction or alteration of objects that affect navigable airspace, as defined in 14 CFR Part 77, safe, efficient use, and preservation of the navigable airspace. (See guidance available on the FAA web site at <a href="http://www.faa.gov/oeaaa.faa.gov">oeaaa.faa.gov</a> .) The form may be downloaded at <a href="http://www.faa.gov/airports/resources/forms/">http://www.faa.gov/airports/resources/forms/</a> , or filed electronically at: <a href="https://oeaaa.faa.gov">https://oeaaa.faa.gov</a> .
7480-1	Notice Of Landing Area Proposal. Form submitted to the FAA Airports Regional Division Office or Airports District Office as formal written notification whenever a project without an airport layout plan on file with the FAA involves the construction of a new airport; the construction, realigning, altering, activating, or abandoning of a runway, landing strip, or associated taxiway; or the deactivation or abandoning of an entire airport. The form may be downloaded at <a href="http://www.faa.gov/airports/resources/forms/">http://www.faa.gov/airports/resources/forms/</a> .
OAJ	Albert J. Ellis Airport
AC	Advisory Circular
ACRC	Aircraft Reference Code
ACSI	Airport Certification Safety Inspector
ADG	Airplane Design Group
AIP	Airport Improvement Program
Airport Operations Department	MCZ Operations Staff that are directly responsible for the airfield operations and well-being of the AOA. Airport Operations Department is located in the Airport Operations Center.
ALECP	Airport Lighting Equipment Certification Program
ANG	Air National Guard
AOA	Airport Operations Area. Any area of the airport used or intended to be used for the landing, takeoff, or surface maneuvering of aircraft. An air operations area includes such paved or unpaved areas that are used or intended to be used for the unobstructed movement of aircraft in addition to its associated runways, taxiways, or aprons.
ARFF	Aircraft Rescue and Fire Fighting
ARC	Airfield Rehabilitation Committee
ARP	FAA Office of Airports
ASDA	Accelerate-Stop Distance Available
ATCT	Air Traffic Control Tower
ATIS	Automatic Terminal Information Service
ATO	Air Traffic Organization
Certificated Airport	An airport that has been issued an Airport Operating Certificate by the FAA under the authority of 14 CFR Part 139, Certification of Airports.
CFR	Code of Federal Regulations

Term	Definition
Construction	The presence and movement of construction-related personnel, equipment, and materials in any location that could infringe upon the movement of aircraft.
Contractor	The person or company that undertakes the contract to provide materials and labor to perform the project.
CSPP	Construction Safety and Phasing Plan. 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.
CTAF	Common Traffic Advisory Frequency
Displaced Threshold	A threshold that is located at a point on the runway other than the designated beginning of the runway. The portion of pavement behind a displaced threshold is available for takeoffs in either direction or landing from the opposite direction.
DOT	Department of Transportation
EPA	Environmental Protection Agency
Engineer	Engineer of Record – also working for WK Dickson
FAA	Federal Aviation Administration
FOD	Foreign Object Debris
HAZMAT	Hazardous Materials
IFR	Instrument Flight Rules
ILS	Instrument Landing System
LD	Liquidated Damages
LDA	Landing Distance Available
LOC	Localizer antenna array
Movement Area	The runways, taxiways, and other areas of an airport that are used for taxiing or hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading aprons and aircraft parking areas (reference 14 CFR Part 139).
MSDS	Material Safety Data Sheet
MUTCD	Manual on Uniform Traffic Control Devices
NAVAID	Navigation Aid
NAVAID Critical Area	An area of defined shape and size associated with a NAVAID that must remain clear and graded to avoid interference with the electronic signal.
Non-Movement Area	The area inside the airport security fence exclusive of the Movement Area. It is important to note that the non-movement area includes pavement traversed by aircraft.
NOTAM	Notices to Airmen
NTP	Notice To Proceed. Effective date for start of construction contract.

Term	Definition
Obstruction	Any object/obstacle exceeding the obstruction standards specified by 14 CFR Part 77, subpart C.
OE / AAA	Obstruction Evaluation / Airport Airspace Analysis
OFA	Object Free Area. An area on the ground centered on the runway, taxiway, or taxi lane centerline provided to enhance safety of aircraft operations by having the area free of objects except for those objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes. (See AC 150/5300-13, for additional guidance on OFA standards and wingtip clearance criteria.)
OFZ	Obstacle Free Zone. The airspace below 150 ft. (45 m) above the established airport elevation and along the runway and extended runway centerline that is required to be clear of all objects, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function, in order to provide clearance protection for aircraft landing or taking off from the runway and for missed approaches. The OFZ is subdivided as follows: Runway OFZ, Inner Approach OFZ, Inner Transitional OFZ, and Precision OFZ. Refer to AC 150/5300-13 for guidance on OFZ.
OSHA	Occupational Safety and Health Administration
Owner	Albert J. Ellis Airport – also referred to as “Airport”
P&R	Planning and Requirements Group
PAPI	Precision Approach Path Indicators
PCI	Pavement Condition Index
PFC	Passenger Facility Charge
PLASI	Pulse Light Approach Slope Indicators
Project Proposal Summary	A clear and concise description of the proposed project or change that is the object of Safety Risk Management.
RE	Resident Engineer
REIL	Runway End Identifier Lights
RNAV	Area Navigation
ROFA	Runway Object Free Area
RSA	Runway Safety Area. A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway, in accordance with AC 150/5300-13.
SIDA	Security Identification Display Area
SMGCS	Surface Movement Guidance and Control System
SMS	Safety Management System

Term	Definition
SPCD	Safety Plan Compliance Document. Details developed and submitted by a contractor to the airport operator for approval providing details on how the performance of a construction project will comply with the CSPP.
SRM	Safety Risk Management
Taxiway Safety Area	A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway, in accordance with AC 150/5300-13.
TDG	Taxiway Design Group
Temporary	Any condition that is not intended to be permanent.
Temporary Runway End	The beginning of that portion of the runway available for landing and taking off in one direction, and for landing in the other direction. Note the difference from a displaced threshold.
Threshold	The beginning of that portion of the runway available for landing. In some instances, the landing threshold may be displaced.
TODA	Takeoff Distance Available
TOFA	Taxiway Object Free Area
TORA	Takeoff Run Available. The length of the runway less any length of runway unavailable and/or unsuitable for takeoff run computations. See AC 150/5300-13 for guidance on declared distances.
TSA	Taxiway Safety Area Transportation Security Administration
UNICOM	A radio communications system of a type used at small airports.
VASI	Visual Approach Slope Indicators
VGSI	Visual Glide Slope Indicator. A device that provides a visual glide slope indicator to landing pilots. These systems include precision approach path indicators (PAPI), visual approach slope indicators (VASI), and pulse light approach slope indicators (PLASI).
VFR	Visual Flight Rules
VOR	VHF Omnidirectional Radio Range
VPD	Vehicle / Pedestrian Deviation
WKD	WK Dickson. Engineering designer of record. Referred to as "Engineer".

## **Appendix D**

### Related Reading Material

This Page Intentionally Left Blank

## Appendix D: Related Reading Material

Obtain the latest version of the following free publications from the FAA on its Web site at

<http://www.faa.gov/airports/>.

AC	Title and Description
AC 150/5200-28	<i>Notices to Airmen (NOTAMS) for Airport Operators</i>
	Guidance for using the NOTAM System in airport reporting.
AC 150/5200-30	<i>Airport Field Condition Assessments and Winter Operations Safety</i>
	Guidance for airport owners/operators on the development of an acceptable airport snow and ice control program and on appropriate field condition reporting procedures.
AC 150/5200-33	<i>Hazardous Wildlife Attractants On or Near Airports</i>
	Guidance on locating certain land uses that might attract hazardous wildlife to public-use airports.
AC 150/5210-5	<i>Painting, Marking, and Lighting of Vehicles Used on an Airport.</i>
	Guidance, specifications, and standards for painting, marking, and lighting vehicles operating in the airport air operations areas.
AC 150/5210-20	<i>Ground Vehicle Operations on Airports</i>
	Guidance to airport operators on developing ground vehicle operation training programs.
AC 150/5300-13	<i>Airport Design</i>
	FAA standards and recommendations for airport design, establishes approach visibility minimums as an airport design parameter, and contains the Object Free area and the obstacle free-zone criteria.
AC 150/5310-24	<i>Airport Foreign Object Debris Management</i>
	Guidance for developing and managing an airport foreign object debris (FOD) program
AC 150/5220-4	<i>Water Supply Systems for Aircraft Fire and Rescue Protection.</i>
	Guidance on selecting a water source and meeting standards for a distribution system to support aircraft rescue and fire fighting service operations on airports.
AC 150/5320-15	<i>Management of Airport Industrial Waste</i>
	Basic information on the characteristics, management, and regulations of industrial wastes generated at airports. Guidance for developing a Storm Water Pollution Prevention Plan (SWPPP) that applies best management practices to eliminate, prevent, or reduce pollutants in storm water runoff with particular airport industrial activities.
AC 150/5340-1	<i>Standards for Airport Markings</i>
	FAA standards for markings used on airport runways, taxiways, and aprons.
AC 150/5340-18	<i>Standards for Airport Sign Systems</i>
	FAA standards for the siting and installation of signs on airport runways and taxiways.
AC 150/5345-28	<i>Precision Approach Path Indicator (PAPI) Systems</i>
	FAA standards for PAPI systems, which provide pilots with visual glide slope guidance during approach for landing.

AC	Title and Description
AC 150/5340-30	<i>Design and Installation Details for Airport Visual Aids</i>
	Guidance and recommendations on the installation of airport visual aids.
AC 150/5345-39	Specification for L-853, Runway and Taxiway Retroreflective Markers
AC 150/5345-44	<i>Specification for Runway and Taxiway Signs</i>
	FAA specifications for unlighted and lighted signs for taxiways and runways.
AC 150/5345-53	<i>Airport Lighting Certification Program</i>
	Details on the Airport Lighting Equipment Certification Program (ALECP).
AC 150/5345-50	<i>Specification for Portable Runway and Taxiway Lights</i>
	FAA standards for portable runway and taxiway lights and runway end identifier lights for temporary use to permit continued aircraft operations while all or part of a runway lighting system is inoperative.
AC 150/5345-55	<i>Specification for L-893, Lighted Visual Aid to Indicate Temporary Runway Closure</i>
AC 150/5370-10	<i>Standards for Specifying Construction of Airports</i>
	Standards for construction of airports, including earthwork, drainage, paving, turfing, lighting, and incidental construction.
AC 150/5370-12	<i>Quality Management for Federally Funded Airport Construction Projects</i>
EB 93	<i>Guidance for the Assembly and Installation of Temporary Orange Construction Signs</i>
FAA Order 5200.11	<a href="#">FAA Airports (ARP) Safety Management System (SMS)</a>
	Basics for implementing SMS within ARP. Includes roles and responsibilities of ARP management and staff as well as other FAA lines of business that contribute to the ARP SMS.
FAA Certalert 98-05	<i>Grasses Attractive to Hazardous Wildlife</i>
	Guidance on grass management and seed selection.
FAA Form 7460-1	<a href="#">Notice of Proposed Construction or Alteration</a>
FAA Form 7480-1	<a href="#">Notice of Landing Area Proposal</a>
FAA Form 6000.26	National NAS Strategic Interruption Service Level Agreement, Strategic Events Coordination, Airport Sponsor Form

Obtain the latest version of the following free publications from the Electronic Code of Federal Regulations at <http://ecfr.gpoaccess.gov/>.

Title 14 CFR Part 77	Safe, Efficient Use and Preservation of the Navigable Airspace
Title 14 CFR Part 139	Certification of Airports
Title 49 CFR Part 1542	Airport Security

Obtain the latest version of the Manual on Uniform Traffic Control Devices from the Federal Highway Administration at <http://mutcd.fhwa.dot.gov/>.



## **Appendix E**

### Construction Project Daily Safety Inspection Checklist

This Page Intentionally Left Blank

## Appendix E. 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.

### Potentially Hazardous Conditions

Item	Action Required (Describe)	No Action Required (Check)
Excavation adjacent to runways, taxiways, and aprons improperly backfilled.		<input type="checkbox"/>
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.		<input type="checkbox"/>
Runway resurfacing projects resulting in lips exceeding 3 in (7.6 cm) from pavement edges and ends.		<input type="checkbox"/>
Heavy equipment (stationary or mobile) operating or idle near AOA, in runway approaches and departures areas, or in OFZ.		<input type="checkbox"/>
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.		<input type="checkbox"/>
Tall and especially relatively low visibility units (that is, equipment with slim profiles) — cranes, drills, and similar objects — located in critical areas, such as OFZ and approach zones.		<input type="checkbox"/>
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.		<input type="checkbox"/>

Item	Action Required (Describe)	No Action Required (Check)
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.		<input type="checkbox"/>
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.		<input type="checkbox"/>
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		<input type="checkbox"/>
Wildlife attractants — such as trash (food scraps not collected from construction personnel activity), grass seeds, tall grass, or standing water — on or near airports.		<input type="checkbox"/>
Obliterated or faded temporary markings on active operational areas.		<input type="checkbox"/>
Misleading or malfunctioning obstruction lights. Unlighted or unmarked obstructions in the approach to any open runway pose aviation hazards.		<input type="checkbox"/>
Failure to issue, update, or cancel NOTAMs about airport or runway closures or other construction related airport conditions.		<input type="checkbox"/>
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.		<input type="checkbox"/>
Restrictions on ARFF access from fire stations to the runway / taxiway system or airport buildings.		<input type="checkbox"/>
Lack of radio communications with construction vehicles in airport movement areas.		<input type="checkbox"/>
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.		<input type="checkbox"/>

Item	Action Required (Describe)	No Action Required (Check)
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.		<input type="checkbox"/>
Spillage from vehicles (gasoline, diesel fuel, oil) on active pavement areas, such as runways, taxiways, aprons, and airport roadways.		<input type="checkbox"/>
Failure to maintain drainage system integrity during construction (for example, no temporary drainage provided when working on a drainage system).		<input type="checkbox"/>
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.		<input type="checkbox"/>
Failure to control dust. Consider limiting the amount of area from which the contractor is allowed to strip turf.		<input type="checkbox"/>
Exposed wiring that creates an electrocution or fire ignition hazard. Identify and secure wiring, and place it in conduit or bury it.		<input type="checkbox"/>
Site burning, which can cause possible obscuration.		<input type="checkbox"/>
Construction work taking place outside of designated work areas and out of phase.		<input type="checkbox"/>